1	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.	
	PROGRAMME NAME: CIVIL ENGINEERING	PROGRAMME CODE:CE
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)
	SEMESTER: I	SCHEME: C-15

Sl.No	Course Name	Teaching Department	Course/QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	Semester End Exam		CIE Marks	Total Marks	Min Marks for passing (including CIE marks)
										Max Marks	Min Marks			
1	Communication Skills in English	Sc& Hum	15CE01E	4	-	-	4	4	3	100	35	25	125	45
2	Engineering Mathematics-I	Sc	15SC01M	4	-	-	4	4	3	100	35	25	125	45
3	Materials of construction	CE	15CE11T	4	-	-	4	4	3	100	35	25	125	45
4	Engineering Drawing-I	CE	15CE12D	-	2	4	6	3	4	100	35	25	125	45
5	Basic Computer Skills Lab	CE	15CE13P	-	2	4	6	3	3	50	25	25	75	35
6	Materials of construction Lab	CE	15CE14P		2	4	6	3	3	50	25	25	75	35
			Total	12	6	12	30	21		500	190	150	650	250

1 Hr Theory = 1 Credit 2Hrs Practical/Tutorial = 1 Credit.

QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

2	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.	
	PROGRAMME NAME: CIVILENGINEERING	**PROGRAMME CODE: CE**
	PATTERN: FULL TIME	**DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)**
	SEMESTER: II	**SCHEME: C-15**

Sl.No	Course Name	Teaching Department	Course/QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	Semester End Exam		CIE Marks	Total Marks	Min Marks for passing (including CIE marks)
										Max Marks	Min Marks			
1	Engineering Mathematics - II	Sc	15SC02M	4			4	4	3	100	35	25	125	45
2	Applied science	Sc	15SC03S	4			4	4	3	100	35	25	125	45
3	Surveying-I	CE	15CE21T	4			4	4	3	100	35	25	125	45
4	Engineering Drawing-II	CE	15CE22D	-	2	4	6	3	4	100	35	25	125	45
5	Applied Science Lab	Sc	15SC04P		2	4	6	3	3	50	25	25	75	35
6	Surveying Practice-I	CE	15CE23P		2	4	6	3	3	50	25	25	75	35
			Total	**12**	**6**	**12**	**30**	**21**		**500**	**190**	**150**	**650**	**250**

1 Hr Theory = 1 Credit 2Hrs Practical/Tutorial= 1 Credit.

QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

3	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME	
	PROGRAMME NAME: CIVIL ENGINEERING	**PROGRAMME CODE: CE**
	PATTERN: FULL TIME	**DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)**
	SEMESTER: III	**SCHEME: C-15**

Sl.No	Course Name	Teaching Department	Course/ QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	Semester End Exam		CIE Marks	Total Marks	Min Marks for passing (including CIE marks)
										Max Marks	Min Marks			
1	Engineering Mechanics & Strength of Materials	CE	15CE31T	4			4	4	3	100	35	25	125	45
2	Water supply Engineering	CE	15CE32T	4			4	4	3	100	35	25	125	45
3	Surveying-II	CE	15CE33T	4			4	4	3	100	35	25	125	45
4	Construction Technology	CE	15CE34T	4			4	4	3	100	35	25	125	45
5	Building Planning and Drawing	CE	15CE35D		2	4	6	3	4	100	35	25	125	45
6	Surveying Practice-II	CE	15CE36P		2	4	6	3	3	50	25	25	75	35
7	Basic CAD in Civil Engg	CE	15CE37P		2	4	6	3	3	50	25	25	75	35
				16	6	12	34	25		600	225	175	775	295

1 Hr Theory = 1 Credit2Hrs Practical/Tutorial= 1 Credit.

QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

4	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.	
	PROGRAMME NAME: CIVIL ENGINEERING	PROGRAMME CODE: CE
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)
	SEMESTER: IV	SCHEME: C-15

Sl.No	Course Name	Teaching Department	Course/QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	Semester End Exam		CIE Marks	Total Marks	Min Marks for passing (including CIE marks)
										Max Marks	Min Marks			
1	Hydraulics	CE	15CE41T	4			4	4	3	100	35	25	125	45
2	Sanitary Engineering	CE	15CE42T	4			4	4	3	100	35	25	125	45
3	Concrete Technology	CE	15CE43T	4			4	4	3	100	35	25	125	45
4	Professional Ethics & Indian Constitution	CE	15CE44T	4			4	4	3	100	35	25	125	45
5	Soil &Material Testing lab	CE	15CE45P		2	4	6	3	3	50	25	25	75	35
6	Comp. Aided Bldg Planning & Drawing	CE	15CE46P		2	4	6	3	3	50	25	25	75	35
7	Hydraulics & Environmental Lab	CE	15CE47P		2	4	6	3	3	50	25	25	75	35
				16	6	12	34	25		550	215	175	725	285

1 Hr Theory = 1 Credit 2Hrs Practical/Tutorial= 1 Credit.

5	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.	
	PROGRAMME NAME: CIVIL ENGINEERING	**PROGRAMME CODE: CE**
	PATTERN: FULL TIME	**PATTERN: FULL TIME**
	SEMESTER: V	**SCHEME: C-15**

Sl.No	Course Name	Teaching Department	Course/ QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
										Max Marks	Min Marks			
1	Design of RCC	CE	15CE51T	4	-	-	4	4	3	100	35	25	125	45
2	Water Resources Engineering	CE	15CE52T	4	-	-	4	4	3	100	35	25	125	45
3	Estimating & Costing	CE	15CE53T	4	-		4	4	3	100	35	25	125	45
4	Transportation Engineering	CE	15CE54T	4	-		4	4	3	100	35	25	125	45
5	Irrigation and Bridge Drawing	CE	15CE55D	-	2	4	6	3	4	100	35	25	125	45
6	Construction Practice	CE	15CE56P	-	2	4	6	3	3	50	25	25	75	35
7	Professional Practice	CE	15CE57P	-	2	4	6	3	3	50	25	25	75	35
8	PROJECT WORK-I	CE	15CE58P	-	1	2	3	-				25	25	-
				16	7	14	37	25		600	225	200	825	295

1 Hr Theory = 1 Credit2Hrs Practical/Tutorial = 1 Credit.

QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

6	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.	
	PROGRAMME NAME:CIVIL ENGINEERING	PROGRAMME CODE: CE
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)
	SEMESTER: VI	SCHEME: C-15

Sl.No	Course Name	Teaching Department	Course/ QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
										Max Marks	Min Marks			
1	Design of Steel & Masonary Structures	CE	15CE61T	4	-	-	4	4	3	100	35	25	125	45
2	Project Management and Valuation	CE	15CE62T	4	-	-	4	4	3	100	35	25	125	45
3	*Elective	CE	*	4	-	-	4	4	3	100	35	25	125	45
4	Computer Application Lab	CE	15CE64P	-	2	4	6	3	3	50	25	25	75	35
5	Extensive Survey Camp/Project	CE	15CE65P	-	2	4	6	3	3	50	25	25	75	35
6	Project Work-II	CE	15CE66P	-	2	4	6	3	3	50	25	25	75	35
7	**In-plant Training	CE	15CE67P	-	-	4	4	2	-	-	-	25	25	-
				12	6	16	34	23		450	180	175	625	240

1 Hr Theory = 1 Credit 2Hrs Practical/Tutorial = 1 Credit. QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

**Students should undergo In-plant training in any Construction Industry and produce certificate from the industry showing trainings undergone.

*Elective Course / QP Code	Course Name	*Elective Course / QP Code	Course Name
15CE63A	Town Planning	15CE63C	Solid Waste Management
15CE63B	Geo Technical Engineering	15CE63F	Environmental Impact Assessment
15CE63G	Theory of Structures		

GOVERNMENT OF KARNATAKA
Department of Technical Education
Curriculum Development Cell
Diploma in Civil Engineering (General)

VISION
Develop globally competent Civil Engineering professionals in an environment conducive to learn technical knowledge, skills, moral values and ethics, **to serve the society** and make the world a better place to live in.

MISSION	
M1	To provide an academic environment, through competitive curriculum in collaboration with industry, conducive for high quality education focusing on transfer of knowledge and skill development for the benefit of the profession and the society.
M2	To nurture talent in students to enable them to be leaders in their chosen professions while maintaining the highest level of ethics.
M3	To promote the spirit of enquiry, innovation, life skills and to encourage entrepreneurship.
M4	To foster effective interactions and networking with all the stakeholders so as to work towards the growth and sustainability of the society and environment.

Programme Educational Objectives (PEOs)	
Civil Engineering Programme is committed to transform students into good human beings, responsible citizens and competent professionals. On completing the diploma programme, the students should have acquired the following characteristics.	
PEO1	To apply technical knowledge and management principles in analyzing and planning problems in the field of Civil Engineering, while ensuring maximization of economic benefits to society and minimization of damage to ecology and environment.
PEO2	To be life-long learners with spirit of enquiry and zeal to acquire new knowledge and skills so as to remain contemporary and possess required professional skills.
PEO3	To enhance entrepreneurial, communication and other soft skills, which will enable them to work globally as leaders, team members and contribute to nation building for the betterment of the society.
PEO4	To make them strongly committed to the highest levels of professional ethics and focus on ensuring quality, adherence to public policy and law, safety, reliability and environmental sustainability in all their professional activities.

Programme Outcomes (POs)	
Students completing Diploma in Civil Engineering are anticipated to have the ability to:	
PO1	Use the knowledge of mathematics and sciences to be applied in the field of Civil Engineering.
PO2	Identify and critically analyze problems related to Civil Engineering by using appropriate analytical tools and through literature review.
PO3	Investigate the identified problems, plan and perform experiments, case studies and practices and use the results, data from literature, databases and relevant codes to solve identified engineering problems and provide valid conclusions.
PO4	Select and apply appropriate techniques, resources, and modern tools in civil engineering activities and also understand their limitations.
PO5	Demonstrate the responsibilities of a Civil Engineer in issues relating to the global, economic, environmental, and societal context.
PO6	Understand the need for sustainable development in the field civil engineering in the wake of depleting natural resources.
PO7	Understand norms of engineering and be committed to ethical and professional responsibilities of a Civil Engineer.
PO8	Function effectively in diverse technical teams as a leader or as a member.
PO9	Communicate effectively by giving and receiving clear instructions, through effective presentations with the civil engineering community and the society at large and be able to design documents and write effective reports.
PO10	Engage in life-long learning particularly in innovative and specialised technologies.

MAPPING OF PEOS WITH MISSIONS

PEO	M1	M2	M3	M4
To apply technical knowledge and management principles in analyzing and planning problems in the field of Civil Engineering, while ensuring maximization of economic benefits to society and minimization of damage to ecology and environment.	☆	☆	☆	☆
To be life-long learners with spirit of enquiry and zeal to acquire new knowledge and skills so as to remain contemporary and possess required professional skills.	☆	☆	☆	☆
To enhance entrepreneurial, communication and other soft skills, which will enable them to work globally as leaders, team members and contribute to nation building for the betterment of the society.	☆	☆	☆	☆
To make them strongly committed to the highest levels of professional ethics and focus on ensuring quality, adherence to public policy and law, safety, reliability and environmental sustainability in all their professional activities.	☆	☆	☆	☆

MAPPING OF PEOS WITH POS

Programme Educational Objectives	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
1	★	★	★	★	★	★	★	★	★	★
2	★	★	★	★	★				★	★
3					★	★		★	★	
4	★	★	★	★	★	★	★		★	★

Linked

OUT COME BASED CURRICULUM COURSE COMPONENTS OF DIPLOMA PROGRAMME IN CIVIL ENGINEERING

The Diploma Programme in Civil Engineering shall comprise curriculum courses in General Studies, Applied Sciences, Basic Engineering Courses, Departmental Core Courses, Specialised Courses (Electives in emerging areas), and inplant training, in Civil Engineering.

General Studies

All disciplines shall contain courses in general studies and communication. These are related to *supervisory / management skills*. Development of *communication skills* required for technicians and also complementary to the main courses of the respective programmes. In addition, courses offered include areas in infrastructure development and quality, safety and entrepreneurial development. A general course on computer literacy and *computer applications* is included.

Applied Sciences

Courses under Applied Sciences include *Mathematics* and *Sciences*. Topics for these courses are chosen depending on their requirement for study of the Basic, Interdisciplinary and Departmental Core courses, as well as to help the students to pursue higher level of studies in chosen areas.

Basic Engineering Courses

Courses in Basic Engineering & Technology include *Civil Engineering Drawing and CAD Lab,* These are necessary for civil disciplines as this will help in the study of the Interdisciplinary and Departmental Core courses.

Departmental Core Courses

These are core studies relevant to the specific programme and are meant to develop competencies required and students acquire outcomes as desired by the profession. *Extensive Survey Camp* will give the students exposure to community living and conducting various surveys in difficult terrain. *Project work*, is intended to provide opportunity for students to develop understanding of the inter relationship between courses and to apply the knowledge gained in a way that enables them to develop and demonstrate higher order skills. Project work has been given due weightage in terms of time (one year long duration spreading in V semester and VI semester). Industry-Institution-Interaction should be an integral component of curriculum wherever possible.

Interdisciplinary Engineering Courses

Courses such as *Hydraulics and Strength of Materials* which are necessary for various engineering programmes are also included in this programme.

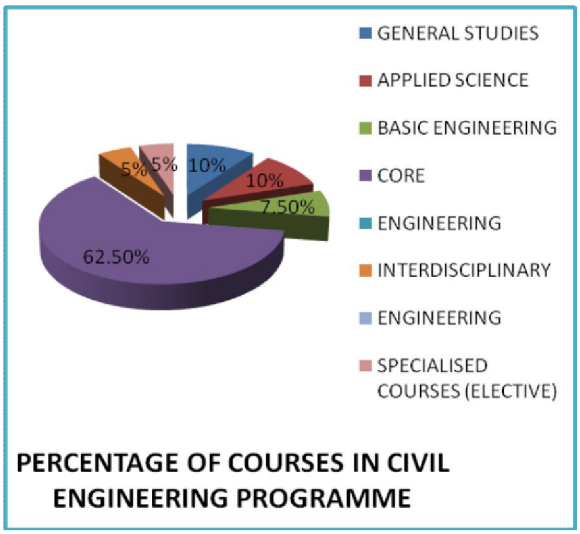
Specialised Courses in Engineering (Electives)

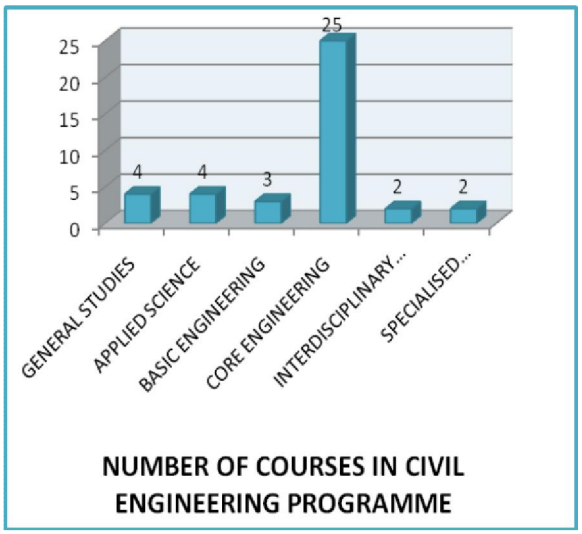
Courses under electives are offered to provide an avenue for specialisation in an area of the students' choice in new and emerging areas. Examples of such courses are *Architecture and Town planning, Advanced Construction Technology, Airport, Harbour and Tunnel Engineering, Geotechnical Engineering*

Inplant training

This course enables students to fit in the industry as they will be exposed to Industrial practices. The industry will issue a certificate indicating the discipline in which the student has undergone training. The training will be for a minimum period of one month preferably in the sixth semester prior to declaration of results.

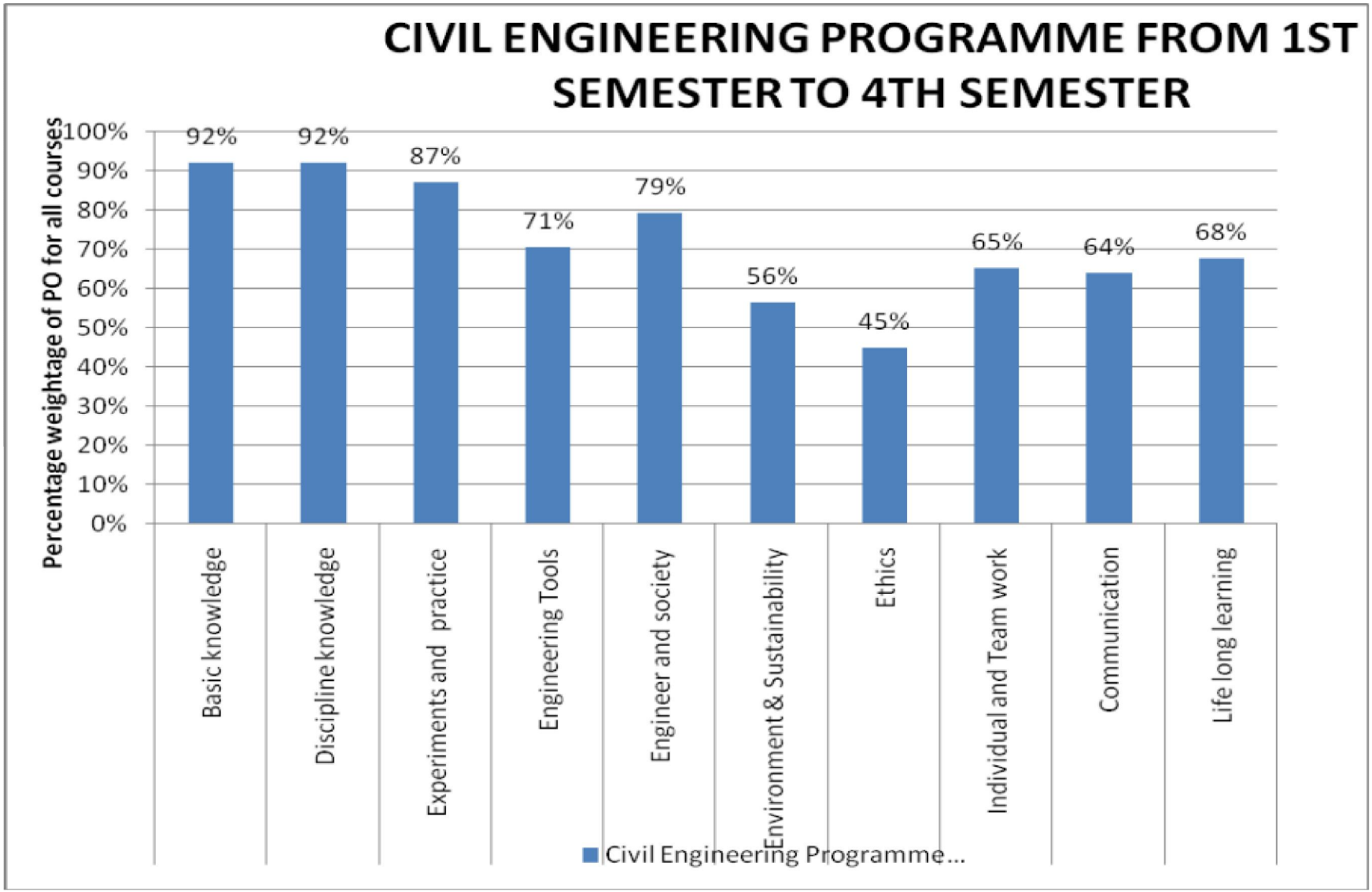
A summary of the new curricular structure for the Diploma Programmes in Engineering & Technology is illustrated below:—





COURSES OF PROGRAMME	1ST SEM.	2ND SEM.	3rd SEM.	4th SEM.	5th SEM.	6th SEM.	TOTAL	
							Nos	(%)
GENERAL STUDIES	2		-	1	1		4	10%
APPLIED SCIENCE	1	3	-				4	10%
BASIC ENGINEERING	1	1	1				3	7.5%
CORE ENGINEERING	2	2	5	5	5	6	25	62.5%
INTERDISCIPLINARY ENGINEERING			1	1			2	5%
SPECIALISED COURSES (ELECTIVE)					1	1	2	5%
T O T A L	6	6	7	7	7	7	40	100%

COURSE			Programme Outcome									
			PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10
			Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
1	Communication skills in english	1st sem	0	0	0	0	2	2	3	1	3	1
2	Engineering mathematics – I		3	3	3	0	0	0	0	0	0	3
3	Materials of construction		3	3	3	3	3	-	3	-	-	-
4	Engineering drawing-I		3	3	3	3	3	-	-	3	3	3
5	Basic computer skills lab		3	3	3	3	0	0	0	3	3	3
6	Materials of construction lab		3	3	3	-	3	3	-	3	3	3
7	Engineering mathematics – II	2nd sem	3	3	3	0	0	0	0	0	0	3
8	Applied science		3	3	3	1	0	2	0	0	2	0
9	Surveying-I		3	3	3	3	3	1	3	2	1	2
10	Engineering drawing-II		3	3	3	3	3	2	2	3	3	3
11	Applied science lab		3	3	3	1	0	0	0	0	3	0
12	Surveying practice -I		3	3	3	3	3	1	1	3	1	2
13	Strength of materials	3rd sem	3	3	2	1	3	3	1	1	3	1
14	Water supply engineering		3	3	2	2	3	3	1	2	1	3
15	Surveying-II		3	3	3	3	3	1	1	3	1	1
16	Construction technology		3	3	1	2	3	3	3	2	-	3
17	Building plannjng & drawing		3	3	3	3	3	3	3	3	3	1
18	Surveying practice-II		3	3	3	3	3	1	1	3	3	3
19	Basic computer aided drafting		3	3	3	3	3	-	1	3	3	3
20	Hydraulics	4th sem	3	3	3	3	3	3	1	1	1	1
21	Waste water engineering		3	3	3	3	3	3	2	2	1	3
22	Concrete technology		3	3	3	3	3	2	2	1	1	1
23	Professional ethics		0	0	0	0	3	3	3	3	2	3
24	Soil & material testing lab		3	3	3	3	3	3	3	3	3	3
25	Computer aided building planning and drawing		3	3	3	3	3	2	-	3	3	1
26	Hydrulics and environmental lab		3	3	3	3	3	3	1	3	3	3
			92 %	92 %	87%	71%	79%	56%	45%	65%	64 %	68%


CIVIL ENGINEERING PROGRAMME FROM 1ST SEMESTER TO 4TH SEMESTER
Percentage weightage of PO for all courses
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
92%
92%
87%
71%
79%
56%
45%
65%
64%
68%
Basic knowledge
Discipline knowledge
Experiments and practice
Engineering Tools
Engineer and society
Environment & Sustainability
Ethics
Individual and Team work
Communication
Life long learning
Civil Engineering Programme...

Government of Karnataka

Department of Technical Education, Bengaluru

DIPLOMA IN CIVIL ENGINEERING

Curriculum Drafting Committee 2015-16

Sl. No.	Name	Designation	Institution
1	**V.B.Kanchi**	Principal	G.P.T Bagalkote
2	**K.G.Nagabhushan**	Principal	Govt. Polytechnic, Channapatana
3	**Prakasha.C.J**	Selection Grade Lecturer. Civil	Govt C.P.C.Polytechnic Mysuru
4	**Girish.L.V**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Harihara
5	**Jayaram.N.S**	Selection Grade Lecturer. Civil	S.J.Govt. Polytechnic, Bengaluru
6	**Chandra Mohan.P**	Selection Grade Lecturer.Civil	Govt Women's Polytechnic Bengaluru
7	**Dr.Suresh Kumar.K.S**	Selection Grade Lecturer. Civil	S.J.Govt. Polytechnic, Bengaluru
8	**G Akram Pasha**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Channasandra
9	**Lakshmana.M**	Senior Grade Lecturer. Civil	Govt. Polytechnic, Channapatana
10	**Mahabaleshwar.K.S**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Ballari
11	**Kumara.D**	Selection Grade Lecturer. Civil	Smt. L.V (Govt.) Polytechnic, Hassan
12	**I.C.Haigar.**	Selection Grade Lecturer. Civil	Anjuman-E-Islam Polytechnic Gadag
13	**Chandrashekar.H**	Selection Grade Lecturer. Civil	M.E.I. Polytechnic, Bengaluru
14	**Shivananju.N**	Lecturer, Civil	J.S.S. Polytechnic, Najungud
15	**Vinayak Naik**	Lecturer, Civil	Govt Polytechnic, Siddapura
16	**Prathiba.N.C**	Lecturer,Civil	S.J.Govt. Polytechnic, Bengaluru
17	**Pallavi.C.J**	Lecturer,Civil	Govt. Polytechnic, Bagepalli
18	**Hemalatha.D.S**	Lecturer,WT&HSl	J.S.S. Polytechnic Najungud

Resource Persons

1	**Dr. R.V.Ranganath**	Principal	B.M.S.I.T,Bangalore
2	**Prof. Arvind Kulkarni**	Principal (Rtd)	K.H.K.Polytechnic, Dharwad

3	**H.M.Ramesh**	Director	Reliance Developers (India) Pvt Ltd
4	**A. Ramesh**	Senior Environmental Engineer	Karnataka Pollution Control Board, Bangalore
5	**Radha Krishna Shetty**	Director	Specs Consultants, Bangalore
6	**Naveen Kumar**	Alumni and Assistant Engineer	Water Resources Department Govt of Karnataka

Government of Karnataka

Department of Technical Education, Bengaluru

DIPLOMA IN CIVIL ENGINEERING

Curriculum Revision Review Committee 2015-16 for 1st and 2nd semester

Sl. No.	Name	Designation	Institution
1.	**Girish.L.V**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Harihara
2.	**Chandra Mohan.P**	Selection Grade Lecturer.Civil	Govt Women's Polytechnic Bengaluru
3.	**Dr.Suresh Kumar.K.S**	Selection Grade Lecturer. Civil	S.J.Govt. Polytechnic, Bengaluru
4.	**Ramesh layadagundi**	Selection Grade Lecturer. Civil	Anjuman-E-Islam Polytechnic Gadag
5.	**Chandrashekar.H**	Selection Grade Lecturer. Civil	M.E.I. Polytechnic, Bengaluru
6.	**Rohithkumar**	Selection Grade Lecturer.	NRAM Polytechnic, NITTE
7.	**Vinayak Naik**	Lecturer, Civil	Govt Polytechnic, Siddapura
8.	**Hemalatha.D.S**	Lecturer,WT&HSl	J.S.S. Polytechnic Najungud
Resources Person			
1.	**K P Murthy**	Strategy consultant	K P Murthy &Associates

Government of Karnataka

Department of Technical Education, Bengaluru

DIPLOMA IN CIVIL ENGINEERING

Curriculum Revision Review Committee 2015-16 for 3rd and 4th semester

Sl. No.	Name	Designation	Institution
1	**Kanchi v. B.**	Principal Civil,	Govt. Polytechnic, Bagalakot.
2	**Suresh kumar k. S.**	Sl. Gr. Lecturer, Civil	S. J. (Govt.) Polytechnic, Bengaluru.
3	**Vinayak naik**	Lecturer, Civil	Govt. Polytechnic, Siddapura.
4	**B. V. Nitali**	Sl. Gr. Lecturer, Civil	B.V.V.S. Polytechnic, Bagalkot.
5	**Lohith s. J.**	Lecturer, Civil	Govt. D.R.R. Polytechnic, Davanagere.
6	**Anilkumar b. S.**	Lecturer, Civil	Govt.Women's Polytechnic, Shiralakoppa
7	**Mohankumar d.**	Sl. Gr. Lecturer, Environmental	Govt. Polytechnic, Mudhol.
8	**Prathibha n. C.**	Lecturer, Environmental	S. J. (Govt.) Polytechnic, Bengaluru.
9	**Hemalatha d. S.**	Lecturer, Water Technology and Health Sciences	J. S. S. Polytechnic, Nanjanagud.
10	**Shankara rao**	Sl. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
11	**Thriveni b.**	Sr. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
12	**R. S. Layadagundi**	Sl. Gr. Lecturer, Civil Engineering	Anjuman E. Islam Polytechnic, Gadag.
13	**Girish. Y. Hallikeri**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
Resources Person			
1.	**Madhusudhan**	General manager	NCC urban infrastructure ltd
2.	**Dr V Ramachandra**	Vice President (Technical Services)	Ultratech Cement Ltd, Bangalore
3.	**Dr A Ramesh**	Senior Scientist	Karnataka State Pollution Control Board

Government of Karnataka

Department of Technical Education, Bengaluru

DIPLOMA IN CIVIL ENGINEERING

Curriculum Drafting Committee 2015-16 for 3rd and 4th semester

Sl. No.	Name	Designation	Institution
1	**Girish.L.V**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Harihara
2	**Suresh kumar k. S.**	Sl. Gr. Lecturer, Civil	S. J. (Govt.) Polytechnic, Bengaluru.
3	**Vinayak naik**	Lecturer, Civil	Govt. Polytechnic, Siddapura.
4	**Mohankumar D.**	Sl. Gr. Lecturer, Environmental	Govt. Polytechnic, Mudhol.
5	**Hemalatha D. S.**	Lecturer, Water Technology and Health Sciences	J. S. S. Polytechnic, Nanjanagud.
6	**Shankara rao**	Sl. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
7	**Thriveni B.**	Sr. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
8	**Girish. Y. Hallikeri**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
9	**Kavyashree K**	Lecturer, Civil	Govt. Polytechnic, Mulbagal.
10	**Benakanakond R N**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
11	**Ataulla A Yellapur**	Sl. Gr. Lecturer, (PHE)	Govt.Women's Polytechnic, Hubli.

Government of Karnataka

Department of Technical Education, Bengaluru

DIPLOMA IN CIVIL ENGINEERING

Curriculum Drafting Committee 2016-17 for 5th and 6th semester

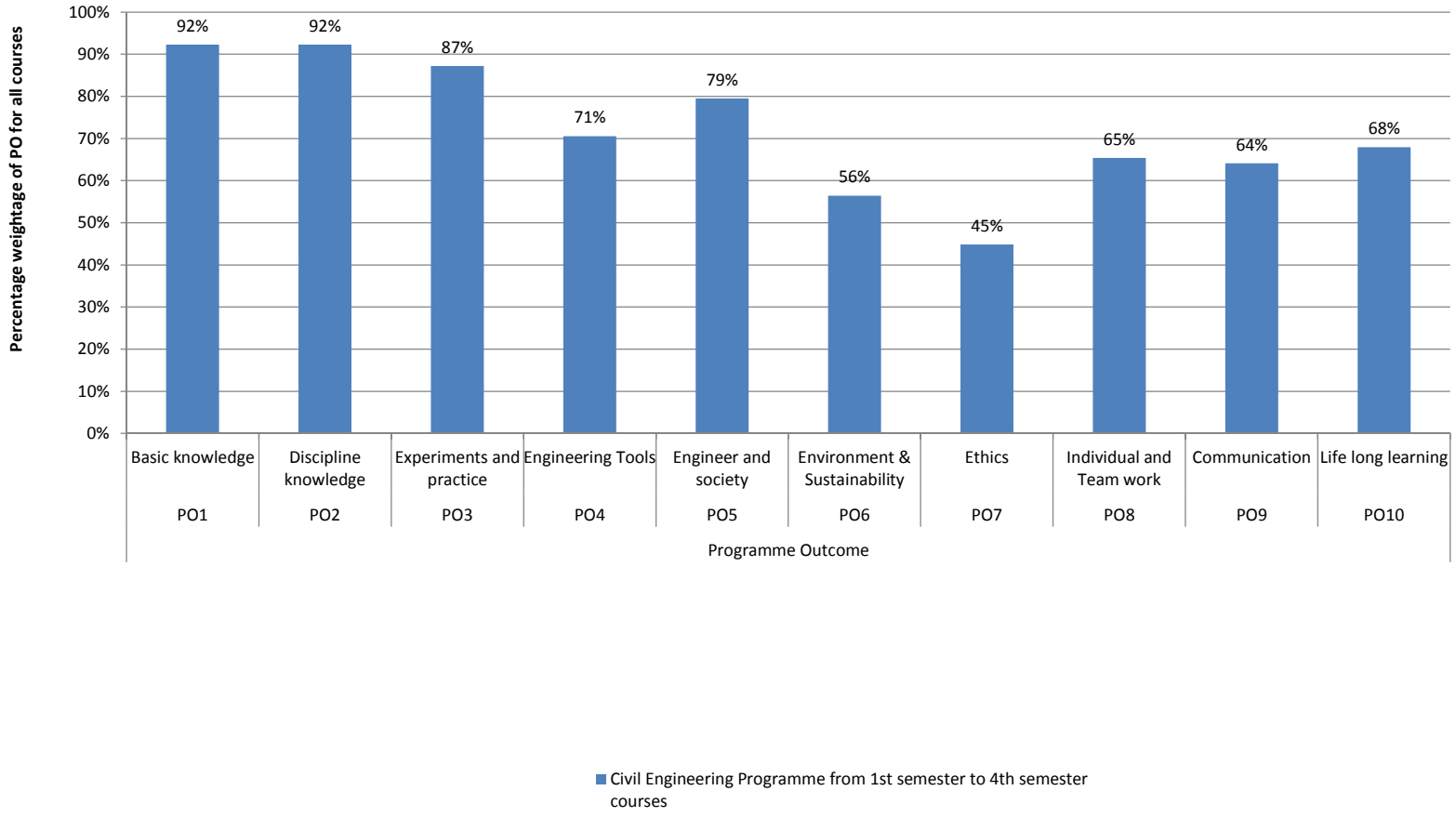
Sl. No.	Name	Designation	Institution
1	**Girish.L.V**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Harihara
2	**Dr.Suresh kumar k. S.**	Sl. Gr. Lecturer, Civil	S. J. (Govt.) Polytechnic, Bengaluru.
3	**Vinayak naik**	Lecturer, Civil	Govt. Polytechnic, Siddapura.
4	**Mohankumar D.**	Sl. Gr. Lecturer, Environmental	Govt. Polytechnic, Mudhol.
5	**Hemalatha D. S.**	Lecturer, Water Technology and Health Sciences	J. S. S. Polytechnic, Nanjanagud.
6	**Shankara rao**	Sl. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
7	**Thriveni B.**	Sr. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
8	**Girish. Y. Hallikeri**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
9	**Kavyashree K**	Lecturer, Civil	Govt. Polytechnic, Mulbagal.
10	**Benakanakond R N**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
11	**Ataulla A Yellapur**	Sl. Gr. Lecturer, (PHE)	Govt.Women's Polytechnic, Hubli.

Curriculum Review Committee 2016-17 for 5th and 6th semester

Sl. No.	Name	Designation	Institution
1	**Girish.L.V**	Selection Grade Lecturer. Civil	Govt. Polytechnic, Harihara
2	**Dr.Suresh kumar k. S.**	Sl. Gr. Lecturer, Civil	S. J. (Govt.) Polytechnic, Bengaluru.
3	**Vinayak naik**	Lecturer, Civil	Govt. Polytechnic, Siddapura.
5	**Hemalatha D. S.**	Lecturer, Water Technology and Health Sciences	J. S. S. Polytechnic, Nanjanagud.
6	**Shankara rao**	Sl. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
7	**Thriveni B.**	Sr. Gr. Lecturer, Civil Draughtsmanship	Govt.Women's Polytechnic, Bengaluru.
8	**Girish. Y. Hallikeri**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
10	**Benakanakond R N**	Sl. Gr. Lecturer, (PHE)	Anjuman E. Islam Polytechnic, Gadag.
11	**Ataulla A Yellapur**	Sl. Gr. Lecturer, (PHE)	Govt.Women's Polytechnic, Hubli.

	COURSE		Programme Outcome									
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
			Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
1	COMMUNICATION SKILLS IN ENGLISH	1st semester	0	0	0	0	2	2	3	1	3	1
2	ENGINEERING MATHEMATICS – I		3	3	3	0	0	0	0	0	0	3
3	Materials of construction		3	3	3	3	3	-	3	-	-	-
4	Engineering drawing-i		3	3	3	3	3	-	-	3	3	3
5	Basic Computer Skills Lab		3	3	3	3	0	0	0	3	3	3
6	Materials of construction lab		3	3	3	-	3	3	-	3	3	3
7	ENGINEERING MATHEMATICS – II	2nd semester	3	3	3	0	0	0	0	0	0	3
8	Applied Science		3	3	3	1	0	2	0	0	2	0
9	Surveying-I		3	3	3	3	3	1	3	2	1	2
10	Engineering drawing-ii		3	3	3	3	3	2	2	3	3	3
11	Applied Science lab		3	3	3	1	0	0	0	0	3	0
12	Surveying practice -i		3	3	3	3	3	1	1	3	1	2
13	Strength of materials	3rd semester	3	3	2	1	3	3	1	1	3	1
14	Water supply engineering		3	3	2	2	3	3	1	2	1	3
15	Surveying-II		3	3	3	3	3	1	1	3	1	1
16	Construction technology		3	3	1	2	3	3	3	2	-	3
17	Building plannjng & drawing		3	3	3	3	3	3	3	3	3	1
18	Surveying practice-ii		3	3	3	3	3	1	1	3	3	3
19	Basic computer aided drafting in civil engineering		3	3	3	3	3	-	1	3	3	3
20	Hydraulics	4th semester	3	3	3	3	3	3	1	1	1	1
21	Waste water engineering		3	3	3	3	3	3	2	2	1	3
22	Concrete technology		3	3	3	3	3	2	2	1	1	1
23	PROFESSIONAL ETHICS & INDIAN CONSTITUTION		0	0	0	0	3	3	3	3	2	3
24	Soil & material testing lab		3	3	3	3	3	3	3	3	3	3
25	Computer aided building planning and drawing		3	3	3	3	3	2	-	3	3	1
26	Hydrulics and environmental lab		3	3	3	3	3	3	1	3	3	3
			2.769	2.7692	2.6154	2.115	2.3846	1.6923	1.346	1.9615	1.923	2.0385
			0.923	0.9231	0.8718	0.705	0.7949	0.5641	0.449	0.6538	0.641	0.6795

CIVIL ENGINEERING PROGRAMME FROM 1ST SEMESTER TO 4TH SEMESTER



REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

GOVERNMENT OF KARNATAKA
DEPARTMENT OF TECHNICAL EDUCATION
Board of Technical Examinations, Bengaluru

Course Title	: **COMMUNICATION SKILLS IN ENGLISH**	Course Code	: **15CP01E**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0** (in hours)	Credits	: **4 Credits**
Type of course	: **Theory**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**

Pre-requisites:

- Basic Knowledge of Grammar
- Listening, Speaking, Reading and Writing Skills as acquired in Secondary Education

Course Objectives:

The students shall be able to:

- Learn to apply the basic grammar in day to day communication in English
- Comprehend the given ideas in a passage and be able to effectively express the same in written form
- Enrich their vocabulary through reading
- Face oral examinations and interviews
- Express their ideas creatively through (spoken/written) exercises

Course Delivery:

The Course will be delivered through lectures, class room interactions, exercises and case studies as detailed below:

Sl. No.	Description	Teaching contact hours
1.	Text	24
2.	Grammar	18
3.	Descriptive writing	5
4.	Comprehension	5
Total		**52**

Text book: Communication Skills in English for Polytechnics – by **ORIENT BLACKSWAN** publishers – published by NITTTR Chennai

Course Content:

UNIT I: CAREER PLANNING (09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Spelling; Grammar- Parts of Speech; Newspaper Reading and Comprehension; Descriptive Writing – Describing Objects; Listening/ Speaking Exercise – Self Introduction.

UNIT-II: THE GREAT INDIAN PSYCHOTHERAPY (09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Prefixes and Suffixes; Grammar – Articles and Prepositions; Descriptive Writing – Describing People; Listening/ Speaking Exercises – Listening to speeches and writing gist of it in one's own words.

UNIT III: GLOBAL WARMING (08Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Synonyms and Antonyms; Grammar – Auxiliaries, Question Tags and Short-form Answers; Descriptive Writing – Describing Places; Listening/ Speaking Exercises – Narrating one's own experiences of different situations in their day- to-day life.

UNIT IV: RENDEZVOUS WITH A WOMAN CORPORATE GIANT (09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Homonyms, Homophones, Homographs; Grammar – Subject-Verb Agreement; Descriptive Writing – Describing Processes; Listening/ Speaking Exercises – A short presentation on a given topic ;Paraphrasing of Proverbs; Different kinds of Interviews.

UNIT V: A UNIQUE PATIENT (09 Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Compound words; Grammar –Tenses; Descriptive Writing – Describing Events (Eg: College Day, National Festivals, Etc.); Comprehension of a paragraph; Quiz – Questions on health and hygiene.

UNIT VI: A FARMER'S WIFE (08 Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Formation of plurals; Grammar – Active and Passive Voices; Descriptive Writing – Describing one's goal and its attainment; Developing hints into a paragraph; Comprehension of an unseen passage.

Reference Books:

1. **HIGH SCHOOL ENGLISH GRAMMAR AND COMPOSITION** BY WREN AND MARTIN (S.CHAND & CO.)
2. **THE KING'S GRAMMAR** BY SANJAY KUMAR SINHA (S.CHAND & CO.)
3. **STRENGTHEN YOUR WRITING** BY V.R. NARAYANA SWAMY (ORIENT BLACKSWAN)
4. **ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al (ORIENT BLACKSWAN)
5. **ENGLISH GRAMMAR &COMPOSITION AND EFFECTIVE BUSINESS COMMUNICATION** BY M.A.PINK AND THOMAS S.E. (S.CHAND & CO.)
6. **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS** BY CHETAN BHAGAT (RUPA PUBLICATION, NEW DELHI)
7. **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL** BY JACK CANFIELD et.al (WESTLAND LIMITED PUBLISHERS)
8. **SOFT SKILLS** BY K. ALEX**(**S.CHAND AND COMPANY)
9. **"REFLECTIONS":** I PUC ENGLISH COURSE BOOK, PUBLISHED BY DEPT.OF PRE-UNIVERSITY EDUCATION, GOVT OF KARNATAKA
10. **A PRACTICAL COURSE FOR WRITING SKILLS IN ENGLISH**BY J.K.GANGAL. (PHI PUBLICATIONS)
11. **ENGLISH LANGUAGE LABORATORIES** – A COMPREHENSIVE MANUAL BY NIRA KONAR (PHI LEARNING)

Course outcomes:

On successful completion of the course, the student will be able to:

1. Read their text, and respond to basic comprehension questions
2. Enhance the students' English grammar skills by using the following grammatical components in written and verbal communication
    - Parts of speech
    - Auxiliaries
    - Articles
    - Tenses
    - Active and Passive voice
    - Prepositions
    - Question Tags and Short form answers
    - Prefixes and Suffixes
    - Subject-Verb Agreement
    - Homonyms/Homophones/ Synonyms /Antonyms
3. Communicate an idea in series logically connected sentences by describing an event such as objects, people, places, processes, expanding proverbs and also conducting activity such as group discussion, presentation, reporting and documentation
4. Comprehend the given passage and able to answer the linked questions

Mapping Course Outcomes with Program Outcomes:

CO –PO Mapping

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Read their text, and respond to basic comprehension questions	5, 6, 7,9	R/U	24	30	25	-	55
CO2	Enhance the student English grammar skills by using the following grammatical components in written and verbal communication • Parts of speech • Auxiliaries • Articles • Tenses • Active and Passive voice • Prepositions • Question Tags and Short form answers • Prefixes and Suffixes • Subject-Verb Agreement • Homonyms/Homophones/ Synonyms /Antonyms	9	U/A	18	-	16	25	41
CO3	Communicate an idea in series logically connected sentences by describing an event such as objects, people, places, processes, expanding proverbs and also conducting activities such as group discussion, presentation, reporting and documentation	7,8,9,10	U/A	7	-	-	15	15
CO4	Comprehend the given passage and able to answer the linked questions	8,9,10	U/A	3	-	10	-	10
		Total Hours of instruction		52	Total marks			121

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
COMMUNICATION SKILLS IN ENGLISH	-	-	-	-	**3**	**3**	**3**	**1**	**3**	**1**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Question Paper Blue Print:

Course: COMMUNICATION SKILLS IN ENGLISH
Course code: 15CP 01E

Sl. No.	Content	Knowledge	Comprehension	Application	Total
1.	**TEXT**				**55**
a	Lesson	30	25		
2.	**GRAMMAR**				**41**
a	Parts of speech			4	4
b	Auxiliaries: Primary and Modals			3	3
c	Articles			3	3
d	Identification of tenses			4	4
e	Active and Passive voice			4	4
f	Prepositions	4			4
g	Question tags			3	3
h	Short form answers			2	2
i	Prefixes and Suffixes	2			2
j	Homonyms/Homophones/	4			4
k	Synonyms and Antonyms	4			4
l	Agreement of the Verb with its Subject	4			4
3.	**DESCRIPTION WRITING**				**15**
a	Descriptive writing – Describing objects, people and places, Process and Events			15	
4.	**COMPRHENSION**				**10**
a	Comprehension of an unseen passage		10		
	Total	**48**	**35**	**38**	**121**

Question Paper Pattern:

Sl. No.	Source	Question	Type	Marks
1.	Textual Units	Answer any twelve of the following questions in one or two sentences each	15 questions to be asked from 6 Textual Units	12 x 2 = 24
2.	Textual Units	Write short notes on any three of the following	5 questions to be asked from 6 Textual Units	3 x 5 = 15
3.	Grammar	Identify the parts of speech of the underlined words	4 sentences are to be given and word to be identified is underlined	4 x 1= 4
4.	Grammar	Fill in the blanks using suitable Auxiliaries	3 sentences are to be given.	3 x 1= 3
5.	Grammar	Fill in the blanks using suitable Articles	3 sentences are to be given	3 x 1=3
6.	Grammar	Identification of Tenses	4 sentences are to be given	4 x 1= 4
7.	Grammar	Active and Passive Voice: Change the voice of the verb in the following sentences	4 sentences are to be given for changing the voice of the verb	4 x 1= 4
8.	Grammar	Prepositions: Fill in the blanks with appropriate prepositions	4 sentences are to be given	4 x 1= 4
9.	Grammar	Question Tags: Add question tags	3 sentences are to be given	3 x 1= 3
10.	Grammar	Short form answers: Give short form answers	2 sentences are to be given	2 x 1= 2
11.	Grammar	Prefixes and Suffixes: Add Prefixes/Suffixes to the stem words	2 stem words are to be given	2 x 1= 2
12.	Grammar	Homonyms, Homophones and Homographs: Use the following words in your own sentences.	4 words are to be given	4 x 1= 4
13.	Grammar	Synonyms / Antonyms: Give the	2 words each are to be given	

		Synonyms/Antonyms for the following words		2 x 1= 2
14.	Grammar	Agreement of the Verb with its Subject: Fill in the blanks with verbs that agree with their subjects	4 sentences are to be given	4 x 1= 4
15.	Composition	Descriptive Writing: Describe objects, people, places and processes	3 questions are to be given	2 x 5 = 10
16.	Composition	Comprehension of an unseen passage: Read the following passage and answer the questions that follow	Questions to be set for 10 marks	10
	Total	-	-	100

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of marks fixed for each category. (As per model question paper)
2. The question paper pattern provided should be adhered to.
3. Care must be taken so that there is only one possible answer for all ‘fill in the blanks’ questions.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Three tests (average of three tests will be computed)	20	Blue Books	1 and 2
		Class room Assignments		Any one Activity(*)	05	Log of Activity	3
				TOTAL	**25**		
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 4
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 4 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit. Any decimals shall be rounded off to the next higher digit. **Eg: 15.1** should be rounded of to **16**.

* Class room Assignments: Evaluated for any ONE activity

Suggested list of Tutorial Exercises leading to the Development of Speaking Skills

1. Introducing oneself
2. Discussion about weather
3. Discussion about hobbies
4. Discussing holiday plans
5. Telephonic conversation
6. Talking about favorite sports, movie, TV shows etc.
7. Description about one's goal and its attainment.

8. Any other topic of your/students' choice.

MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY

RUBRICS FOR ACTIVITY(5 Marks)						
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Speaks on the given topic	Does not perform any duties assigned to them	Performs very few duties but unreliable	Performs very few duties	Performs nearly all duties	Performs all duties assigned	Ex: 4
Students' Enunciation	Does not enunciate clearly	Enunciation not up to the mark	Enunciation adequate	Enunciation above average	Enunciation extremely good	3
Presentation Skills	Poor presentation	Scope for improvement	Average presentation skills	Presentation effective	Excellent Presentation	2
Submission of Assignment	Does not collect any information relating to the topic	Collects very limited information	Collects some information	Collects much information	Collects a great deal of information	5
Average / Total marks = (4+3+2+5) /4 = 14/4= 3.5 = 4						**4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (course coordinator) for assessing the given activity.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1.	Remembering	42
2.	Understanding the course	25
3.	Applying the knowledge acquired from course	33

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/ Date and Time	Semester/ Year	Course / Course Code	Max. Marks
Ex: I test/6 th week of sem. 10-11 a.m.	I/II SEM	COMMUNICATION SKILLS IN ENGLISH	20
	Year: 2015-16	Course Code:15CP01E	

Name of Course Coordinator : **Units: 2 CO's: 2**

Question No.	QUESTIONS	MARKS	CL	CO	PO
I	**Answer any <u>five</u> of the following in one or two sentences each:** 1. What do you mean by career? 2. Define 'Career Planning'? 3. What should be the major focus of career planning? 4. What are the questions often asked by the young? 5. What are the three traits as identified by the author? 6. How have the content of our films changed? 7. What has startled global experts?	5x 2 = 10	R/U	1	5,7,9
II	**<u>Grammar:</u>** **1. Identify the parts of speech of the underlined words:** a. **<u>All</u>** spoke in his favour. b. Let us **<u>even</u>** the ground. **2. Fill in the blanks with suitable articles:** a. Charlie is ___ European. b. She is ____untidy girl. **3. Fill in the blanks with appropriate prepositions:** a. Caesar was killed ____Brutus____ a dagger. b. We arrived____ Belagavi_____6 o' clock. **4. Add Suffix and Prefix to the following:** _____ nation_____	**2 x 1 = 2** **2 x 1 =2** **4 x 1 = 4** **2 x 1 = 2**	U /A	2	9

Sources:

UNIT 1: CAREER PLANNING: **SOFT SKILLS** -BY DR. K. ALEX

UNIT 2: THE GREAT INDIAN PSYCHOTHERAPY: **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS** - BY CHETAN BHAGAT

UNIT 3: GLOBAL WARMING: AN ESSAY BY DR. B.M.RAVINDRA, RETD. DY. DIR., DEPT. OF MINES AND GEOLOGY

UNIT 4: RENDEZVOUS WITH A WOMAN CORPORATE GIANT**: ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al.

UNIT 5: A UNIQUE PATIENT: **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL** - BY JACK CANFIELD et.al.

UNIT 6: A FARMER'S WIFE: **REFLECTIONS:** I PUC ENGLISH COURSE BOOK, PUBLISHED - BY DEPT. OF P.U. EDUCATION, GOVT. OF KARNATAKA

Government of Karnataka
Department of Technical Education, Bengaluru

Course: COMMUNICATION SKILLS IN ENGLISH

Course code: 15CP 01E

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1.	Mrs. Geetha K.	Selection Grade Lecturer	GRICP, Bengaluru
2.	Mr. C.V. Inamdar	Selection Grade Lecturer	Govt. Polytechnic, Belagavi
3.	Mrs. Bharathi Naik	Selection Grade Lecturer	Women's Polytechnic, Mangaluru
4.	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
5.	Mrs. Sunitha M.N.	Selection Grade Lecturer	HMS Polytechnic, Tumakuru
6.	Mr. Deepak Dongre	Selection Grade Lecturer	Govt. Residential Women's Polytechnic, Shivamogga

Review committee

	Name	Designation	Institution
1.	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
2.	Mrs. Shailaja D.	Lecturer	Women's Polytechnic, Bengaluru

Model Question Paper:

Code: 15CP 01E

I / II Semester Diploma Examination

COMMUNICATION SKILLS IN ENGLISH

(Common to all Diploma programmes)

Time: 3 Hours] **[Max. Marks: 100**

Note:

(i) Answer all the questions as directed.
(ii) Spelling and grammatical errors shall be penalized.
(iii) Answers to Question No. I and II are based on the prescribed text.

I. Answer any TWELVE of the following in one or two sentences each: **2 x 12 = 24**

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. What are the questions often asked by the young?
5. What are the three traits as identified by the author?
6. How have the content of our films changed?
7. What is Global Warming?
8. How does Global Warming occur?
9. What are the major causes for Global Warming?
10. What was the usual talk when the parents of the children met?
11. What ambition did Nooyi's mother have for her daughter?
12. Who is the sinner according to the poem?
13. Why did the farmer commit suicide?
14. Explain in your own words the reason for the farmer's visit to the clinic.
15. Describe how the doctor fixed the bull's tooth.

II. Write short notes on any THREE of the following: **5 x 3 = 15**

1. How does career planning play a major role in making career choices?
2. How does our environment contribute to our numbness to injustice?
3. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
4. Explain in your own words the reason for the farmer's visit to the clinic.
5. Why does the farmer's wife resolve to live?

III. GRAMMAR:

1. **Identify the parts of speech of the underlined words:** **4 x 1= 4**
   a. **<u>All</u>** spoke in his favour.
   b. Let us **<u>even</u>** the ground.
   c. I can **<u>shift</u>** for myself.
   d. She lives in **<u>luxury.</u>**

2. **Fill in the blanks with suitable auxiliaries:** **3 x 1 =3**
   a. You _____ not use calculators in the exam hall.
   b. _____I come in sir?
   c. _____ you lend me your scooter?

3. **Fill in the blanks with suitable articles:** **3 x 1 = 3**
   a. Charlie is ___ European.
   b. She is ____untidy girl.
   c. What is ____matter?

4. **Identify the tense of the verbs in the following sentences:** **4 x 1 = 4**
   a. I am writing a letter.
   b. Sun rises in the east.
   c. I have done my homework.
   d. She has been learning western music.

5. **Change the voice of the verb in the following sentences:** **4 x 1 = 4**
   a. Who did this?
   b. The money was lost.
   c. The cat is chasing the mouse.
   d. He was made the king.

6. **Fill in the blanks with appropriate prepositions:** **4 x 1= 4**
   a. Caesar was killed ____Brutus____ a dagger.
   b. We arrived____ Belagavi_____6 o' clock.

7. **Add suitable question tag:** **3 x 1=3**
   a. You were late this morning,_____?
   b. I did not hurt you, _____?
   c. Your father is a doctor, _____?

8. **Give short form answers for the following:** **2 x 1=2**
   a. Does your father smoke? (Negative)
   b. Have you read today's newspaper? (Affirmative)

9. **Add Suffix and Prefix to the following:** **2 x 1= 2**
   a. _____ nation_____

10. **Frame sentences using each word to bring out the difference in meaning clearly:**

4 x 1 = 4

a. (i) Sight (ii) Site
b. (i) Present (ii) Present

11. Give Synonyms to the following words: **2 x 1=2**

a. Teach
b. Agree

12. Give Antonyms to the following words: **2 x 1 = 2**

a. War
b. Happy

13. Fill in the blanks with verbs to agree with their subjects: **4 x 1 = 4**

a. Twenty kilometers _____not a long distance.
b. Either you or I_____ mistake.
c. Gold and Silver_____ precious metals
d. The captain with his team _____arrived.

IV. COMPOSITION: (Answer any <u>two</u> in 80 -100 words each) **5 x 2 = 10**

1. Describe your favorite tourist place.
2. Describe the process of preparing tea.
3. Expand – Work is worship.

V. **COMPREHENSION:**

Read the following passage and answer the questions that follow:

She was all of one-and-a-half years old. Two nurses were holding her down while a third was trying to insert a syringe into a vein to get a blood sample. She was crying loudly, but I was crying even louder. We had no option. It was the fifth day and the fever had not broken; it was imperative that we run the test to rule out typhoid. They finally asked me to leave the room, not just because they were embarrassed at a grown-up crying, but because they thought it would be easier and quicker for the child if the mother was not in the room. They got her out within a few minutes. She jumped into my arms and gave a few more loud wails. Fresh tears streamed down my eyes as we made our way out of the wretched pathology lab. Her paediatrician was getting into the building just then. Between sobs I told him how my daughter had flung the syringe and the lab had to have three attendants on her to collect the sample. As I was talking, my voice broke. To my surprise, Dr. Patel handed me his briefcase and stethoscope, took my girl in his arms and went to the store just a few paces away. He bought her a Cadbury bar and my daughter's face lit up like a million bucks. Gone were the tears, the memory of the syringe, smell of antiseptic, cotton …everything receded to the background as she un wrapped the big bar with her tiny fingers and dug into it with all her heart. I smiled as the angelic doctor handed me my princess.

Meanings of difficult words:

1. **Imperative:** absolutely essential
2. **Wretched:** miserable; unpleasant
3. **Pathology lab:** where the causes and effects of diseases are studied
4. **Receded:** moved back gradually
5. **Paediatrician:** children's doctor
6. **Flung:**(past tense of fling) an act of throwing violently
7. **Attendants:** one who attends

Questions:

1.	How old was the child?	1
2.	What did the nurses have to do to get a blood sample?	2
3.	Why was the mother asked to leave the room?	2
4.	Why does the mother called the pathology lab 'wretched'?	2
5.	How did Dr. Patel calm down the little girl?	2
6.	Suggest a suitable title for this passage.	1

****

Model Question Bank:

Course Title :**COMMUNICATION SKILLS IN ENGLISH**	Course Code: **15CP01E**

I. ANSWER IN ONE OR TWO SENTENCES EACH:

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. List out the benefits of career planning?
5. Identify the guidelines for choosing a career?
6. What are the frequently asked questions about career fields?
7. How do connections help in searching for a suitable job?
8. What are the sample questions asked about a particular job title?
9. What is the role of a career counselor in charting out a career path?
10. List out the factors influencing career decisions?
11. What has startled global experts?
12. What are the questions often asked by the young?
13. What are the three traits as identified by the author?
14. How have the content of our films changed?
15. In what way have we been exposed to corruption from our childhood?

16. How can we contribute to India's progress?
17. What is global warming?
18. How does global warming occur?
19. What are the major causes for Global Warming?
20. What is the quantity of fossil fuel burnt each year?
21. How does the concentration of carbon dioxide in the air increase?
22. Define Greenhouse effect?
23. By burning forests around the world, how much carbon dioxide is added to the atmosphere?
24. What are the steps to be taken to save our environment?
25. What is the possible problem of global warming and its result?
26. What is the effect of global warming?
27. What was the usual talk when the parents of the children met?
28. What ambition did Nooyi's mother have for her daughter?
29. How did Nooyi's mother threaten Nooyi?
30. What good news did Indra Nooyi want to share with her mother?
31. What did Nooyi's mother say when she was told the good news?
32. What lesson did Nooyi learn from her mother?
33. Why does Nooyi's mother take full credit for Nooyi's success?
34. What does Indra Nooyi discover about the language of business in the U.S?
35. What does Indra Nooyi think about herself as a mother?
36. What is the secret of Indra Nooyi's success?
37. How does Indra Nooyi manage time?
38. What is Indra Nooyi's passion?
39. Describe the farmer who visited the dentist's clinic.
41. What was the curious act of the farmer?
42. What request did the farmer make?
43. Why did the doctor almost 'faint in shock'?
44. What did the farmer say when he came back to the clinic?
45. Who do 'you' and 'I' in the poem refer to?
46. Who is the sinner according to the poem?
47. Why did the farmer commit suicide?
48. Explain the meaning of the phrase 'you crossed over'.
49. What are the contrasts depicted by the writer between the farmer's wife and her husband?
50. What memories of her husband trouble her now?

II. ANSWER IN A PARAGRAPH OF NOT MORE THAN 100 WORDS EACH:

1. Write a short note on Guidelines for Choosing a Career.
2. How does career planning play a major role in making career choices?
3. Explain in your own words the first trait of our psyche.
4. How does our environment contribute to our numbness to injustice?
5. Describe the divisiveness that the author talks about**.**
6. What are the causes and effects of global warming?
7. How does deforestation affect our environment?

8. What information do you gather about Indra Nooyi after going through the interview with Nandan Nilekani?

9. How did Indra Nooyi's mother try to teach her the role of a woman in a family? Do you agree with her?
10. How do you think Indra Nooyi's mother and her husband contribute to her success?
11. What does Indra Nooyi mean when she says "I have to decide every moment in time whether I am going be a mother or a wife or an executive"?
12. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
13. Explain in your own words the reason for the farmer's visit to the clinic.
14. Describe how the doctor fixed the bull's tooth.
15. Describe the lament of the farmer's wife on her husband's death?

III.GRAMMAR:

1. Fill in the blanks with suitable articles:

a. Dr. Sanjay is ___ dentist.
b. My friend is ___ MLA.
c. Have you ever visited___ Himalayas?
d. Please bring me ___ cup of coffee.
e. He is ___untidy boy.
f. She is __backbone of her organization.
g. He is ___ honour to his profession.
h. Raghu is going to___ mall.
i. ____world is ___happy place.
j. I met___ European at ___ party in ___ friend's house.

2. Fill in the blanks with suitable prepositions:

a. She works __ a big shop __ Jayanagar.
b. There is a book ___ the floor. Put it __ the table.
c. I often see Mrs. Dixit __ the station, waiting __ her train.
d. Mangalore is __ the coast __ the south __ India.
e. My daughter isn't __ work today because she isn't feeling well.
f. There were several people __ the bus stop.
g. Mr. and Mrs. Sharma were __ the shop talking __ the assistant.
h. Yesterday we spent the day __ the country.
i. We had lunch __ a pretty little village.
j. When I was __ the bus stop this morning; I saw two boys __ the church roof.

3. Add appropriate prefixes to form new words:

a. form b. regular c. literate d. accurate e. operate
f. pure g. fix h. technic i. tone j. national

4. Add appropriate suffixes to form new words:

a. rich b. love c. start d. beauty e. differ
f. use g. cheer h. attract i. save j. slow

5. Give the synonyms of the following:

a. release b. arrive c. trap d. happinesse. e. large
f. teach g. change h. confusion i. discover j. charge

6. Give the antonyms for the following:

a. rise b. increase c. smiled. d. strict. e.sadness
f. full g. host h. success i. discover j. charge

7. Add the correct question tags to the following statements:

a. It is cold,_____?
b. But it isn't as cold as yesterday, ____?
c. It was very cold yesterday,_____?
d. It hasn't been so cold for a long time, ____?
e. It is snowing in the north, ____?
f. It often snows there, ____?

8. Give short form answers for the following:

a. Does Renu work hard?_____._____.
b. Can you swim?_____._____.
c. Are you angry with me?_____._____.
d. Do you like watching movies?_____._____.
e. Have you met our Prime Minister?_____._____.

9. Fill in the blanks with appropriate words from the brackets:

a. His father-in-law owns a _____ farm. (dairy/diary)
b. Diabetics must take extra care of their _____. (feat/feet)
c. Rekha is a popular ____ of Bollywood.(heroin/heroine)
d. The country was prosperous during the_____of Krishnadevaraya.(rein/reign/rain)
e. You should be_____ in the class. (quite/quiet)

10. Differentiate between the following pairs of words by using each of them in a sentence of your own:

a. Wrong, rung b. Principal, principle c. Hair, hare
d. Gate, gait. e. Sea, see f. Fair, fare
g. Some, sum. h. Sell, cell i. Weather, whether
j. Birth, berth k. Vacation, vocation l. Bear, bare

11. Fill in the blanks with verbs to agree with their subjects:

a. Every seat in the bus ____ taken.
b. All the seats in this bus ____ reserved.
c. One of my friends _____ visiting me this week end.
d. Neither Gopal nor Deepak ____ come today.
e. The Captain of Indian team as well as his players ____ staying here.
f. Intelligence and hard work _____ required to get good marks.
g. Mathematics ____ my favourite subject.
h. _____ your father and mother at home?

12. Identify the tense of the verbs in the following in the sentences.

a. He was listening to her attentively.
b. Raghu denies stealing my purse.
c. She has bought a flat near my house.
d. Kiran fought bravely.
e. The teachers are discussing the details of the annual day function.
f. I am not trying to copy you.
g. Sushma was cooking pasta.
h. The students have been waiting eagerly for the results.
i. Risheeba speaks Tamil very fluently.
j. I have been waiting for her for over an hour.

13. Change the voice:

a. Ramu was making a kite.
b. Close the door.
c. Cable wires have been cut.
d. We prohibit smoking.
e. Everyone loves him.
e. My watch was lost.
f. He was refused admission.
g. Do not insult the poor.
h. Without effort nothing can be gained.
i. They made him captain.

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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: **ENGINEERING MATHEMATICS – I**		Course Code	: **15SC01M**
Semester	: **I**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **4:0:0**	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programmes: **Common to all Engineering Diploma Programmes**			

Pre-requisites:

Basics in Algebra, Trigonometry and Coordinate Geometry in Secondary Education.

Course Objectives:

1. Apply the concept of matrices and determinants and their applications to solve the linear equation in engineering field.
2. Apply the vector algebra in solving the problems of statics and mechanics.
3. Analyse the civil engineering problems using concepts of probability.
4. Evaluate the advanced engineering mathematical problems using logarithms.
5. Apply and evaluate trigonometric concept in vector engineering field.
6. Create the basic concept of calculus.

Course Content:

Topic and Contents	Hours	Marks
LINEAR ALGEBRA		
UNIT-1: MATRICES AND DETERMINANTS	10	31
(a) Matrices: Basic concepts of matrices: Definition, types of matrices and mathematical operations on matrices (addition, subtraction and multiplication of matrices).	02	
(b) Determinant: Definition, problems on finding the determinant value of 2^{nd} and 3^{rd} order. Problems on finding unknown quantity in a 2^{nd} and 3^{rd} order determinants using expansion. Solving simultaneous linear equations using determinant method (Cramer's rule up to 3^{rd} order).	04	

(c) Inverse and applications of matrices: Minors and Cofactors of elements of matrix. Adjoint and Inverse of matrices of order 2^{nd} and 3^{rd} order. Elementary row and column operations on matrices. Characteristic equation and characteristic roots (eigen values) of 2x2 matrix. Statement of Cayley-Hamilton theorem and its verification for 2x2 matrix. Solution of system of linear equations using Gauss Elimination method (for 3 unknowns only).	04	
ALGEBRA		
UNITS-2: VECTORS	08	27
Definition of vector. Representation of vector as a directed line segment. Magnitude of a vector. Types of vectors. Position vector. Expression of vector by means of position vectors. Addition and subtraction of vectors in terms of line segment. Vector in plane and vector in a space in terms of unit vector i, j and k respectively. Product of vectors. Scalar product and vector product of two vectors. Geometrical meaning of scalar and vector product. Applications of dot (scalar) and cross (vector) products. Projection of a vector on another vector. Area of parallelogram and area of triangle. Work done by force and moment of force.		
UNITS-3: PROBABILITY AND LOGARITHMS	08	14
(a) **Probability:** Introduction. Random experiments: outcomes and sample space. Event: Definition, occurrence of an event, types of events. Algebra of events- complementary event, the events A or B, A and B, A but not B, mutually exclusive events, exhaustive events, defining probability of an event. Addition rule of probability. Conditional probability: definition, properties of conditional probability, simple problems.	06	
(b) **Logarithms:** Definition of common and natural logarithms. Laws of logarithms (no proof). Simple problems on laws of logarithms.	02	

TRIGONOMETRY		
UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES.	16	47
(a) Recapitulation of angle measurement, trigonometric ratios and standard angles. **Allied angles:** Meaning of allied angle. Signs of trigonometric ratios. Trigonometric ratios of allied angles in terms of θ. Problems on allied angles. (b) **Compound angles:** Geometrical proof of sin(A+B) and cos(A+B) and hence deduce tan(A+B). Write the formulae for sin(A-B), cos(A-B) and tan(A-B), problems. Multiple and sub multiple angle formulae for 2A and 3A. Simple problems. Transformation formulae. Expression for sum or difference of sine and cosine of angles into product form. Expression for product of sine and cosine of angles into sum or differences form.	02 06 08	
UNIT-5:COMPLEX NUMBERS	04	09
Meaning of imaginary number i and its value. Definition of complex number in the form of $a + ib$. Argand diagram of complex number$a + ib$ (Cartesian system). Equality of complex numbers. Conjugate of complex number. Algebra of complex numbers, modulus of complex number, principal value of argument of complex number, polar form: $Z = r(cos\theta + i\, sin\theta)$ and exponential form $Z = re^{i\theta}$of complex number, where r is modulus and θ is principal value of argument of complex number.		
UNIT-6: INTRODUCTION TO CALCULUS	06	17
Limits: Constants and variables. Definition of function. Types of functions: Explicit and implicit function, odd and even functions(definition with example). Concept of $x \to a$.Definition of limit of a function. Indeterminate forms. Evaluation of limit of functions by factorization, rationalization. Algebraic limits. Statement of $\lim_{x\to a} \frac{x^n - a^n}{x-a} = na^{n-1}$ where n is any rational number. Proof of $\lim_{\theta\to 0} \frac{\sin\theta}{\theta} = 1$ where θ is in radian. Related problems. Standard limit (statement only) 1. $\lim_{x\to 0} \frac{a^x - 1}{x} = \log_e a$, 2. $\lim_{x\to 0} \frac{e^x - 1}{x} = 1$ 3. $\lim_{n\to\infty} \left(1 + \frac{1}{n}\right)^n = e$, 4. $\lim_{n\to 0} (1+n)^{\frac{1}{n}} = e$ Simple problems on standard limits.		
TOTAL	**52**	**145**

Course outcomes:

On successful completion of the course, the student will be able to:

1. Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation.
2. Find the product of vectors and their geometrical applications in finding moment of force, work done.
3. Determine probability of various types of events.
4. Solve the problems related to logarithms.
5. Solve the problems on trigonometric functions with angle of any magnitude.
6. Evaluate the limiting value of algebraic and trigonometric functions.

Mapping Course Outcomes with Program Outcomes:

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation	**1,2,3**	**R/U/A**	**10**	**9**	**10**	**12**	**31**
CO2	Find the product of vectors and their geometrical applications in finding moment of force, work done	**1,2,3**	**R/U/A**	**8**	**6**	**15**	**6**	**27**
CO3	Determine probability of various types of events	**1,2,**	**R/U/A**	**8**	**3**	**5**	**6**	**14**
CO4	Evaluate the integrations of algebraic, trigonometric and exponential function	**1,2,3,10**	**R/U/A**	**16**	**15**	**20**	**12**	**47**
CO5	Solve the problems related to logarithms.	**1,2**	**R/A**	**4**	**3**	**0**	**6**	**09**
CO6	Evaluate the limiting value of algebraic and trigonometric functions	**1,2,10**	**R/U/A**	**6**	**6**	**5**	**6**	**17**
		Total Hours of instruction		**52**	**Total marks**			**145**

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Engineering Mathematics-I	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference:

1. NCERT Mathematics Text books of class XI and XII.
2. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr.Ramaverma published by S.Chand & Co.Pvt.Ltd.
3. CBSE Class Xi & XII by Khattar&Khattar published PHI Learning Pvt. ltd.,
4. First and Second PUC mathematics Text Books of different authors.
5. www.freebookcentre.net/mathematics/introductory-mathematics -books.html

Course Assessment and Evaluation:

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests will be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	5	Log of record	1 to 6
				Total	25		
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT	Student feedback		Students	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	25
2	Understanding	40
3	Applying the knowledge acquired from the course	30
	Analysis and Evaluation	5

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	ENGINEERING MATHEMATICS –I	20
	Year:	Course code: **15SC01M**	
Name of Course coordinator :			Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Model Question Paper:

Code: 15SC01M

I Semester Diploma Examination

ENGINEERING MATHEMATICS –I

(Common to All Engineering Diploma Programmes)

Time: 3 Hours.][Max marks: 100

Note:

(i) Answer any **Ten** questions from **section-A,** any **Eight** questions from **section-B** and any **Five** questions from **section-C.**

(ii) Each question carries **3** marks in **section-A**.

(iii) Each question carries **5** marks in **section-B**.

(iv) Each question carries **6** marks in **section-C**.

SECTION – A

1. Find the product of $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}$
2. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 1 \\ 0 & -3 \end{bmatrix}$ find adj(AB).
3. If $A + B = \begin{bmatrix} 3 & -7 \\ 0 & 2 \end{bmatrix}$,$A - B = \begin{bmatrix} 1 & 5 \\ 4 & -6 \end{bmatrix}$ find A.
4. If $\vec{a} = i + 2j - 3k$, $\vec{b} = 3i - 5j + 2k$. Find the magnitude of $2\vec{a} + 3\vec{b}$.
5. If $\vec{A}$=(3,-4), $\vec{B}$= (-5,6) find position vector of A and B and also find $|\overrightarrow{AB}|$
6. Three coins are tossed simultaneously. List the sample space for event.
7. If $\sin\theta = -{}^{8}/_{17}$ and $\pi < \theta < \frac{3\pi}{2}$ find the value of$4tan\theta + 3sec\theta$.
8. Find the value of $\sin 75^{o}$ using standard angles.
9. Show that $\frac{cosec(180-A)\cos(-A)}{\sec(180+A)\cos(90+A)} = cot^2 A$
10. Prove that$\sin(A + B)\sin(A - B) = \sin^2 A - \sin^2 B$.
11. Prove that$\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$.
12. Express the product $(1 + i)(1 + 2i)$ in $a + ib$ form and hence find its modulus.
13. Evaluate : $\lim_{x\to 3}\left[\frac{x-1}{2x^2-7x+5}\right]$
14. Evaluate: $\lim_{x\to\infty}\left[\frac{3x^2+4x+7}{4x^2+7x-1}\right]$

SECTION – B

1. Find the value of x if $\begin{vmatrix} 1 & x & 0 \\ 2 & -1 & 3 \\ -2 & 1 & 4 \end{vmatrix} = 0$.

2. Find the characteristic equation and its roots of a square matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$
3. Find the $sine$ of the angle between the vectors$2i - j + 3k \; and \; i - 2j + 2k$.
4. If vector $\vec{a} = i + j + 2k, \vec{b} = 2i - j + k$ show that $\vec{a} + \vec{b}$perpendicular$\vec{a} - \vec{b}$.
5. Find the projection of $\vec{a} = 2i + j - k$on $\vec{b} = 2i - 3i + 4k$.
6. Prove that $\frac{1}{\log_a abc} + \frac{1}{\log_b abc} + \frac{1}{\log_c abc} = 1$
7. Find the numerical value of$\sin\left(\frac{\pi}{3}\right).\cos\left(-\frac{\pi}{3}\right) - \cos\left(\frac{\pi}{4}\right).\sin\left(-\frac{3\pi}{4}\right)$
8. Prove that $\sin(A + B) = \sin A \cos B + \cos A \sin B$ geometrically
9. If$A + B + C = \frac{\pi}{2}$, prove that $\tan A \tan B + \tan B \tan C + \tan C \tan A = 1$.
10. Show that$\frac{\sin 56^o - \sin 44^o}{\cos 56^o + \cos 44^o} = \cot 82^o$
11. Evaluate:$\lim_{x \to 0}\left[\frac{\sqrt{1+x+x^2}-1}{x}\right]$

SECTION – C

1. Solve for x, y & z using determinant method

$x + y = 0, y + z = 1 \& z + x = 3.$

2. Solve the equation$x + y + z = 6, 2x - 3y + z = 1 \& x + 3y - 2z = 7$ using Gauss elimination method.
3. A force $\vec{F} = 2i + j + k$ is acting at the point (-3,2,1). Find the magnitude of the moment of force $\vec{F}$ about the point (2,1,2).
4. A die is thrown twice and the sum of the numbers appearing is absorbed tobe. What is the conditional probability that the number 5 has appeared at least once?
5. Prove that $\frac{\cos\left(\frac{5\pi}{2} - \theta\right)}{\sin(4\pi + \theta)} + \frac{\tan(-\theta)}{\cot(\pi - \theta)} = sec^2\theta$
6. Prove that $\cos 80^o \cos 60^o \cos 40^o \cos 20^o = \frac{1}{16}$
7. Find the modulus and argument of the complex number $z = -\sqrt{3} + i$ and hence represent in argand diagram.
8. Prove that $\lim_{\theta \to 0}\left(\frac{\sin\theta}{\theta}\right) = 1$ where θ is in radian.

Question Paper Blue Print:

Course: ENGINEERING MATHEMATICS – I **Course Code: 15SC01M**

UNIT NO		HOURS	Each questions to be set for 3 Marks Section - A	Each questions to be set for 5 Marks Section - B	Each questions to be set for 6 Marks Section- C	Weightage of Marks
1	a	2	2	-	-	31
	b	4	-	1	1	
	c	4	1	1	1	
2		8	2	3	1	27
3	a	6	1	-	1	14
	b	2	-	1	-	
4	a	8	1	1	1	47
	b	8	4	3	1	
5		4	1	-	1	9
6		6	2	1	1	17
TOTAL		**52**	**14**	**11**	**08**	**145**
Questions to be answered			**10**	**08**	**05**	**100**

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weigh age of model fixed for each unit.
2. The question paper pattern provided should be adhered to
   Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks
   Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.
   Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.
4. Questions should not be set from the recapitulation topics.

Model Question Bank:

Course Title: **ENGINEERING MATHEMATICS – I**	Course Code: **15SC01M**

UNIT-1: MATRICES AND DETERMINANTS

3 MARK QUESTIONS

1. If $A = \begin{bmatrix} 3 & -9 \\ -4 & 7 \end{bmatrix}$, find $A + A'$.
2. If $A = [2 \quad -1 \quad 3]$ and $B = \begin{bmatrix} 5 & -2 \\ 3 & 1 \\ 2 & 4 \end{bmatrix}$, find AB matrix.
3. If matrix $A = \begin{bmatrix} 2 & -1 & 3 \\ 5 & 1 & 0 \\ 1 & 0 & x \end{bmatrix}$ is a singular matrix, then find the value of x.
4. Find the adjoint of the matrix $A = \begin{bmatrix} 4 & -5 \\ 3 & -2 \end{bmatrix}$.
5. If $A = \begin{bmatrix} 3 & -1 \\ 0 & -2 \end{bmatrix}$ find the characteristic equation.

5 MARK QUESTIONS

1. Solve the equations $x + y = 3, 2x + 3y = 8$ by Cramer's rule.
2. Solve for x, if $\begin{vmatrix} 1 & 5 & 7 \\ 2 & x & 14 \\ 3 & 1 & 2 \end{vmatrix} = 0$
3. Verify Cayley-Hamilton theorem if $A = \begin{bmatrix} 1 & 3 \\ 2 & -4 \end{bmatrix}$.
4. Verify $A(AdjA) = |A|.I.$ if $A = \begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$.
5. Find the adjoint of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 2 & -3 & 1 \\ 0 & 4 & 2 \end{bmatrix}$

6 MARK QUESTIONS

1. Solve for x &y from the equations $4x + y = 7, 3y + 4z = 5, 5x + 3z = 2$ by Cramer's rule.
2. Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$
3. Prove that adj(AB)=(adjB).(adjA) if $A = \begin{bmatrix} -1 & 0 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$

4. Find the characteristic roots of a matrix $\begin{bmatrix} 1 & -1 \\ -6 & -2 \end{bmatrix}$.
5. Solve the equations by Gauss elimination method $3x - y + z = 0, x + 2y - 2z = 3, 3x + z = 4$.

UNIT-2: VECTORS

3 MARK QUESTIONS

1. Find the magnitude of vector 2i +3j – 6k
2. If $\vec{a} = i + 2j - 3k, \vec{b} = 3i - 5j + 2k$ find magnitude of $\overrightarrow{3a} - \overrightarrow{2b}$
3. Show that $\cos\theta i - \sin\theta j$ is unit vector
4. Show that the vectors $2i + 5j - 6k$,and $7i + 2j + 4k$ orthogonal vectors.
5. If $\vec{a} = 5i + 2j - 4k$, and $\vec{b} = 2i - 5j + 3k$find $\vec{a}X\vec{b}$.

5 MARK QUESTIONS

1. Find cosine of the angle between the vectors $4i - 2j - 3k$and $2i - 3j + 4k$.
2. Find the projection of $\vec{b}$ on $\vec{a}$ if $\vec{a} = 5i + 2j - 4k$and $\vec{b} = 2i - 5j + 6k$.
3. If $\vec{a} = 3i + 2j - 4k$ and $\vec{b} = i - 2j + 5k$ are two sides of a triangle, find its area.
4. Simplify $(\vec{a} + \vec{b}).(\vec{a} - \vec{b})$and $(\vec{a} + \vec{b})X(\vec{a} - \vec{b})$.
5. Find the magnitude of moment of force $4i - 2j + 5k$ about (2,5,-7) acting at (4,7,0)

6 MARK QUESTIONS

1. If A=(2,5,7), B=(3,9,4) and C=(-2,5,7) are three vertices of parallelogram find its area.
2. If a force $4i + 6j + 2k$ acting on a body displaces it from (2,7,-8) to (3,9,4). Find the work done by the force.
3. Find the sine of the angle between the vectors $4i - 2j - 3k$and $2i - 3j + 4k$.
4. Find the unit vector in the direction perpendicular to both vector $2i - 5j + k$and $5i + j + 7k$.
5. Show that the points whose position vectors are $i - 3j - 5k$, $2i - j + k$ and $3i - 4j - 4k$ form a right angled triangle.

UNIT-3: PROBABILITY AND LOGARITHMS

3 MARK QUESTIONS

1. Define equally likely events, Independent event, and mutually exclusive event.
2. Define probability of an event.
3. A coin is tossed twice. What is the probability that at least one head occurs.
4. A die is thrown once, what is the probability an odd number appears.
5. If E and F are events such that P(E)=0.6, P(F)=0.3 and P(E∩F)= 0.2. Find P(E/F).

5 MARK QUESTIONS

1. Prove that $\frac{1}{1+\log_c ab} + \frac{1}{1+\log_a bc} + \frac{1}{1+\log_b ca} = 1$
2. If $x = \log_c ab$, $y = \log_b bc$, $z = \log_a ca$,
   Prove that $xyz = x + y + z + 2$
3. If $x = \log_{2a} a$, $y = \log_{3a} 2a$, $z = \log_{4a} 3a$, prove that $xyz + 1 = 2yz$
4. If $a^2 + b^2 = 7ab$, prove that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$
5. Solve for x given that $(\log_2 x)^2 + (\log_2 x) - 20 = 0$

6 MARK QUESTIONS

1. An integer is chosen at random from the numbers ranging from 1 to 50 . What is the probability that the integer chosen is a multiple of 3 or 10 ?
2. Two unbiased dice are thrown once . Find the probability of getting the sum of the numbers obtained on the two dice is neither a multiple of 2 nor a multiple of 4 .
3. One card is drawn from a well shuffled pack of 52 cards. If E is the event "the card drawn is a king or an ace" and F is the event " the card drawn is an ace or a jack " then find the conditional probability of the event E, when the event F has already occurred .
4. A pair of dice is thrown once. If the two numbers appearing on them are different, find the probability that the sum of the numbers is 6.
5. A family has two children. What is the probability that both the children are boys given that (i) the youngest is a boy. (ii) at least one is a boy ?

UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES

ALLIED ANGLES

3 MARKS QUESTIONS

1. Find the value of $\cos ec(-1110^0)$
2. Find the value of $\frac{\cos ec(180^0 - A)\cos A}{\sec(180^0 + A)\cos(90^0 + A)}$
3. 3.If $\sin\theta = \frac{1}{2}$ and $\frac{\pi}{2} \subset \theta \subset \pi$, find $\cos\theta$
4. 4. If A+B+C =180^0 Prove that $\cot\left(\frac{A+B}{2}\right) = \tan c/2$
5. 5.find the value of $\tan\left(\frac{7\pi}{3}\right)$

5 MARKS QUESTIONS

1. Prove that $\frac{\sin(180^0 - A)COS(360^0 - A)\tan(180^0 + A)}{COS(270 + A)\sin(90 + A)\cot(270 - A)} = 1$
2. If secx = 13/5 and $270^0 \subset x \subset 360^0$, Find the value of $\frac{3\sin x - 2\cos x}{9\cos x + 4\sin x}$
3. Find the value of $\cos 570^0 \sin 510^0 - \sin 330^0 \cos 390^0$
4. Evaluate $\frac{\sin(-\alpha)}{\sin(90^0 + \alpha)} - \frac{\cos(-\alpha)}{\cos(90 - \alpha)} - \frac{\sec(90^0 - \alpha)}{\cos(180^0 + \alpha)}$
5. Show that $\tan 225^0 x \cot 405^0 + \tan 765^0 x \cot 675^0 + \operatorname{cosec} 135^0 x \sec 315^0 = 0$

6 MARK QUESTIONS

1 .Evaluate $\tan 315^0 x \cot 405^0 + \tan 765^0 x \cot 675^0 + \operatorname{cosec} 135^0 x \sec 315^0$

2. Find x if $\frac{x \sin^2 300^0 \sec^2 240^0}{\cos 225^0 \cos ec^2 240^0} = \cot^2 315^0 \tan^2 300^0$
3. If $\sin\theta = \frac{-1}{4} and \pi \subset \theta \subset \frac{3\pi}{2}$, find the value of $\frac{\cos\theta + \tan\theta}{\cot\theta + \sec\theta}$
4. Evaluate $\frac{\sin(2\pi - A)}{\sin(\pi - A)} - \frac{\tan\left(\frac{\pi}{2} + A\right)}{\cot(2\pi + A)} + \frac{\cos ec(-A)}{\sec\left(\frac{\pi}{2} + A\right)}$
5. Show that $\tan^2(315^0)\cot(-405^0) + \cot(495^0)\tan(-585^0) = 0$

COMPOUND ANGLES

3 MARKS QUESTIONS

1. Find the value of $\sin 15^0$
2. Show that $\tan(45^0 + \theta) = \frac{1 + \tan\theta}{1 - \tan\theta}$
3. Prove that $\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A} = 0$
4. Using tan(A+B), prove that $\cot(A+B) = \frac{\cot A \cot B - 1}{\cot A + \cot B}$
5. Prove that $\frac{\sin 2A}{\sin A} - \frac{\cos 2A}{\cos A} = \sin A$

5 MARKS QUESTIONS

1. Prove that cos(A-B) cos(A+B)= $\cos^2 A - \sin^2 B$
2. Show that $\sin\left(A+\frac{\pi}{4}\right)+\cos\left(A+\frac{\pi}{4}\right)=\sqrt{2}\cos A$
3. If sinA= $\frac{1}{\sqrt{10}}, \sin B = \frac{1}{\sqrt{5}}$ $prove that A+B = 45^0$
4. Prove that $\tan 3\theta - \tan 2\theta - \tan\theta = \tan\theta \tan 2\theta \tan 3\theta$
5. If A+B = $\frac{\pi}{4}$, $prove that (1+\tan A)(1+\tan B)) = 2$

TRASFORMATION FORMULAE

3 MARKS QUESTIONS

1 P.T $\frac{\cos A+\cos B}{\sin A+\sin B} = \cot\left(\frac{A+B}{2}\right)$

2 P.T $\frac{\sin 68^\circ + \sin 52^\circ}{\cos 68^\circ + \cos 52^\circ} = \sqrt{3}$

3 Show that $\cos 40^\circ - \cos 50^\circ = \sqrt{2}\ \sin 5^\circ$

4 Show that $\sin 47^\circ + \cos 77^\circ = \cos 17^\circ$

5 Show that $\cos 80^\circ + \cos 40^\circ - \cos 20^\circ = 0$

MARKS QUESTIONS

1 P.T $\frac{\sin\theta+\sin 3\theta+\sin 5\theta}{\cos\theta+\cos 3\theta+\cos 5\theta} = \tan 3\theta$

2 In and triangle ABC prove that tanA + tanB +tanC = tanA tanB tanC

3 Show that $\frac{\sin 9^\circ + \cos 9^\circ}{\cos 9^\circ - \sin 9^\circ} = \tan 54^\circ$

4 Prove that $\cos 55^\circ + \cos 65^\circ + \cos 175^\circ = 0$

5 Prove that $\sin 20^\circ \times \sin 40^\circ \times \sin 80^\circ = \frac{\sqrt{3}}{8}$

MARKS QUESTIONS

1 Prove that $\cos 20^0 x \cos 40^0 x \cos 80^0 x \cos 60^0 = 1/16$

2 In any triangle ABC prove that sinA + sinB + sinC=4Cos(A/2)cos(B/2)cos(C/2)

3 Show that $\frac{\cos x+\cos 2x-\cos 3x-\cos 4x}{\sin x+\sin 2x+\sin 3x+\sin 4x} = \tan x$

4 If A+B+C = 180^0 prove that $\cos^2 A+\cos^2 B+\cos^2 C = 1-2\cos A\cos B\cos C$

5 If A+B+C = 180^0 prove that sin2A-sin2B+sin2C=4cosAcosCsinB

UNIT-5: COMPLEX NUMBERS

3 MARK QUESTIONS

1. Evaluate i^{-999}
2. Find the complex conjugate of $(1+2i)(3i-4)$
3. Express $(3+4i)^{-1}$ in the form a+ib
4. Find the real part and imaginary part of $\frac{1}{\sqrt{2}+i}$
5. $if\, x+iy = \cos\theta + i\sin\theta$ show that $x+\frac{1}{x} = 2\cos\theta$

5 MARK QUESTIONS

1. Evaluate $\left(i^{19}+\left(\frac{1}{i}\right)^{25}\right)^2$
2. Find the modulus and amplitude of $\left(1-i\sqrt{3}\right)$
3. Express in a + ib form: $\frac{(2+3i)}{(1+3i).(2+i)}$
4. Express the complex number 1 + i in the polar form.
5. Find the amplitude of $\sqrt{3}+i$ and represent in Argand diagram.

UNIT-6: INTRODUCTION TO CALCULUS

3 MARK QUESTIONS

1. Evaluate: $\lim_{x\to -3}\frac{x^2-9}{x+3}$
2. Evaluate: $\lim_{\theta\to 0}\left(\frac{\tan m\theta}{\sin n\theta}\right)$
3. Evaluate: $\lim_{n\to\infty}\left(\frac{n+1}{n}\right)^n$.
4. Evaluate: $\lim_{x\to\infty}\left(\frac{3x^2-2x+1}{2x^2+5x-1}\right)$
5. Evaluate: $\lim_{x\to 0}\left(\frac{1-\cos 2x}{x^2}\right)$

5 MARK QUESTIONS

1. Evaluate:$\lim_{x\to 1}\frac{x^2+x-2}{x^2-1}$.
2. Evaluate: $\lim_{x\to 0}\left(\frac{\sqrt{a+x}-\sqrt{a-x}}{3x}\right)$
3. Evaluate: $\lim_{x\to 1}\left(\frac{x^m-1}{x^n-1}\right)$

4. Evaluate: $\lim_{\theta \to 0} \left(\frac{1-\cos x+\tan^2 x}{x \sin x} \right)$
5. Evaluate: $\lim_{x \to 0} \left(\frac{e^{ax}-e^{bx}}{x} \right)$.

6 MARK QUESTIONS

1. Prove that $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$, if θ is in "radian".
2. Evaluate: $\lim_{x \to 0} \left(\frac{\sin \pi x}{x-1} \right)$
3. Evaluate: $\lim_{n \to \infty} \left(\frac{(5-n^2)(n-2)}{(2n-3)(n+3)(5-n)} \right)$.
4. Evaluate: $\lim_{x \to 1} \frac{x^2-5x+4}{x^2-12x+11}$.
5. Evaluate: $\lim_{x \to 2} \left(\frac{x^2-4}{\sqrt{x+2}-\sqrt{3x-2}} \right)$

Government of Karnataka
Department of Technical Education, Bengaluru

Course: ENGINEERING MATHEMATICS - I

Course code: 15SC01M

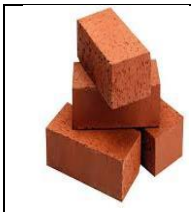
Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	**Dr. D.S. Prakash**	Asst. Director (LRDC)	DTE, Bengaluru
2	**Dr.MokaShekhu, ,**	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	**Sri.Sathyanaraya Dixit,**	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
4	**Sri. Guruprasad V**	Lecturer (Selection Grade /Science)	APS Polytechnic, Somanahalli
5	**Dr.RajasekharHeera,**	Lecturer/Science,	Government Polytechnic, Gulbarga.

Curriculum Review committee

	Name	Designation	Institution
1	**Dr.MokaShekhu, ,**	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
2	**Sri.Sathyanaraya Dixit,**	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru



Course Title: **MATERIALS OF CONSTRUCTION**		
Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE11T**
Type of Course: **Lectures, Self Study & Quiz**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Prerequisites: Knowledge of basic Science in Secondary Education.

Course Objectives:

1. Understand properties of various materials.
2. Select suitable materials for appropriate engineering applications.

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Identify the types, origin, properties, manufacturing, qualities, uses of building element (Stones, Bricks & blocks) as per IS code requirements.	R/U	1,2,3,4,5,7	21
CO2	Comprehend about timber and able to select different market forms for appropriate field application.	R/U	1,5	10
CO3	Explain about composition, functions, manufacturing, tests, types, uses and storage of cement as per IS codes.	R/U	1,2,3,4,5	8
CO4	Summarize about paints, varnishes & distemper and recognize its good qualities	R/U	1,5	4
CO5	Compare the types, properties, uses and market forms of ferrous, nonferrous metals and their alloys.	R/U	1,2,5	9
			Total sessions	**52**

Legend- R; Remember U: Understand

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
MATERIALS OF CONSTRUCTION	3	3	3	3	3	-	3	-	-	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

UNIT I-STONES

Classification of rocks, Quarrying of stones by wedging & blasting, Tests on stone (Acid test, Attrition, crushing, impact & water absorption), Characteristics of a good building stone, Deterioration & Preservation of stones

UNIT II-BRICKS

Composition of good brick earth & harmful ingredients, Manufacture of bricks, Burning of bricks by clamps-intermittent (down draught) and continuous kiln (Hoffman's), Classification of bricks as per I S, Test on bricks (Field tests, Crushing strength, absorption, shape & size, efflorescence test), Requirements of good bricks, Substitutes for bricks – Cement concrete blocks (solid), Production process of solid blocks. Fire clay/Refractory bricks, Calcium Silicate Bricks (properties and uses).

UNIT-III-TIMBER

Classification of timber based on mode of growth, Cross- section of an exogenous tree, Properties of good timber, Defects in timber, Preservation of Timber, Seasoning of Timber, Conversion of timber and Market forms(types and uses).

UNIT-IV-CEMENT

Composition of ordinary Portland cement, Functions of ingredient of cement, Manufacture of OPC (Mixing of raw materials by dry process, Burning &Grinding), Storage of cement, Field tests on cement, Types of cement and its uses.

UNIT-V-PAINTS, VARNISH & DISTEMPER

Objects, characteristics &Ingredients of paints, varnishes & distemper

UNIT-VI-FERROUS, NONFERROUS AND ALLOY

FERROUS METALS: Properties & uses of Cast iron, Wrought iron, Mild steel Tor steel, TMT, High tensile steel, Market forms of structural steel NONFERROUS METALS:- Properties & uses of Copper, Aluminum, Zinc and Tin ALLOY: - Types, properties & uses - aluminum alloy, copper alloy & steel alloy

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TEXT BOOKS

1. Engineering Materials by SC Rangwala
2. Building Materials by S SBhavikatti

REFERENCES

1. Engineering Materials by GJ Kulkarni
2. Engineering Materials by Sushil Kumar
3. Engineering Materials by Duggal
4. Engineering Materials by Gurucharan Singh
5. Materials of construction by TTTI Publication (Oxford university madras)
6. Building Materials by- P.C.Varghese (Prentice Hall)
7. Materials of construction -I byH.S.Vishwanath- Sapna Publications
8. Civil Engineering handbook byKhanna

Course content and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE Cognitive Levels R	Questions to be set for SEE Cognitive Levels U	Marks weightage	weightage (%)	A*	B*
1	STONES	10	50% **14**	50% **14**	28	19	2	2
2	BRICKS	11	50% **15**	50% **15**	31	21	2	2
3	TIMBER	10	65.0% **18**	35.0% **10**	28	19	1	2
4	CEMENT	8	65.0% **15**	35.0% **8**	22	15	1	2
5	PAINTS, VARNISH & DISTEMPER	4	50.00% **6**	50.00% **6**	11	8	2	-
6	FERROUS, NONFERROUS AND ALLOY	9	65.00% **16**	35.00% **9**	25	17	1	2
Total		52	**57.5%** **83.79**	**42.5%** **61.21**	145	100	9	10

Legend- R: Remember U: Understand

A*-SEE questions to be set for (05 marks) in Part – A
B*- SEE questions to be set for (10 marks) in Part – B
Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**100**

Course Delivery: The course will be delivered through lectures and Power point presentations/ Videos

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment civil	CIE*	IA	Students	Three IA tests(Average of three tests will be computed)	Test 1	20	Blue books	CO1
					Test 2			CO2, CO3
					Test 3			CO4, CO5
				Written Quiz (MCQ)		05	Quiz Sheets	1,2,3,4,5
	SEE*	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3,4,5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

MODEL OF RUBRICS / CRITERIA FOR ASSESSING STUDENT ACTIVITY (Course Coordinator)

Dimension	Scale					Students score (Group of five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	3				
2	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2				
3	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	5				
4	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks **One activity on any one CO (course outcome) may be given to a group of FIVE students** **Grand Average/Total**						14/4 =3.5 ≈4				

- **MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY**

RUBRICS FOR ACTIVITY(5 Marks)						
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (Course Coordinator) for assessing the given activity.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QP FOR CIE (TESTS)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	**III SEM**	**Materials Of Construction**	**20**
	Year: 2015-16	**Course code:15ME3011**	
Name of Course coordinator :			**Units:1,2 Co: 1,2**

Note: Answer all questions

	Questions	M	CL	CO	PO
1	Discuss the geological classification of rocks?	**5**	**R**	**1**	**1,2**
2	Explain acid test & attrition test conducted on stone? OR Explain acid test & attrition test conducted on stone?	**5**	**U**	**1**	**1,2**
3	List the harmful ingredients of good brick earth?	**5**	**R**	**1**	**1,2**
4	Explain the IS test conducted on bricks OR Explain burning of bricks in clamp with a neat sketch?	**5**	**U**	**1**	**1,2**

MODEL QUESTION PAPER

Code: **15CE11T**

I- Semester Diploma Examination

MATERIALS OF CONSTRUCTION

Time: **3 Hours**] [Max Marks**: 100**

Note: Answer any SIX from Part A and any SEVEN from Part B

PART-A

6x5=30 marks

1. What are the characteristics of good stone?
2. Write short notes on preservation of stones?
3. Explain the burning of bricks in a clamp with a neat sketch?
4. Give comparison between burning bricks in a kiln & clamp?
5. Explain the Cross- section of an exogenous tree with a neat sketch?
6. List market forms of timber?
7. List the functions of ingredient of cement?
8. Briefly explain the field tests conducted on cement?
9. Write the properties of cast iron?

PART-B

7x10=70 marks

10. Explain the process of quarrying by wedging?
11. Briefly explain the physical & chemical classification of rocks?
12. Explain the Crushing strength test & absorption test conducted on brick?
13. Explain burning of bricks in Hoffman's kiln with a neat sketch?
14. Explain classification of timber based on mode of growth?
15. Explain the defects in timber due to natural forces?
16. Explain the burning process of ordinary Portland cement?
17. What are the characteristics of paints & varnish?
18. a) List the properties & uses of TMT bars?
    b)List the properties & uses of Zinc?
19. Explain the alloy of copper & aluminium?

MODEL QUESTION BANK

Diploma in civil Engineering

1st Semester

Course title: Materials of Construction, Course Code:15CE11T

CO1 : Know the origin, types, properties, manufacturing, qualities, uses of building element (Stones, Bricks & blocks) as per IS code requirements.

REMEMBER LEVEL QUESTIONS

1. List the classification of stones?
2. List the characteristics of good stone?
3. Describe preservation of stones
4. List the useful & harmful ingredients of good brick earth
5. List the properties of good building bricks
6. State any five different Substitutes for bricks

UNDERSTANDING LEVEL QUESTIONS

1. Discuss the geological classification of rocks?
2. Explain the physical & chemical classification of rocks
3. Explain the method of quarrying by blasting?
4. Explain the process of quarrying by wedging?
5. Describe the deterioration of stones?
6. Explain acid test & attrition test conducted on stone?
7. Explain crushing strength & water absorption test conducted on stones?
8. Explain the process of manufacture of bricks
9. Explain the burning of bricks in a clamp with a neat sketch?
10. Explain burning of bricks in intermittent down draught kiln with neat sketch
11. Explain burning of bricks in Hoffman's kiln with a neat sketch?
12. Explain with a neat sketch any method of burning bricks in continuous kiln?
13. Distinguish burning bricks in a kiln & clamp?
14. Explain the classification of bricks?
15. Explain the field test conducted on bricks?
16. Describe cement concrete blocks?
17. Explain production process of cement concrete blocks?
18. Explain the Crushing strength test & absorption test conducted on brick
19. Explain shape & size test & efflorescence test conducted on brick

CO 2 : Comprehend about timber and able to select different market forms for appropriate field application..

REMEMBER LEVEL QUESTIONS

1. State the classification of timber based on mode of growth
2. List the properties of good timber
3. Describe the preservation of Timber
4. List the market forms of timber

UNDERSTANDING LEVEL QUESTIONS

1. Explain the Cross- section of an exogenous tree with a neat sketch
2. Explain the defects in timber due to natural forces
3. Explain the defects in timber due to Fungi
4. Discuss the defects in timber due to Seasoning
5. Explain the defects in timber due to conversion
6. Explain the defects in timber due to Insects
7. Explain the importance of Seasoning of Timber
8. Illustrate the conversion of timber

CO 3 : Know about composition, functions, manufacturing, tests, types, uses and storage of cement as per IS codes

REMEMBER LEVEL QUESTIONS

1. List the functions of ingredient of cement
2. List the varieties of cement
3. List the precautions to be taken in storing of cement
4. List field tests conducted on cement.

UNDERSTANDING LEVEL QUESTIONS

7. Explain the composition of ordinary Portland cement
8. With flow diagram explain Dry process of mixing the raw materials for manufacture of ordinary Portland cement
9. With a neat sketch explain burning of cement in Rotary kiln.
10. Explain the grinding process of cement?

CO 4 : Know about paints, varnishes & distemper and recognize its good qualities

REMEMBER LEVEL QUESTIONS

1. State the objects of paints
2. List the characteristics of good paint
3. State the objects of varnish
4. List the characteristics of varnish
5. State the objects of distemper

6. List the characteristics of distemper

UNDERSTANDING LEVEL QUESTIONS

1. Explain the ingredients of paint?
2. Explain the ingredients of varnish?
3. Explain the ingredients of distemper?

CO 5 : Understand types, properties, uses and market forms of ferrous, nonferrous metals and their alloys

REMEMBER LEVEL QUESTIONS

1. List the types of cast iron
2. List the types of wrought iron
3. List the types of mild steel
4. State properties & uses of cast iron
5. List the properties & uses of wrought iron
6. List the properties & uses of mild steel
7. State the properties & uses of Tor steel
8. Tabulate the properties & uses of Tiscon steel
9. List the properties & uses of Tor steel &Tiscon steel
10. State the properties & uses of deformed bars
11. List the properties & uses of copper
12. List the properties & uses of zinc
13. State the types of aluminium alloy
14. List the types of steel alloy
15. List the properties & uses of steel alloy

UNDERSTANDING LEVEL QUESTIONS

1. Discuss the properties & uses of TMT bars?
1. Discuss the properties & uses of High tensile steel?
2. Describe the properties & uses of aluminium?
3. Discuss the properties & uses of tin?
4. Explain the types of copper alloy?
5. Explain the properties & uses of aluminium alloy?
6. Explain the properties & uses of copper alloy?

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: ENGINEERING DRAWING-I		
Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE12D**
Type of Course: **Tutorials and Drafting**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

(Common to all Civil Engineering (GL) / Civil Engineering (Draughtsman)/ Civil Engineering (Environmental)/ Civil Engineering (Public Health Engineering)/ Civil Engineering (Water Technology and Health Sciences) Programme)

Prerequisites: Basic Geometry in Secondary Education and zeal to learn the course.
Course Objectives:

1. The course is aimed at developing Basic Drawing skills.
2. Develop Skills in Preparation of Basic Drawings.
3. Skills in Reading and Interpretation of Engineering Drawings.

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Acquire Knowledge to use the drawing instruments effectively and able to dimension the given figures and print letters	R/U/Ap	1,2,3,4,9	15
CO2	Appreciate the usage of engineering curves in solving civil engineering drafting problems and develop attitude of lifelong learning.	R/U/Ap	1,2,3,4,9	15
CO3	Develop a scale for any map and able to read it	R/U/Ap	1,2,3,4 5,6,8,9	6
CO4	Discover the concept of projection and acquire visualization skills related to projections of points, Lines and Planes.	R/U/Ap/ Ay	1,2,3,4 5,6,8,9,10	42
			Total sessions	**78**

Legend- R: Remember U: Understand Ap: Application Ay: Analysis

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
ENGINEERING DRAWING-I	3	3	3	3	3	-	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENTS

UNITS	CONTENT	HOURS
1	**INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE** Drawing Instruments Standard Sizes of Drawing sheets-Layout of drawing sheets Types of lines and their applications Different types of lettering as per I.S.I; uppercase letters of vertical and slanting type as per I.S.I Numerical figures of vertical and slanting type as per I.S.I.	**09**
2	**DIMENSIONING PRACTICE** Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning, Methods of arrangements of Dimensioning Dimensioning of common features like diameters, radii, arcs and chords. Dimensioning of simple civil Engineering Objects.	**06**
3	**GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS** Drawing of tangents to circles and arcs, Drawing a common tangent of given arcs to circles of equal or unequal radii. Inscribing a circle in a regular polygon -Inscribing circles touching each side of a regular polygon and its two adjacent circles. Inscribing circles touching two sides of polygon and two other circles - graded exercises. Division of a line into equal number of parts Introduction to conic sections-Types of conic section	**15**

	Construction of ellipse by Intersecting lines method (Rectangular and parallelogram methods) and Concentric circles method Construction of parabola by rectangle method, parallelogram method and tangential method.	
4	**SCALES** Construction of plain and diagonal scales and marking distances on scales constructed - exercises	**06**
5	**ORTHOGRAPHIC PROJECTIONAND PROJECTION OF POINTS** Introduction to orthographic projection-Principal planes of projection-Four Quadrants- Concept of First angle & Third angle projection methods-Projection of points in all the four quadrant system.	**12**
6	**PROJECTION OF LINES AND PLANES SURFACES** (Only first angle projection) Projection of lines – Line Parallel to both HP and VP, Line parallel to one plane and Perpendicular to other-Line parallel to one plane and Inclined to the other, Line inclined to both HP and VP. Projection of plane Surfaces -Construction of polygons Plane surface parallel to one plane and Perpendicular to other two – Plane surface Perpendicular to one plane and inclined to the other- Plane surface inclined to both HP and VP	**30**

Total Hours= 78 Hours

Note: Grade exercises Plan in each unit should be as per table provided below.

Course Delivery: The course will be delivered through lectures with classroom practices and Power point presentations/ Video.

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE*	IA	Students	Graded Exercises (Average of marks allotted to each graded exercise)	25	Drawing Sheets	1,2,3,4
	SEE*	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE Cognitive Levels R	U	Ap	Ay	Marks weightage	weightage (%)	A*	B*
1	Introduction to Engineering drawing and lettering practice	9	15% **3**	45% **8**	40.00% **7**	0.00% **0**	18	12	1	
2	Dimensioning practice	6	20% **2**	60% **7**	20.00% **2**	0.00% **0**	11	8	1	
3	Geometrical constructions and conic sections	15	25.00% **7**	55.00% **16**	20.00% **6**	0.00% **0**	29	19	3	
4	Scales	6	20.00% **2**	40.00% **5**	40.00% **5**	0.00% **0**	12	8		1
5	Orthographic projection and projection of points	12	15.00% **3**	30.00% **7**	30.00% **7**	20.00% **5**	22	15	1	1
6	Projection of lines and plane surfaces	30	15.00% **9**	35.00% **20**	30.00% **17**	20.00% **12**	58	38		4
	Total	78	**18.30%** **26.54**	**44.20%** **62.31**	**25.70%** **43.85**	**5.70%** **16.15**	150	100	6	6

Legend- R; Remember U: Understand Ap: Application Ay: Analysis

A*-SEE QUESTIONS TO BE SET FOR (10 MARKS) in PART – A

B*- SEE QUESTIONS TO BE SET FOR (15MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**63**
2	Applying the knowledge acquired from the course	**26**
3	Analysis	**11**

Graded Exercise Plan

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
I	INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE	1	Use of drawing instruments	06
		3	Lettering	10
II	DIMENSIONING PRACTICE	3	Dimensioning	15
III	GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS	2	Arc and line tangents	12
		2	Inscribing circles in polygon	10
		2	Ellipse and parabola	10

IV	SCALES	3	Plain and Diagonal scales	15
V	ORTHOGRAPHIC PROJECTIONAND PROJECTION OF POINTS	2	Projection of Points	10
VI	PROJECTION OF LINES AND PLANE SURFACES	3	Projection of Lines	20
		3	Projection of Planes	20
	TOTAL	**24**		**128**

TEXT BOOK

1. K.R.Gopalakrishna"Fundamentals of Drawing" Subhas Publications, 2010.
2. K.R.Gopalakrishna"Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S.ChandPublishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGrawHill Publishing Company Limited, 2008.
6. BasantAgarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings

Model Question Paper

Code:**15CE12D**

I semester Diploma Examination

ENGINEERING DRAWING-I

Time: 4 Hours][Max. Marks: 100

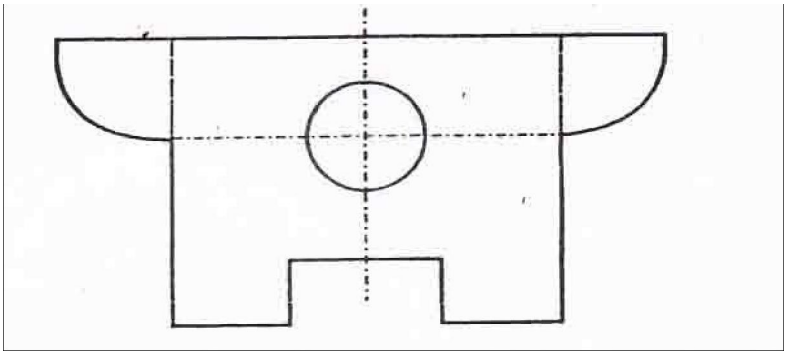
Note: Answer any **UR** questions from **Section-A& B**

SECTION –A

1.Print the following Statement in single stroke vertical capital letters of height 22mm.
(10 Marks)

ANNUAL SPORTS MEET 2015

2. Draw the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method
(10 Marks)



3. Draw an arc of radius 90mm tangential internally to a circle of radius 30mm and externally to another circle of radius 15 mm the center of the two circles are 80mm apart.
(10 Marks)

4. Inscribe 6 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles. (10 Marks)

5. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000. (10 marks)

6. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point. (10 Marks)

(Turn over)

SECTION –B

7. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.
(15Marks)

8. The distance between Bangalore and Chennai is 352km. On a map, it is represented by a length 70.4mm. What is the R.F. on which the map has been drawn? Draw a diagonal scale of this R.F. to read up to one km and long enough to measure 800km. Mark on the scale the distances 549km and 207km.
(15 Marks)

9. A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.
(15Marks)

10. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three

principal views of the line.

(15Marks)

11. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.

(15Marks)

12. A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

(15Marks)

Model Question Bank

1ST Semester Diploma in Civil Engineering

Course: **ENGINEERING DRAWING-I** Code: **15CE12D**

UNIT-I

10 Marks Questions

1.Print the following title to a height of 20mm single stroke vertical capital letters.
2.Print the following Statement in single stroke vertical capital letters of height 22mm.
3.Print the following statement in single stroke inclined capital case letters of height 18mm.

4. Print the following statement in single stroke inclined capital letters of height 16 mm
5. Print the following Statement in single stroke vertical capital letters of height 22mm.
6. (a) List the standard sizes of drawing sheets.

(b)Mention the types of lines and their applications.

7.(a) Illustrate the elements of dimensioning with the help of a sketch.
b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.

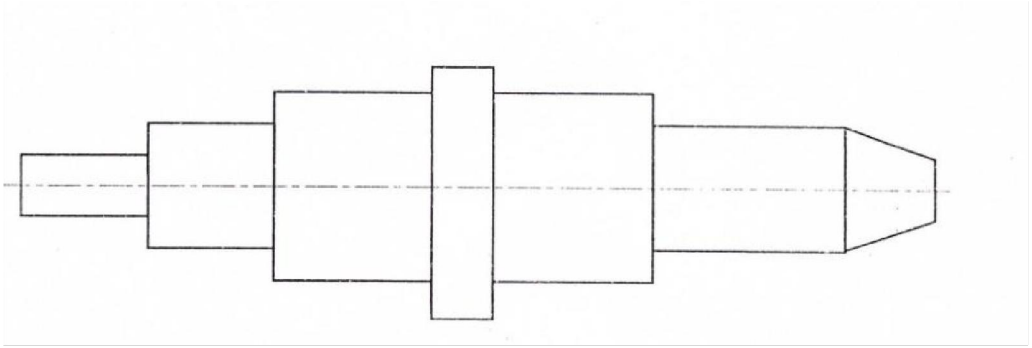
8 (a) Mention the uses of the following drawing instruments.
i) T-square ii) Set square iii) Bow compass iv) Clinograph v) Mini-drafter
b) Mention the uses of the following drawing instruments.
i) French curves ii) Protractor iii) Clips iv) Erasing Shield v) Drafting machine

9. Mention the types of lines and their applications

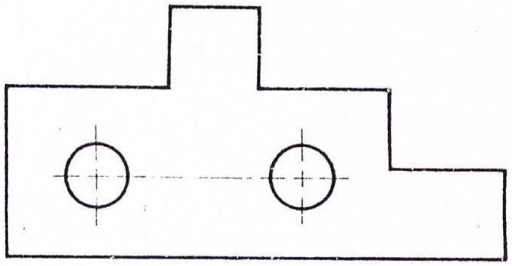
UNIT-II

(10 Marks questions)

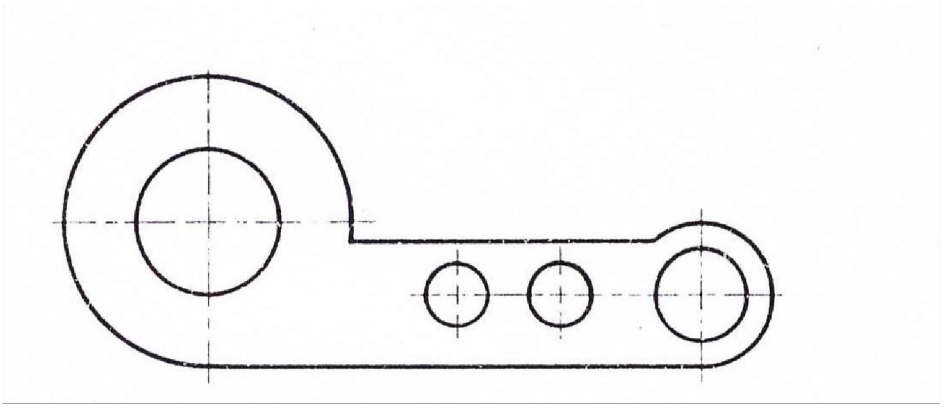
10.Copy the given sketch to 1:1 scale and dimension adopting aligned system with parallel Dimensioning method.



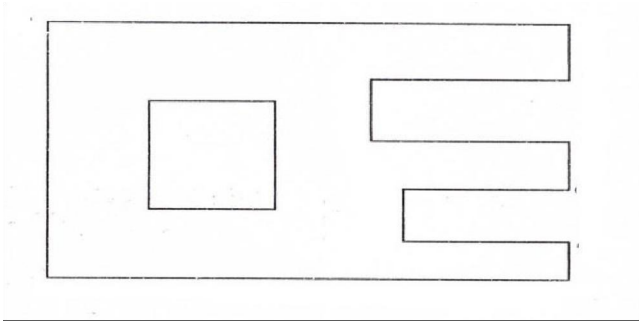
11. Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method.



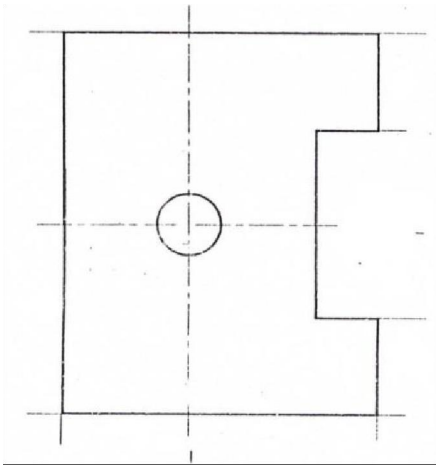
12. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with chain dimensioning method.



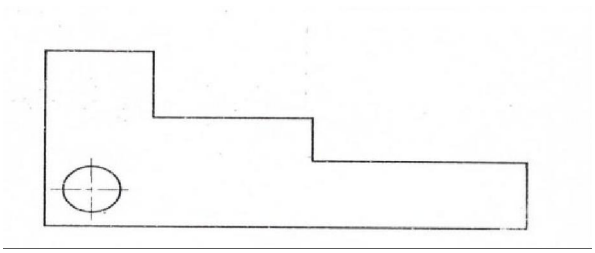
13. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with combined dimensioning method.



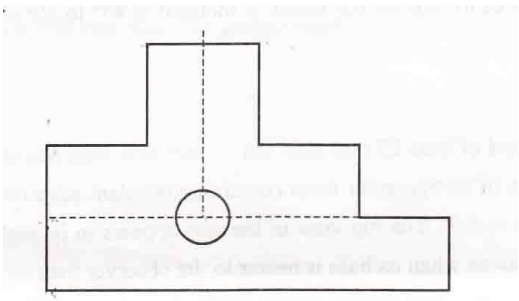
14. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with parallel dimensioning method.



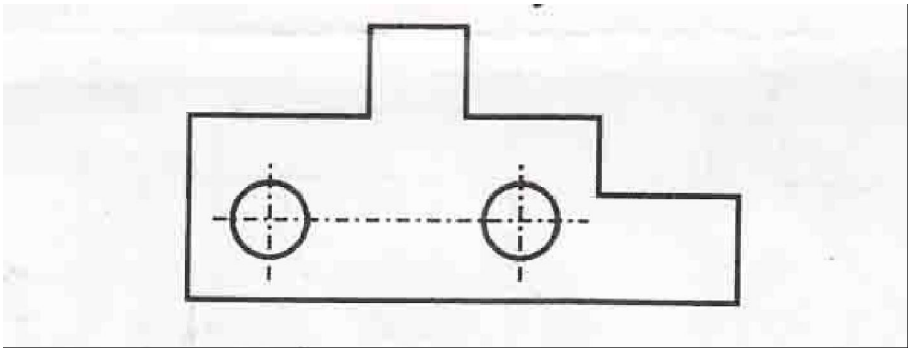
15. Copy the given sketch to 1:1 scale and dimension adopting aligned system with chain dimensioning method.



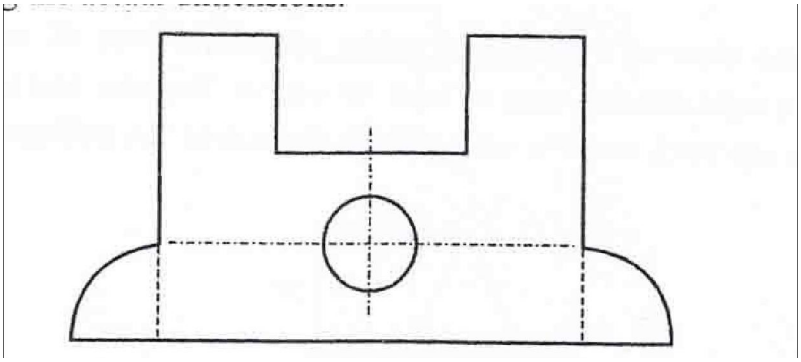
16. Copy the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method



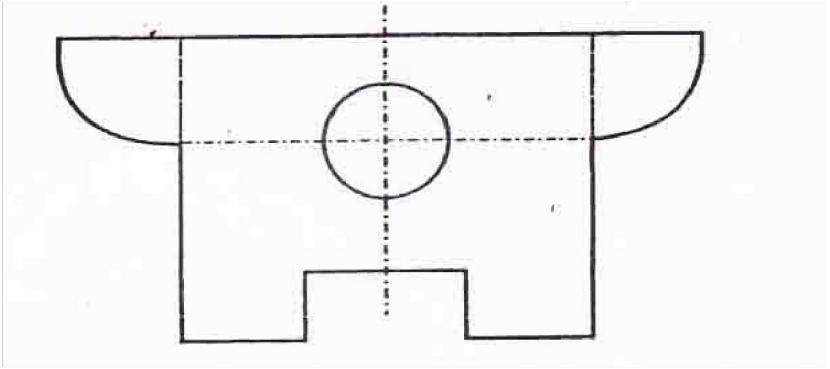
17. Copy the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



18. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



19. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



UNIT-III

(10 MARKS)

20. Draw an arc of radius 50mm tangential external to two circles of radii 30mm and 20mm and having their centers 90mm apart.

21. Draw an arc of radius 80mm tangential internally to two circles of radii 35mm and 25mm and having their centers 100mm apart.

22. Draw a common external tangent to two circles of radius 40mm and 20mm whose centers are 90 mm apart.

23. Draw an arc of radius 90mm tangential internally to a circle of radius 30mm and externally to another circle of radius 15 mm the center of the two circles are 80mm apart.

24. Draw a common external tangent to two circles of equal radii 30mm and having their centers 80mm apart.

25. Draw a common internal tangent to two circles of diameters 60mm and 40mm having their centers 100mm apart.

26. Inscribe 5 equal circles in a regular Pentagon of side 60mm so as to touch each side and two adjacent circles.

27. Inscribe 6 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles.

28. Inscribe 5 equal circles in a regular Pentagon of side 50 mm so as to touch two sides and two adjacent circles.

29. Inscribe 6 equal circles in a regular Hexagon of side 50 mm so as to touch two side and two adjacent circles.

30. Inscribe 3 equal circles in a regular Hexagon of side 60 mm so as to touch two side and two adjacent circles.

31. Inscribe 3 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles.

UNIT-III

(15 marks Questions)

32. Inscribe an ellipse in a rectangle of side 150mm and 120mm.

33. A parallelogram has sides 130 mm and 90mm at an included angle of 65^0. Inscribe an ellipse in the parallelogram. Find the major axes and minor axes of the ellipse.

34. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.

35. Inscribe parabola in a rectangle of side 120mm and 80mm.

36. Inscribe parabola in a parallelogram of side 100mm and 70mm and having included angle 55^0.

37. A shot is discharged from the ground level at an inclination of 55^0 to the ground which is assumed to be horizontal. The shot returns to the ground at a point 75m distance from the point of discharge. Trace the path of the shot. Take scale 1:1000.

38. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.

39. Construct a diagonal scale of RF$\frac{1}{20,000}$to show kilometers and decimals of kilometer. Mark on the scale a distance of 2.37 kilometer and 3.42 kilometer.

40. On building plan a line 10cm long represents a distance of 5m. Construct a diagonal scale for the plan to read up to 6m. Show, meters, decimeters and centimeters indicate on the scale the length 4.54m and 5.37m.

41. The distance between Bangalore and Chennai is 352km. On a map, it is represented by a length 70.4mm. What is the R.F. on which the map has been drawn? Draw a diagonal scale of this R.F. to read up to one km and long enough to measure 800km. Mark on the scale the distances 549km and 207km.

42. Construct a plain scale to show kilometer and hectometer when R.F = 1:40000 and long enough to measure 6 km. Mark on the scale 3.2km and 4.3 km on the scale.

43. Construct a plain scale to read centimeter and decimeter and long enough to measure 6 decimetre. RF=1/4. Show on it a distance of 4.9 decimetre.

UNIT-IV

(10 marks Questions)

44. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point.

45. A point P is 30 mm above HP, 50 mm behind VP and 45 mm in front of left PP. Draw the three principal views of the point

46. Draw the three principal views of a point P lying 40 mm behind VP, 60 mm below HP and 30 mm behind the right PP.

47. Draw the three principal views of a point P lying 60 mm below HP, 50 mm in front of VP and 45 mm in front of the left PP.

UNIT-V

(15 Marks questions)

48. Draw the three principal views of a line 90 mm long placed parallel to VP and perpendicular to HP. The line is 60mm in front of VP and 50mm in front of right PP. The lower end of the line is 40mm above HP.

49. Draw the three principal views of a line 90 mm long when it is placed parallel to both HP & VP. One of the ends of the line is 60 mm above HP, 30 mm in front of VP and 40mm in front of the right PP.

50. A line AB 95 mm long is inclined at 40° to HP and parallel to VP. The line is 90 mm in front of VP. The lower end A is 35 mm above HP, 110 mm in front of the right PP and is away from it than the higher end. Draw the three principal views of the line.

51. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.

52. Draw the projections of a line AB, 80 mm long inclined at 30° to HP and parallel to VP. The line is 40 mm in front of VP. The lower end A is 20 mm above HP.

53 The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP. The line is 15 mm above HP and one end of the line is 10 mm in front of VP. Draw the projections of the line and measure top and front views.

54 A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.

55. A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP. The other end B is 60 mm in front of VP and 50 mm above HP. Draw the projections of the line with HP & VP.

56. A line PQ has its end P 15 mm above HP and mm in front of VP. The end Q is 55 mm above HP and the line is inclined at 30° to HP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP & VP is 50 mm. Draw the projections of the line and find its inclinations with VP.

57. The distance between the end projectors passing through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front of VP. The line AB appears as 65 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP & VP.

UNIT-VI

(15 marks Questions)

58. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.

59. An equilateral triangular lamina of sides 40mm is resting with one of its corners on HP, The surface of the lamina is inclined at 50° to HP and the side opposite to the corner on which the lamina rests is inclined at 40° to VP. Draw the projections of the lamina.

60 A square lamina of 40mm side rests with one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the square lamina in this position.

61. A square lamina of 40mm sides rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to VP and Lamina appears to be inclined at 35° to HP. Draw its projections.

62. A square lamina of side 40mm rests with one of its corner on HP. The diagonal passing through this corner is inclined at 55° to HP and 30° to VP. Draw its projections.

63..A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

64. A hexagonal lamina of side 30mm is resting with one of its corner on HP so that the diagonal passing through that corner is inclined at an angle of 45° and appears to be inclined at 30° to VP. Draw the top and front views of the lamina.

65. A square lamina of ABCD of 40mm side rests on the corner C such that diagonal AC appears as at 35° to the VP in the top view. The two sides BC and CD containing the corner C make equal inclinations with the HP. The surface of the lamina makes 40° with HP. Draw its top and front views.

66.A pentagonal plane lamina of edges 30mm is resting on HP with one of its corner touching it such that plane surface makes an angle of 50° with HP. The two of the base edges containing the corner on which the lamina rests make equal inclinations with HP. If the edge opposite to this corner makes an angle of 40° with the VP, draw the top and front views of the plane lamina in this position.

67.A hexagonal lamina of 40mm sides rests on HP on one of its sides. The side which is on HP is perpendicular to VP and the surface of the lamina is inclined to HP at 45°.The lamina is then rotated through 90° such that the side on HP is parallel to the VP, while the surface is still inclined to HP at 45°. Draw the front view and the top view of the lamina in its final position.

68. A circular lamina of 65mm diameter rests on HP such that the surface of the lamina is inclined at 40° to HP. The diameter through the point on which the lamina rests on HP appears to be inclined at 50° to the VP in the top view. Obtain its projections.

Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: **Basic Computer Skills Lab**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE13P**
	Type of Course: **Tutorial and Practical's**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre-requisite

Knowledge of English comprehension.

Course Objectives

Will learn and understand the Basics of Computers and apply the application tools like word processor, spread sheet and presentation.

Course Outcome

On successful completion of the course, the students will be able to attain CO:

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Understand and identify the models, components of a computer along with its connections, operating system concepts along with internet operation	***1-7***	***U***	1,2,3,4,8,10	**15**
CO2	Demonstrate skills using word processor	***8-13***	***A***	1,2,3,4,8,9,10	**24**
CO3	Demonstrate skills using spreadsheet presentation	***14-18***	***A***	1,2,3,4,8,9,10	**24**
CO4	Demonstrate skills using presentation	***19-21***	***A***	1,2,3,4,8,9,10	**15**
			Total sessions		**78**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Basic Computer Skills Lab	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

LIST OF GRADED EXERCISES

Tutorials and Practice

Unit – I

Computer hardware and software

1. Identify and understand the models of Computers, Identify and understand front panel switches and back panel connections of a Computer system, Identify and understand the physical components of a Computer.
2. Conduct computer system connection and understand the booting process.
3. Study and Practice of Basic DOS Commands.
4. Familiarization of GUI based Operating System Environment.
5. Practice creating Icons and Folders, Creating/Opening of file, Editing and saving the document, Copy, Cut and Paste operations, built-in utilities of OS like – Text Editors, Paint, Calculator, etc.
6. Practice browsing of different sites using Search Engine.
7. Practice Creating E-Mail accounts, Sending, Receiving of E-Mails.

Unit –II

Word Processing

8. Create a Business Letter and Personal Letter.
9. Create a Company Letter head.
10. Create a Simple Newsletter with minimum three columns. Insert a Clip Art in the Newsletter.
11. Create a Resume for a Job Application.
12. Create the Cover Page of a Project Report (use Word Art, insert Picture Image).
13. Prepare the class time table of your class.

Spreadsheet

14. Create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
15. You have a monthly income of Rs.11000. Your monthly expenditures are: Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).
16. Create a worksheet containing the Pay details (containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF, PT, Insurance, Gross and Net salary) of the Employees using Formulas.
17. Create a Simple Bar Chart to highlight the sales of a company for three different periods.
18. Create a Pie Chart for a sample data and give legends.

Presentation

19. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
20. Create a presentation about a Book containing Title, Author, Publisher and Contents.
21. Create an automated (with timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

Mini-Project [CIE- 05 Marks]

Prepare a mini project of a minimum of 5 pages of report, using the above concepts of Unit-I and/or Unit-II

References

1. Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication, RP-2014, ISBN: 81-219-2388-3
2. http://www.tutorialsforopenoffice.org/
3. http://www.libreoffice.org/get-help/documentation/

Software Tools

Any open source tool or equivalent proprietary tools

Course Delivery

The course will be delivered through tutorials of two hours and four hours of hands on practice per week.

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
DIRECT ASSESSMENT	CIE (Continuous Internal Evaluation)	IA Tests	Students	Two Tests (Average of two tests will be computed)	10	Blue books	1,2,3,4
				Record Writing (Average marks of each exercise to be computed)	10	Record Book	1,2,3,4
				Mini Project	05	Report	1,2,3,4
				TOTAL	**25**		
	SEE (Semester End Examination)	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4
INDIRECT ASSESSMENT	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	20
3	Application	70

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

All student activities should be done in a group of 4-5 students with a team leader.

Scheme of Evaluation for End Exam

SN	Scheme	Max. Marks
1	Testing Skills/ Abilities from Unit - I	10
2	Writing steps on any one from Unit -II	10
3	Execution	10
4	Presentation of Result	10
5	Viva voce	10
	Total	**50**
Note: 1. Candidate shall submit Lab Record for the Semester End Examination. 2. Student shall be allowed to execute directly even if he / she is unable to write the procedure 3. In case of change in experiment or no write up, marks will not be awarded for writing procedure/steps.		

Resource Requirements for Basic Computer Skills Lab

(For an Intake of 60 Students [3 Batches])

Hardware requirement

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	03
3	Networking (Structured) with CAT 6e / Wireless 24 Port switches / Wireless Router I/O Boxes for networking (as required)	03
4	Broad Band Connection	01

Software Requirement:

Linux, Libre Office/Open Office/Kingsoft Office/ any equivalent software.

Note: Student: Computer ratio in the Lab should be strictly **1:1** for a batch of twenty Students.

MODEL QUESTION BANK

Course Title: **Basic Computer Skills Lab**	Course Code: **15CE13P**

Note: *One Question from Unit-I and Unit-II*

UNIT-I

1. Identify Physical components of a Computer System.
2. Demonstrate Internal and External DOS Commands and differentiate between them.
3. Create and Rename the file using DOS Commands.
4. Create a directory and copy a file inside the directory using DOS Commands.
5. Demonstrate the basic formatting features in Text Editors.
6. Create two file in a folder and place the shortcut of these files on the desktop.
7. Demonstrate how search engine may be used in browsing Internet.
8. Create an E-mail account
9. Create and Send an E-mail with a picture attachment.
10. Demonstrate how documents can be downloaded using Internet.

UNIT-II

11. Using Word Processor Application create a Business Letter.
12. Using Word Processor Application create a Personal Letter.
13. Using Word Processor Application create a letter head for company.
14. Using Word Processor Application create a Simple Newsletter with minimum of three columns. Insert a Clip art in the newsletter.
15. Using Word Processor Application create a Resume for a Job application.
16. Using Word Processor Application create the cover page of a Project Report (use Word Art, insert Picture Image).
17. Prepare the class time table for your class using Word Processor Application.
18. Using Spreadsheet Application, create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
19. You have a monthly income of Rs.11000. Your monthly expenditures are Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month). Use Spreadsheet Application.

20. Using Spreadsheet Application, create a worksheet containing the pay details (containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF, PT, Insurance, Gross and Net salary) of the employees using formulas.
21. Using Spreadsheet Application, create a Simple Bar Chart to highlight the sales of a company for three different periods.
22. Using Spreadsheet Application, create a Pie Chart for a sample data and give legends.
23. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
24. Create a presentation about a book containing Title, Author, Publisher and Contents.
25. Create an automated (timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: **MATERIALS OF CONSTRUCTION LAB**		
Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE14P**
Type of Course: **Practical, Demo& Assignments**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 50 Marks

Pre-requisites: Basic knowledge of science in secondary education.

Course Objectives: Identification & understanding the properties & uses of various building materials.

Course Outcomes:

On successful completion of the course, the students will be able to:

Course Outcome		Experiments Linked	CL	Linked PO	Teaching Hrs
CO1	Demonstrate the important properties and uses of various solid building materials.	***1***	***R/U***	1,2,5,6,8,9, 10	18
CO2	Apply knowledge of building materials to provide predictive capability to optimize building performance & to minimize building failure.	***2,3,4,5***	***R/U***	1,2,5,6,8,9, 10	24
CO3	Explain the important properties and uses of various types of Timber.	***6***	***R/U***	1,2,5,6,8,9, 10	06
CO4	Illustrate the various types of plastic, glass and preservative materials used in the construction.	***7,8***	***R/U***	1,2,5,6,8,9, 10	12
CO5	Recognize the need & to engage in independent lifelong learning in identifying miscellaneous materials.	***9***	***R/U***	1,2,5,6,8,9, 10	09
CO6	Apply the properties of materials in societal & environmental context & demonstrate knowledge for sustainable development.	***10***	***R/U/Ap/ C***	1,2,5,6,8,9, 10	09
				Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Materials of construction lab	3	3	3	-	3	3	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

EXPERIMENT 1 : BUILDING UNITS

i) Stones

Identification & understanding the properties & uses of the following stones:Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.

Identification	Geological Classification	Properties	Uses

ii) Bricks

Identification & understanding the properties& uses of the following bricks:

Ground moulded, Table moulded, Machine moulded(Wire cut), Soil stabilized blocks, Concrete blocks (solid-hallow), Fly ash bricks, Fire bricks, Light weight blocks (clay hallow blocks & autoclave aerated concrete blocks)

Specimen tabular column

Identification	Standard size	Properties	Uses

EXPERIMENT 2 : FLOORING MATERIAL

Identification & understanding the properties & uses of the following flooring materialsGranolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring

Identification	Properties	Uses

EXPERIMENT 3 : BINDING MATERIAL

Identification & understanding the properties & uses of the following binding materials Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.
Specimen tabular column

Identification	Properties	Uses

EXPERIMENT 4 : CLADDING & ROOFING MATERIALS

Identification & understanding the properties & uses of the following Cladding material- Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding.
Roofing Material- Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.

Identification	Properties	Uses

EXPERIMENT 5: FINISHING, DECORATIVE & FALSE CEILING MATERIAL

Identification & understanding the properties & uses of the following: Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt.

Identification	Properties	Uses

EXPERIMENT 6 : TIMBER

Identification & understanding the properties & uses of the following timber Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo.
Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets

Identification	Properties	Uses

EXPERIMENT 7 : PLASTICS & GLASS

Identification & uses of the following material
Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fibre glass, Float glass, Toughened glass.
Plastics- Thermosetting plastic articles, Polycarbonate.

Identification	Uses

EXPERIMENT 8 : COATING MATERIAL

Identification & understanding the uses of the following paints, primers, varnishes & distemper
Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints
Varnish-French polish, Metallic paint (grills & all purpose)
Distemper- Water based & weather proof exterior emulsion.

Identification	Uses

EXPERIMENT 9 : MISCELLANEOUS MATERIALS

Identification & uses of the following material
Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids.

Identification	Uses

EXPERIMENT 10 : MINI PROJECT

Each Student should collect at least five different building materials & prepare the report.

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	**Students score (Group of five students)**				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	3				
2.Fulfill team's roles & duties	4				
3.Conclusion	5				
4.Convensions	5				
Total	17				
Average=(Total /4)	17/4=4.25=5				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course coordinator (faculty).

Course Delivery: The course will be delivered through Tutorials and Demonstration of materials.

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE*	IA	Students	Two IA Tests (average of two tests will be computed)	Test 1	10	Blue books (Test Papers)	1,2,3
					Test2			4,5,6
				Record writing (average of marks allotted for each experiment)		10	Lab Record	1,2,3,4,5,6
				Mini project		05	Report	1,2,3,4,5,6
				Total		**25**		
	SEE*	End Exam		End of the course		50	Answer scripts at BTE	CO1 to CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		---	Feedback forms	CO1,CO2, CO3 Delivery of course
	End of Course Survey			End of the course		---	Questionnaires	CO1 to CO6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. (Any decimals shall be rounded off to next higher digit).

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**60**
2	Applying the knowledge acquired from the course	**25**
3	Analysis	**10**
4	Synthesis (Creating new knowledge)	**3**
5	Evaluation	**2**

TEXT BOOKS&REFERENCEBOOKS

1. Materials by SC Rangwala
2. Engineering Building materials by S SBhavikatti
3. Engineering Materials by GJ Kulkarni
4. Engineering Materials by Sushil Kumar
5. Market brochures

E-Links

1. www.constructionmaterials.com/
2. en.wikipedia.org/wiki/Building material
3. en.wikipedia.org/wiki/List_of_building_materials
4. www.exponent.com
5. http://www.tce.co.in/
6. www.prakruthibuilding.com
7. http://www.aboutcivil.org

SCHEME OF VALUATION

Course**: MATERIALS OF CONSTRUCTION LAB** Course Code: **15CE14P**

Sl. no.	Performance	Max. Marks
1	Identify & list the properties & uses of given 7 material Identification-1 mark Properties-2 marks Uses-2 marks	35
2	Viva-Voce	10
3	Mini-project report and graded exercise	5
	TOTAL	**50**

List of equipment and materials

Sl No	Description	Nos
	Furniture	
1	Display table 4'X8'	8
2	Stools/ Chairs	40
3	Display Racks	10
4	Metal Trays	10
	Specimens	
6	**STONES** Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.	Each 5Nos
7	**BRICKS** Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hallow), Fly ash bricks, Fire bricks, Light weight blocks (clay hallow blocks & autoclave aerated concrete blocks)	Each 5Nos
8	**FLOORING MATERIAL** Granolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring	Each 5Nos
9	**BINDING MATERIAL** Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.	Each 5Nos
10	**CLADDING MATERIAL** Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding. **ROOFING MATERIAL**- Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non-asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.	Each 5Nos
11	**FINISHING, DECORATIVE & FALSE CEILING MATERIAL** Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt	Each 5Nos
12	**TIMBER** Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo. Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets	Each 5Nos
13	**PLASTICS & GLASS** Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fiber glass, Float glass, Toughened glass. Plastics- Thermosetting plastic articles, Polycarbonate.	Each 5Nos

Sl No	Description	Nos
14	**COATING MATERIAL** (Paint samples to be displayed on panels of size 30cm X 30cm) Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints Varnish-French polish, Metallic paint (grills & all purpose) Distemper- Water based & weather proof exterior emulsion.	15X2=30 panel
15	**MISCELLANEOUS MATERIALS** Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids	Each 5Nos

Note: Minimum Floor area required for establishing Material-testing Lab is 60 Sqm.

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Course Title: **ENGINEERING MATHEMATICS – II**		Course Code	: **15SC02M**
Semester	: **II**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0**(in hours)	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programmes: **Common to all Engineering Diploma Programmes**			

Pre-requisites:

Engineering Mathematics-I, in First Semester Diploma curriculum.

Course Objectives:

1. Apply the concept of straight line and conic section in engineering field.
2. Determine derivatives of functions involving two variables.
3. Apply the concepts of differentiation in physics and engineering courses.
4. Evaluate the integrals of functions of two variables.
5. Apply the concepts of definite integrals and its application over a region.
6. Solve the ODE of first degree, first order in engineering field.

Course Contents:

Topic and Contents	Hours	Marks
Unit-1: COORDINATE GEOMETRY	08hr	23
a. **Straight lines:** Different forms of equations of straight lines: $y = mx + c$, $y - y_1 = m(x - x_1)$, $y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)(x - x_1)$. General equation of a line$ax + by + c = o$ (graphical representation and statements) and problems on above equations. Equation of lines through a point and parallel or perpendicular to a given line. Problems.	04 hr	
b. **Conic Section:** Definition of conic section. Definition of axis, vertex, eccentricity, focus and length of latus rectum. Geometrical representation of parabola, ellipse and hyperbola: Equations of parabola$y^2 = 4ax$,	04hr	

Equation of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$and Equation of hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$(without proof of above 3 equations). Equations of parabola, ellipse and hyperbola with respect to x-axis as axis of conic. Finding axes, vertices, eccentricity, foci and length of lattice rectum of conics. Problems on finding the above said equations with direct substitution.		
UNIT – 2: DIFFERENTIAL CALCULUS	15hr	39
Differentiation. Definition of increment and increment ratio. Definition of derivative of a function. Derivatives of functions ofx^n, $\sin x$, $\cos x$and $\tan x$with respect to 'x' from first principle method. List of standard derivatives of $\text{cosec}x$, $\sec x$, $\cot x$, $\log_e x$, a^x, e^x.....etc. Rules of differentiation: Sum, product, quotient rule and problems on rules. Derivatives of function of a function (Chain rule) and problems. Inverse trigonometric functions and their derivatives. Derivative of Hyperbolic functions, Implicit functions, Parametric functions and problems. Logarithmic differentiation of functions of the type u^v,where u and v are functions of x.Problems. Successive differentiation up to second order and problems on all the above types of functions.		
UNIT – 3: APPLICATIONS OF DIFFERENTIATION.	07hr	17
Geometrical meaning of derivative. Derivative as slope. Equations of tangent and normal to the curve y = f(x) at a given point- (statement only). Derivative as a rate measure i.e.to find the rate of change of displacement, velocity, radius, area, volume using differentiation. Definition of increasing and decreasing function. Maxima and minima of a function.		
UNIT-4: INTEGRAL CALCULUS.	12hr	30
Definition of Integration. List of standard integrals. Rules of integration (only statement) 1.$\int kf(x)dx = k\int f(x)dx.$ 2.$\int \{f(x)\pm g(x)\}dx = \int f(x)dx \pm \int g(x)dx$ problems. Integration by substitution method. Problems. **Standard integrals of the type**		

1. $\int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)+c$ 2. $\int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\left(\frac{x}{a}\right)+c$. 3. $\int \frac{dx}{x\sqrt{x^2-a^2}} = \frac{1}{a}\sec^{-1}\left(\frac{x}{a}\right)+c$ (1 to 3 with proof) 4. $\int \frac{dx}{x^2-a^2} = \frac{1}{2a}\log\left(\frac{x-a}{x+a}\right)+c$ if x > a > 0. 5. $\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\log\left(\frac{a+x}{a-x}\right)+c$ if a > x > 0. (4 & 5 without proof) and problems on above results Integration by parts of the type $\int x^n e^x dx$,$\int x\sin x dx$, $\int x\cos x dx$, $\int x\log x dx$, $\int \log x dx$, $\int \tan^{-1} x\, dx$, $\int x\sin^2 x\, dx$, $\int x\cos^2 x\, dx$ where n=1, 2. Rule of integration by parts. Problems		
UNIT – 5: DEFINITE INTEGRALS AND ITS APPLICATIONS	05 hr	22
Definition of Definite integral. Problems on all types of integration methods. Area, volume, centres of gravity and moment of inertia by integration method. Simple problems.		
UNIT – 6: DIFFERENTIAL EQUATIONS.	05 hr	14
Definition, example, order and degree of differential equation with examples. Formation of differential equation by eliminating arbitrary constants up to second order. Solution of O. D. E of first degree and first order by variable separable method. Linear differential equations and its solution using integrating factor.		
Total	52	145

Course Delivery:

The Course will be delivered through lectures, class room interaction, exercises, assignments and self-study cases.

Course outcome:

On successful completion of the course, the student will be able to:

1. Formulate the equation of straight lines and conic sections in different forms.
2. Determine the derivatives of different types of functions.
3. Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.
4. Evaluate the integrations of algebraic, trigonometric and exponential function.
5. Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration.
6. Form and solve ordinary differential equations by variable separable method and linear differential equations.

Mapping Course Outcomes with Program Outcomes:

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Formulate the equation of straight lines and conic sections in different forms.	**1,2,3,10**	**R/U/A**	**08**	**6**	**5**	**12**	**23**
CO2	Determine the derivatives of different types of functions.	**1,2,3,10**	**R/U/A**	**15**	**12**	**15**	**12**	**39**
CO3	Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.	**1,2,3,10**	**R/U/A**	**07**	**6**	**5**	**6**	**17**
CO4	Evaluate the integrations of algebraic, trigonometric and exponential function	**1,2,3,10**	**R/U/A**	**12**	**9**	**15**	**6**	**30**
CO5	Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration	**1,2,3,10**	**R/U/A**	**05**	**6**	**10**	**6**	**22**
CO6	Form and solve ordinary differential equations by variable separable method and linear differential equations.	**1,2,3,10**	**R/U/A**	**05**	**3**	**5**	**6**	**14**
		Total Hours of instruction		**52**	**Total marks**			**145**

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Engineering Maths-II	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference Books:

1. NCERT Mathematics Text books of class XI and XII.
2. Higher Engineering Mathematics by B.S Grewal, Khanna publishers, New Delhi.
3. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr. Ramaverma published by S.Chand & Co.Pvt. ltd.
4. CBSE Class Xi & XII by Khattar & Khattar published PHI Learning Pvt. ltd.,
5. First and Second PUC mathematics Text Books of different authors.
6. E-books:www.mathebook.net
7. www.freebookcentre.net/mathematics/ introductory-mathematics -books.html

Course Assessment and Evaluation:

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests to be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	5	Log of record	1 to 6
				Total	25		
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT	Student feedback		Student	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	31
2	Understanding	41
3	Applying the knowledge acquired from the course	25
	Analysis Evaluation	3

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	**ENGINEERING MATHEMATICS –II**	20
	Year:	Course code: **15SC02M**	
Name of Course coordinator :			Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Model Question Paper:

Code: 15SC02M

II Semester Diploma Examination

ENGINEERING MATHEMATICS –II

(For All Engineering Diploma Programmes)

Time: 3 Hours][Max. Marks: 100

NOTE: i)Answer any 10 questions from section A, 8 questions from section B and 5 questions from section-C

ii) Each question carries 3 marks in section A.

ii) Each question carries 5 marks in section B.

iii) Each question carries 6 marks in section C.

SECTION-A

1. Find the equation of the line passing through the point (2,-3) with slope 1/3.
2. Find the equation of parabola with vertex (2,0) and focus (5,0)
3. Differentiate: $(3x + 8)^7$ with respect to x.
4. If $y = \cos^{-1} x$ show that $\frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}}$.
5. If $y = x^x$, find $\frac{dy}{dx}$.
6. If $y = \frac{1+\sin x}{1-\sin x}$ find $\frac{dy}{dx}$.
7. Find the equation to the tangent to the curve $2x^3 + 5y - 4 = 0$ at (-2,4).
8. The volume of the sphere is increasing at the rate of 6cc/sec. Find the rate of change of radius when the radius is 3 cm.
9. Integrate: $(2x + 1)(x + 5)$ with respect to x
10. Evaluate: $\int \tan^2 x dx$
11. Evaluate: $\int \frac{\cos x}{1+\sin x} dx$
12. Evaluate: $\int_0^{\pi/4} (\sec^2 x + 1) dx$.
13. Find area bounded by the line $x + 2y = 0$, x- axis, and ordinates $x = 0, and x = 4$ by integration.
14. Form differential equation for curve $y^2 = 4ax$

SECTION – B

1. Find the equation of line passing through the point (2,5) and (-3,2).
2. Differentiate $\sqrt{x} + \log x + \sin^{-1} x + e^{\tan x} - a^x$ with respect to x.
3. Differentiate $\tan x$ with respect to x using first principal method.
4. If $y = \sinh 3x \cosh 2x$ then find $\frac{dy}{dx}$.
5. If $S = t^3 - t^2 + 9t + 8$, where S is distance travelled by particle in t seconds. Find the velocity and acceleration at t = 2 sec.
6. Integrate: $\frac{1}{x} - \tan x + e^{-3x} + \frac{1}{1+x^2} + 5$ with respect to x.
7. Evaluate: $\int \frac{(1+\log x)^2}{x} dx$
8. Evaluate: $\int x \sin x dx$

9. Evaluate: $\int_0^{\pi/2} \cos 5x \cos 3x \, dx$
10. Evaluate: $\int_0^{\pi/2} \cos^3 x \, dx$
11. Solve the differential equation $\sin^2 y dx - \cos^2 x dy = 0$

SECTION – C

1. Find the equation of median through B in a triangle with vertices A(-1 ,3), B(-3, 5) and C(7,-9)
2. Find the equation of hyperbola, given that vertices are $(\pm 7, 0)$ and eccentricity, e=4/3
3. If $x^y = a^x$, show that $\frac{dy}{dx} = \frac{x \log_e a - y}{x \log_e x}$.
4. If $y = e^{\tan^{-1} x}$ then show that $(1 + x^2)\frac{d^2y}{dx^2} + (2x - 1)\frac{dy}{dx} = 0$.
5. Find the maximum and minimum values of the function
$f(x) = 2x^3 - 21x^2 + 36x - 20$.
6. Evaluate: $\int \tan^{-1} x \, dx$
7. Find the volume of solid generated by revolving the curve
$y = \sqrt{x^2 + 5x}$ between x=1 & x=2.
8. Solve the differential equation $x\frac{dy}{dx} - 2y = 2x$

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Question Paper Blue Print:

Course: **ENGINEERING MATHEMATICS – II** Course Code**: 15SC02M**

UNIT NO		HOURS	Each questions to be set for 3 Marks Section - A	Each questions to be set for 5 Marks Section - B	Each questions to be set for 6 Marks Section- C	Weightage of Marks
1	a	4	01	01	01	23
	b	4	01	--	01	
2		15	04	03	02	39
3		07	02	01	01	17
4		12	03	03	01	30
5		05	02	02	01	22
6		05	01	01	01	14
TOTAL		52	14	11	08	145
Questions to be answered			**10**	**08**	**05**	**100**

Guidelines to Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weight age of model fixed for each unit.
2. The question paper pattern provided should be adhered to
   Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks.
   Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.
   Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.

Model Question Bank:

Course Title: **ENGINEERING MATHEMATICS – II**	Course Code: **15SC02M**

UNIT-1: STRAIGHT LINES AND CONIC SECTION:

3 MARK QUESTIONS

1. Find the equation of the straight line passing through (2,3) and having slope 5.
2. Find the slope and x-intercept and y-intercepts of the line $2x + 3y - 11 = 0$.
3. Find the vertex and focus of the parabola $(y - 2)^2 = 8x$.
4. Show that the lines 3x-2y+2=0, 2x+3y+7=0 are perpendicular.
5. Find the eccentricity of the ellipse $\frac{x^2}{64} + \frac{y^2}{9} = 1$

5 MARK QUESTIONS

1. Find the equation to the line passing through the point (6,-4) and perpendicular to the line 7x-6y+3=0.
2. Find the equation to the line passing through the point (2,3) parallel to the line joining the points (-8,-6) & (2,-4).
3. Find the equation of straight line inclined at 135o to the x-axis having y-intercept 2/3.
4. Find the equation of straight line joining the points (2,3) & (-4,6).
5. Find the equation of the line passes through (-3,-2) which is perpendicular to x-axis.

6 MARK QUESTIONS

1. Find the equation to the median of the triangle through the vertex A with vertices A(-1,3), B(-3,5) &C(7,-9).
2. The vertices of a quadrilateral taken in order are A(1,2), B(2,1),C(3,4) & D(-1,-2). Find the equation to the diagonal BD.

3. Obtain the equation of the hyperbola in the form $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, whose eccentricity is 8 and distance between the foci is 12.
4. Find the equation of the ellipse with length of major axis is 8 and minor axis is 3.
5. Find the equation to the line passing through point (3,-2) and perpendicular to the line joining points (5,2) &(7,-6).

UNIT-2: DIFFERENTIATION:

3 MARK QUESTIONS

1. Find $\frac{dy}{dx}$, if $y=2x^2-3x+1$.
2. Differentiate xtanx with respect to x.
3. Find $\frac{dy}{dx}$, if $x^2+y^2=25$
4. Find $\frac{dy}{dx}$ if $x=ct, y=\frac{c}{t}$,
5. If $y=4ax$, find $\frac{d^2y}{dx^2}$.

5 MARK QUESTIONS:

1. Differentiate the function x^n by method of first principle.
2. Find $\frac{dy}{dx}$ if $y=6x^3-3\cos x+4\cot x+2e^{-x}-\frac{5}{x}$.
3. Find $\frac{dy}{dx}$ if $y=\frac{\cos x+\sin x}{\cos x-\sin x}$
4. Find $\frac{dy}{dx}$ if $y=(\cos x)^{\sin x}$
5. If $y=\tan^{-1}x$, provethat $(1+x^2)y_2+2xy_1=0$

6 MARK QUESTIONS:

1. Find $\frac{dy}{dx}$ if $y=\frac{x\log x}{1+\sin x}$
2. Find $\frac{dy}{dx}$ if $x=a\cos^3\theta, y=a\sin^3\theta$ at $\theta=\pi/4$.
3. Find $\frac{dy}{dx}$ if $y=x^{x^{x^{x^{\cdot^{\cdot^{\cdot^{\infty}}}}}}}$.
4. If $y=\tan^{-1}\left(\frac{1+x}{1-x}\right)$, find $\frac{dy}{dx}$.
5. If $y=e^{m\sin^{-1}x}$, provethat $(1-x^2)y_2-xy_1-m^2y=0$

UNIT-3 APPLICATIONS OF DIFFERENTIATION

3 MARK QUESTIONS

1. Find the slope of the tangent to the curve $x^2 + 2y^2 = 9$ at a point (1, 2) on it.
2. Find the slope of the normal to the curve $y = 2 - 3x + x^2$ at (1, 0).
3. The law of motion of a moving particle is $S = 5t^2 + 6t + 3$ where 'S' is the distance in metres and 't' time in seconds. Find the velocity when t=2.
4. Find the rate of change of area of a circle with respect to its radius.
5. Show that the curve $2x^3 - y = 0$ is increasing at the point (1, 2).

5 MARK QUESTIONS

1. For a moving body vertically upwards, the equation of motion is given by $S = 98t - 4.9t^2$. When does the velocity vanish?
2. Find the equation to the tangent to the curve $y = 2x^2 - 3x - 1$ at (1,-2).
3. A circular patch of oil spreads on water and increases its area at the rate of 2 sq.cm/min. find the rate of change of radius when radius when radius is 4 cm.
4. The volume of the spherical ball is increasing at the rate of 36π cc/sec. Find the rate at which the radius is increasing. When the radius of the ball is 2cm.
5. Find the max value of the function $y = x^3 - 3x + 4$.

6 MARK QUESTIONS

1. Find the max & min values of the function $y = x^5 - 5x^4 + 5x^3 - 1$.
2. Find the equation of normal to the curve $y = x^2 + 2x + 1$ at (1,1).
3. If S is the equation of motion where $S = t^3 - 2t^2$ find its acceleration when velocity is 0.
4. The volume of sphere is increasing at 3c.c per second. Find the rate of increase of the radius, when the radius is 2cm.
5. Water is flowing into a right circular cylindrical tank of radius 50 cms at the rate of 500π cc/min. Find how fast is the level of water going up.

UNIT-4: INTEGRATION

3 MARK QUESTIONS

1. Evaluate: $\int (x^2 + x + 1)\, dx$.
2. Evaluate: $\int \cot^2 x\, dx$
3. Evaluate: $\int e^{5x+8}\, dx$
4. Evaluate: $\int \frac{1}{2x+5} dx$
5. Evaluate: $\int \sin^5 x \cos x\, dx$

5 MARK QUESTIONS

1. Evaluate $\int \left(x^4 - \frac{1}{x} + \operatorname{cosec}^2 x - e^{-2x} + \cos x\right) dx.$
2. Evaluate: $\int \cos^3 x \, dx$
3. Evaluate: $\int \sin 6x \cos 2x \, dx$
4. Evaluate: $\int \log x \, dx$
5. Evaluate: $\int \frac{(\tan^{-1} x)^3}{1+x^2} dx$

6 MARK QUESTIONS

1. Evaluate: $\int (\tan x + \cot x)^2 dx.$
2. Evaluate: $\int (x+1)(x-2)(x-3) dx$
3. Evaluate: $\int x^2 \cos x \, dx$
4. Prove that $\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c$
5. Evaluate: $\int \frac{1}{9\sin^2 x + 4\cos^2 x} dx$

UNIT-5: DEFINITE INTEGRATION AND ITS APPLICAITON.

3 MARK QUESTIONS

1. Evaluate: $\int_2^3 (2x+1) \, dx.$
2. Evaluate: $\int_0^{\pi/4} \sec^2 x \, dx.$
3. Evaluate: $\int_0^2 e^x \, dx$
4. Evaluate: $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx.$
5. Evaluate: $\int_0^{\pi/2} \cos x \, dx.$

5 MARK QUESTIONS

1. Evaluate: $\int_0^{\pi/2} \sin 3x \cos x \, dx.$
2. Evaluate: $\int_0^{\pi} \frac{\cos x}{1+\sin^2 x} dx.$
3. Evaluate: $\int_0^1 x(x-1)(x-2) \, dx.$
4. Find the area bounded by the curve $y = x^2 + 1$ the x-axis and ordinates$x = 1, x = 3.$
5. Find the volume of the solid generated by the revolving of the curve $y^2 = x^2 + 5x$ between the ordinates x=1, x=2 about x-axis.

6 MARK QUESTIONS

1. Evaluate: $\int_0^1 \frac{\cos(\tan^{-1} x)}{1+x^2} dx$.
2. Find the area between the curves $y = x^2 + 5$ and $y = 2x^2 + 1$.
3. Find the volume of ellipsoid generated by revolving $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ between the ordinates $x = \pm a$ about x-axis.
4. Find the centre of gravity of a solid hemisphere.
5. Determine the moment of inertia of a uniform rod of length 2l,
   Cross-sectional area "a" about an axis perpendicular to the rod and passing through the mid-point of the rod.

UNIT-6: INTEGRATION

3 MARK QUESTIONS

1. Write the order and degree of the differential equation $\left(\frac{dy}{dx}\right)^8 + 3\frac{d^2y}{dx^2} - ye^x = 0$.
2. Form the differential equation by eliminating arbitrary constants in $y = m e^{2x}$.
3. Solve $xdx + ydy = 0$.
4. Solve $\frac{dy}{1+y^2} = \frac{dx}{1+x^2}$.
5. Solve $e^x dx + dy = 0$.

5 MARK QUESTIONS

1. Form the differential equation by eliminating arbitrary constants A and B in $y = Ae^x + Be^{-x}$.
2. Form the differential equation by eliminating arbitrary constants in $y = a\cos mx + b\sin mx$.
3. Solve $(1 + y)dx + (1 + x)dy = 0$.
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + y\tan x = \cos x$

6 MARK QUESTIONS

1. Solve $x(1 + y^2)dx + y(1 + x^2)dy = 0$.
2. Solve $\sec^2 x \tan y\, dx + \sec^2 y \tan x\, dy = 0$.
3. Solve $x\frac{dy}{dx} + y = x^3$
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + 2y\cot x + \sin 2x = 0$

Government of Karnataka
Department of Technical Education, Bengaluru

Course: ENGINEERING MATHEMATICS - II

Course code: 15SC02M

Curriculum Drafting Committee 2015-16

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1	**Dr.MokaShekhu**	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	:**APPLIED SCIENCE**	Course Code	: **15SC03S**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **4:0:0**	Credits	: **4 Credits**
Type of course	: **Lecture &Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programme: **Common to all Engineering Diploma Programmes**			

Prerequisite:

Dynamics, Heat, Sound, Matter, recent trends in Physics, Basic chemistry in Secondary Education.

Course Objective:

1. Learn concepts of Units, Laws of vectors, parallel forces, moment of force, couple.
2. Learn the fundamentals of properties and behavior of the materials
3. Learn the concepts of heat and thermodynamics.
4. Enhance theoretical and practical principles with applications of sound wave.
5. Understand different types of communication systems.
6. Develop awareness about corrosion, materials, and energy sources in engineering field.

Course Content:

UNIT I:MECHANICS **(08 Hrs)**

Units and Measurements: Definition of unit, types of unit (fundamental and derived)
SI units: Definition, Basic and supplementary units, advantages.
Measuring Instruments: Vernier calipers, principle and least count, diagram of vernier calipers with labeling the parts. Screw gauge(pitch, ZE, ZC), principle and least count, diagram of screw gauge with labeling the parts, simple problems.

Scalars and Vectors: Definition of scalar and vector with examples, representation of a vector, definition of resultant, equilibrium and equilibrant. Laws of vectors: Statement of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Deriving an expression for magnitude and direction of resultant of two vectors acting at a point. Resolution of vectors, mentioning rectangular component of resolution of vector.

Experimental verification of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Simple problems on laws of vectors

Parallel forces. Types of parallel forces, Moment of force: definition, S.I unit, types and examples. Couple: definition with examples. Moment of a couple. Conditions of equilibrium of coplanar parallel forces, applications. Experimental verification of Conditions of equilibrium of coplanar parallel forces using moment bar and simple problems.

UNIT-2: PROPERTIES OF SOLIDS AND LIQUIDS: (10 Hrs)

Properties of solids: Definitions of deforming force, elasticity and plasticity, examples for elasticity and plasticity, definition of stress and its types with examples and its S.I unit, definition of strain and its types with examples, elastic limit, Hooke's law, stress - strain graph with explanation. Modulie of elasticity and its types, derivation of an expression for Young's modulus of a material. Definition of Compressibility and factor of safety. Simple problems on stress, strain and Young's modulus.

Properties of liquids: Definition of thrust and pressure with S.I units. Derivation of expression for pressure at a point inside the liquid at rest, simple problems.

Energy of liquid in motion: Kinetic, Potential energies and Pressure energy in moving liquid. Bernoulli's theorem: statement and expression (No derivation). Cohesive and adhesive forces, angle of contact.

Surface Tension: Definition of surface tension and its S.I unit, factors affecting surface tension, applications of surface tension, capillarity and its applications.

Viscosity: Types of flow of liquid, definition of stream line flow and turbulent flow, definition of viscosity, expression for coefficient of viscosity, experimental determination of coefficient of viscosity of water, effect of temperature on viscosity. List of applications of viscosity. Simple problems.

UNIT III: HEAT AND PROPERTIES OF GASES. (07Hrs)

Concept of heat & temperature: Definitions of heat and temperature with S.I units, definition of Specific heat of substance with S I unit, equation for specific heat of a substance (no derivation).

Transmission of heat: Definitions of conduction, convection and radiation with examples, definition of thermal conductivity, derivation of co-efficient of thermal conductivity(K) and its S.I unit. Applications of conduction, convection and radiation, simple problems on K.

Gas laws: Statement of Boyle's law, Charle's law, Gay-Lussac's law, derive the relation between them (PV=nRT), definition of C_p and C_v ,relation between them (Mayer's equation no derivation), simple problems on Boyle's law and Charle's law.

Thermodynamics: Definition of thermodynamics, Laws of thermo dynamics: Zeroth law, I^{st}law and II^{nd}law (only statement), types of thermodynamics process: isothermal process, adiabatic process.

UNIT IV: WAVE MOTION (10Hrs)

Simple Harmonic Motion: Definition of periodic motion with example, definition of Simple Harmonic Motion, representation of S.H.M with respect to particle in circular motion, derivation of displacement of a particle executing S.H.M. Definitions of period, frequency, amplitude, in case of vibrating particle.

Wave: Definition of wave, wave period(T), wave frequency (n or f), wave amplitude (a), wave length(λ) and wave velocity (v) in case of wave motion. Derive the relation between v, n and λ. simple problems.

Types of waves: Mechanical and Non mechanical waves with examples. Definition of longitudinal and transverse waves, differences.

Propagation of sound waves in air: Newton's formula for the velocity of sound in air and Laplace's correction to it, various factors affecting velocity of sound in air. Simple problems.

Vibrations: Free vibrations, Forced vibration, Damped vibrations and Un-damped vibrations with examples. Resonance with examples. Laws of transverse vibrations of stretched string, derivation of equation for fundamental frequency of vibrations of stretched string. Simple problems.

Experiment to determine the unknown frequency of a given tuning fork by absolute and comparison methods using sonometer.

Stationary waves: Formation of stationary waves and their characteristics. Experimental determination of velocity of sound in air by using resonance air column apparatus.

Beats: Formation of Beats, definition of beat frequency, its applications.

UNIT V:MODERN PHYSICS (07Hrs)

Electromagnetic waves: Definition, generation of electromagnetic waves and their properties.

Electromagnetic spectrum: Definition, classification and its applications.

Lasers: Principle and listing the types of Laser, properties of Laser, applications.

Nano-Technology: Definition of Nano-Technology, advantages and dis-advantages of nano-Technology.

Advance Communication Systems: Basic elements of communication systems with block diagram, List commonly used terms in electronic communication systems.

Satellite communication: Introduction, advantages and disadvantages,
Optical fiber: principle and applications.

UNIT VI: INDUSTRIAL CHEMISTRY (10 Hrs)

Electrolysis: Definition of electrolyte, types of electrolytes with examples, definition of electrolysis. Arrhenius theory of electrolytic dissociation. Mechanism of Electrolysis. Faradays laws of Electrolysis: state and explain.
Corrosion: Definition, necessary conditions for corrosion, electrochemical theory of corrosion, list the preventive methods of corrosion.
Batteries: Basic concept, classification and applications of batteries.
Fuel cells: Definition, mentioning the types and advantages.
Metallurgy: Definitions of minerals, ore, flux, slag, alloys. Purpose of making alloys, composition and uses of alloys.
Polymers: Definition and classification of polymers, methods of polymerization and applications.
Composite materials: Definition, types, advantages and dis-advantages of composite materials.
Solutions: Definition of solute, solvent, solutions. Saturated and unsaturated solutions, concentration of solutions: normal, molar and molal solutions, simple problems on concentration of solution.
pH Value: Hydrogen ion concentration and concept of pH, definition of pH of solution, pH scale, applications of pH in different fields.

Course Delivery:

The Course will be delivered through lectures, class room interaction and exercises.

Course Outcome:

On successful completion of the course the student will be able to:

1. Determine the dimensions of objects using measuring instruments and analyze vector in mechanics.
2. Create knowledge of properties of matter applicable to engineering.
3. Apply the concepts of thermal properties of matter and gas laws related to engineering.
4. Analyse the different concepts of waves and vibration in the field of engineering.
5. Analyse the recent trends in physics related to engineering.
6. Apply the basic concepts of chemistry in the field of engineering.

Mapping Course Outcomes with Program Outcomes:

CO –PO mapping

	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Determine the dimensions of objects using measuring instruments and analyze vector in mechanics	1,2,3,4,9	R/U/A	08	8	10	6	24
CO2	Create knowledge of properties of matter applicable to engineering.	1,2	R/U/A	10	6	15	6	27
CO3	Apply the concepts of thermal properties of matter and gas laws related to engineering	1,2,3,9	R/U/A	07	4	10	6	20
CO4	Apply the different concepts of waves and vibration in the field of engineering.	1,2,3,9	R/U/A	10	4	10	18	32
CO5	Apply the recent trends in physics related to engineering.	1,2,6	R/U/A	07	4	10	6	20
CO6	Apply the basic concepts of chemistry in the field of engineering.	1,2,6	R/U/A	10	4	20	6	30
		Total Hours of instruction		52	Total marks			153

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Applied Science	3	3	3	1	-	2	-	-	2	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference Books:

1. Principle of physicsfor class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabusS.Chand and Company, New Delhi
2. Engineering chemistry for Diploma by Ranjan Kumar Mahapatra (PHI Learning Pvt. Ltd., New Delhi)
3. Basic Physics by Kongbam Chandramani Singh (PHI Learning Pvt. Ltd., New Delhi)
4. Principle of physics by P.V.Naik (PHI Learning Pvt. Ltd. New Delhi)

Website:

1. www.rsc.org/Education/Teachers/resources/Inspirational/…/4.3.1.pdf
2. www.nanogloss.com/nanotechnology/advantages and disadvantages
3. www.freebookcentre.net/physics/ introductory-physics-books.html

e-books:

1. Introduction to physics – II, Robert P Johnson.
2. Lecture notes physics university of Rochester.
3. Text book of Physics poynting J.H Thomson sir J.J.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Three tests (average of three tests will be computed)	20	Blue Books	1 to 6
		Class room Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	05	Log of Activity	1 and 6
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 6 Effectiveness of delivery of instructions and assessment

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	APPLIED SCIENCE	20
	Year:	Course code:15SC03S	
Name of Course coordinator :			Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal Choice may be given for each CO at the same cognitive level (CL).

Question Paper Blue Print:

Course Title	:**APPLIED SCIENCE**	Course Code	: **15SC03S**

Name and Unit No.	Allotted Hours	Questions to be set for (2marks) PART - A	Questions to be set for (5marks) PART - B	Questions to be set for (6marks) PART - C
Mechanics **I**	08	04	02	01
Properties of Solids and Liquids **II**	10	03	03	01
Heat and properties of gases **III**	07	02	02	01
Wave motion **IV**	10	02	02	03
Modern Physics **V**	07	02	02	01
Industrial chemistry **VI**	10	02	04	01
Total	**52**	**15**	**15**	**8**

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of model fixed for each unit.
2. The question paper pattern provided should be adhered to

Part – A: 10 questions to be answered out of 15 questions each carrying 02 marks
Part – B: 10 questions to be answered out of 15 questions each carrying 05 marks.
Part – C: 05 questions to be answered out of 08 questions each carrying 06 marks.

Model Question Paper:

Code:15SC03S

I Semester Diploma Examination

APPLIED SCIENCE

(Common for All Engineering Programmes)

Time: 3 Hours][Max Marks: 100

***Note*:** i) Answer any 10 questions from section A, each carry 02marks.
ii) Answer any 10 questions from section B, each carry 05 marks.
iii) Answer any 05 questions from section C, each carry 06 marks.

SECTION – A

1. Define Unit.
2. Differentiate scalars and vectors.
3. Define Resultant of forces.
4. Define moment of couple.
5. Define plasticity.
6. Define compressibility.
7. Define viscosity of liquid.
8. Define specific heat of substance.
9. Define thermodynamics.
10. Define time period.
11. Define beats.
12. Define Electro-magnetic waves.
13. Define Nano-Technology.
14. Define electrolyte.
15. Define composite materials.

PART-B

1. Draw a neat diagram of Vernier calipers and label its parts.
2. Write the condition for equilibrium of coplanar parallel forces with an example.
3. Explain stress-strain graph.
4. Define K.E of liquid in motion. State Bernoulli's theorem.
5. Define capillarity? Write any three application of surface tension.
6. State 1st law of thermodynamics. Explain isothermal & adiabatic process.
7. State the three gas laws.(Boyle's law, Charle's law & Gay-Lussac law)

8. Explain mechanical &non- mechanical waves with examples.
9. Distinguish between longitudinal & transverse waves.
10. Write any three advantages and two disadvantages of F.M.
11. Write the principle of laser. Lists its properties.
12. Explain the mechanism of electrolysis of HCL.
13. Write the basic concepts of batteries. Mention any three applications of batteries.
14. Distinguish between minerals and ore. Write any three applications of pH.
15. Define composite materials. Write the advantages of composite materials.

PART-C

1. Derive an expression for magnitude and direction of resultant of two forces acting at a Point.
2. Describe an experiment to determine coefficient of viscosity of water by Poiseuille's method.
3. 1.25cc volume of a gas at 15^0C &755mm of mercury pressure. Calculate volume at NTP.
4. Derive an expression for fundamental frequency of transverse vibrations of stretched string.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Calculate the velocity of sound in air at 25^0C & 75cm of mercury pressure, if the density of air at 0^0C & 76cm of mercury pressure is $1.29 kgm^{-3}$. (given γ=1.41 for air).
7. Write the basic elements of communication system with block diagram.
8. Explain any two methods of polymerization.

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Model Question Bank:

Course Title :**APPLIED SCIENCE**	Course Code : **15SC03S**

UNIT – I : MECHANICS

PART – A (02MARKS QUESTIONS)

1. Define unit of a physical quantity.
2. Define fundamental and derived units.
3. List supplementary units in S.I systems.
4. Define S.I units give two eg of S.I, basic units.
5. Define least count of measuring instrument.
6. Write the principle of Vernier calipers and screw gauge.
7. Define least count of Vernier calipers?
8. Define pitch of a screw.
9. Define ZE and ZC in screw gauge.
10. Define scalar quantity & give its examples.
11. Define vector quantity & give its examples.
12. Write the relation between resultant and equilibrant.
13. State law of parallelogram of vectors.
14. State Converse law of triangle of forces.
15. State Lami's theorem.
16. Define moment of force.
17. Write the two rectangular component of a vector.
18. Write how moment of force is measured.
19. Discus why the handles of the doors and windows are fixed at the end.
20. Define couple.
21. Define is moment of couple.
22. Write how you measure moment of couple.
23. Define equilibrium.
24. Write the conditions of equilibrium when number of co-planar parallel forces acting on a body.
25. Define like & unlike parallel forces.

PART – B (05 MARKS QUESTIONS)

1. Mention seven basic units and two supplementary units of SI system.
2. Draw a neat diagram of Vernier calipers and label its parts.
3. Draw a neat diagram of Screw Gauge and label its parts.
4. Explain parallel forces with their types.

5. List two types of moment of force. Write any three applications of couple.
6. Write the advantages of S.I system.
7. Mention the difference between scalars and vectors.
8. State Converse law of triangle of forces; write the line diagram & equation of Converse law of triangle of forces.
9. State Lami's theorem, write the line diagram & equation of lami's theorem
10. Define moment of force, write the equation to measure moment of force & give its examples.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for magnitude and direction of resultant of two forces acting at a point.
2. Derive an expression for horizontal and vertical components of force acting at an angle θ with horizontal.
3. Write the conditions for equilibrium of coplanar parallel forces acting on a rigid body with equations & diagram.
4. Describe an experiment to verify law of parallelogram of forces.
5. Describe an experiment to verify Converse law of triangle of forces.
6. Describe an experiment to verify Lami's theorem.
7. Describe an experiment to verify the conditions of equilibrium of co-planar parallel forces using moment bar.
8. A main scale is divided into 0.5 mm the length of vernier attached to it is 12mm and is divided into 25equal parts. Calculate the value of 1vsd and L.C of vernier.
9. In Vernier calipers, main scale is divided into 1mm;9division of main scale is divided into 10 equal parts on Vernier scale. In a setting zero of Vernier scale lies between 4.8cm and 4.9cm, and 7^{th} division of vernier coincide with the main scale division. What is the total reading?
10. A screw gauge has a pitch of 0.5mm and 50 divisions on head scale. The reading when jaws touch is +5div. When gripping a wire the reading is 3 turns and 17 div. What is the diameter of the wire?
11. The resultant of two equal forces acting at a right angle to each other is 1414N.Findthe magnitude of each force.
12. Two forces of 5kg wt. and 10kg wt. acts at right angles to one another. Find the magnitude and direction of the resultant forces.
13. Two unlike parallel forces equal to 20N and 12N acts at two points A and B on a rigid body. Find the magnitude and direction of their resultant and the point where it acts if AB=0.8m
14. Two like parallel forces equal to 80N and 100N act on a body at two points A and B. If AB=0.6m,find the magnitude and the point where there resultant acts.
15. Three forces P, Q and 100 N acting on a body in equilibrium. If the angles opposite to P and Q are 120^0 and 150^0 respectively. Find the magnitude of P and Q.

UNIT II: PROPERTIES SOLIDS & LIQUIDS

PART – A (02MARKS QUESTIONS)

1. Define plasticity.
2. Define elasticity.
3. Define deforming force.
4. Define restoring force.
5. Define stress.
6. Write the types of stress.
7. Define strain.
8. Write the type of strain.
9. Define elastic limit.
10. State Hooke's law.
11. Define Young's modulus.
12. Define Bulk modulus.
13. Define Rigidity modulus.
14. Define compressibility? Write its S.I unit.
15. Write S.I units of stress and strain.
16. Define pressure of liquid.
17. Write equation for the pressure at a point inside the liquid at rest.
18. State Bernoulli's theorem.
19. Define cohesive force.
20. Define Adhesive force.
21. Write reason why glue stick to paper?
22. Define angle of a contact.
23. Name the type of angle of a contact formed for water and glass, water and mercury.
24. Define surface tension.
25. List the factors affecting surface tension.
26. Define capillarity.
27. Write any four applications of capillarity.
28. List the applications of surface Tension.
29. Write the equation used to determine surface tension of water by capillary raise method.
30. Define viscous force.
31. Give two examples of viscous liquid.
32. Define co-efficient of viscosity. Write its S.I unit.
33. List the factors affecting viscosity of liquid.
34. Write the effect on viscosity of gas if temperature is increased.
35. Write any four applications of viscosity.
36. List the types of flow of liquid.

PART – B (05 MARKS QUESTIONS)

1. Explain elasticity with an example.
2. Define elasticity and list three types of modulei of elasticity.
3. Define strain. Write the types of strain. Give e.g. for each type of strain.
4. Define stress. Write the types of stress. Give e.g. for each type of stress.
5. Define elastic limit. State Hooke's law? Write its mathematical form .
6. Explain stress-strain graph.
7. Define compressibility and factor of safety. Write the SI unit of stress.
8. Define thrust and pressure, write their SI units.
9. Define K.E and P.E of liquid. State the Bernoulli's theorem.
10. Define cohesive and adhesive force with an example.
11. Define pressure energy and angle of contact.
12. Define two types of flow of liquid with an example.
13. Define angle of a contact. What type of angle of contact is formed for water and glass, water and mercury? List the factors affecting surface tension.
14. Define capillarity. Write any four applications of capillarity.
15. Write the difference between stream line flow and turbulent flow of liquids.
16. Define viscosity and write the effect of temperature on viscosity of liquid & gas.
17. Define stress and explain the types of stress.
18. Define strain and explain the types of strain.
19. State Hooke's law? List any three applications of viscosity.
20. Define surface tension. Mention any three factors affecting surface tension.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for young's modulus of elasticity.
2. Derive an expression for pressure at any point inside the liquid at rest.
3. Derive an expression for co-efficient of viscosity of liquid.
4. Describe an experiment to determine the surface tension of water by capillary rise method.
5. Describe an experiment to determine coefficient of viscosity of water by Poiseuille's method.
6. A uniform wire of length 0.5m and diameter 0.0006m when stretched by a mass of 5kgextends by 0.0004m. Calculate Young's modulus of wire.
7. A wire of length 1m is fixed at one end and a mass of 1kg is hung from free end, the area of cross section of the wire is 2.5×10^{-6} m^2 and the Young's modulus of the material of the wire is 2×10^{11} Nm^{-2}. Calculate stress, strain and extension of the wire.
8. A spring 60cm long is stretched by 2cm by the application of a load 200g. What will be the length when the load of 500g is applied (given g = 980cm/s^2).

9. A rectangular tank is 3m long,2m wide and 1.5m in height, it contains water to a depth of 1m,the density of water is 1000kg/m^3. Calculate the pressure at the bottom of the tank.
10. Calculate the pressure at the bottom of a swimming pool 10m wide if the water is 3m deep, the density of water is 1000kg/m^3.
11. A square plate of 6cm side moves parallel to another plate with a velocity of 10cm/s, both the plates being immersed in water (η = 0.01poise). If the distance between the plates 0.5mm.Calculate the viscous force.
12. In a certain experiment on the flow of water through a capillary tube, the following data were obtained. Volume of water coming out per minute = 15cc; pressure head of water = 30cm
    Length of tube = 25cm; radius of tube = 0.05cm; calculate coefficient of viscosity of water(g=980cm/s^2, density=1gm/cc)
13. A castor oil of viscosity 98.6NS/ m^2 fills the space between two horizontal plates1cm apart. If the lower plate is stationary and upper plate is moving horizontally with a velocity of 3m/s . Find the tangential force per unit area.

UNIT-III: HEAT AND PROPERTIES OF GASES.

PART – A (02MARKS QUESTIONS)

1. Define heat & write SI unit of heat.
2. Define temperature & write SI unit of temperature.
3. Define specific heat of substance & write its SI unit.
4. Define conduction of heat.
5. Define convection of heat.
6. Define Radiation of heat.
7. Define Thermal conductivity.
8. Define specific heat of a gas at constant volume.
9. Define specific heat of a gas at constant pressure.
10. State Boyle's law.
11. State Charle's law.
12. State Gay-Lussac's law
13. Define isothermal process.
14. Define adiabatic process.
15. Define thermodynamics.
16. State zeroth law of thermodynamics.
17. State I^{st} law of Thermodynamics.
18. State II^{nd} law of Thermodynamics
19. Write Mayer's equation.

PART – B (05 MARKS QUESTIONS)

1. Write any five differences between heat & temperature.

2. Define heat, temperature & specific heat of Substance. Write Mayer's equation for gas.
3. Define conduction, convection, radiation and thermal conductivity.
4. Write any five applications of conduction.
5. Write any five applications of convection.
6. Write any five applications of radiation.
7. Define Cp & Cv , write the relation between them.
8. Define conduction, write applications of conduction.
9. Define convection, write applications of convection.
10. Define radiation, write applications of radiation..
11. State 1st law of thermodynamics, explain isothermal & adiabatic process.
12. Derive an expression for coefficient of thermal conductivity (K).
13. Compare the three modes of transfer of heat.
14. State the three gas laws. (Boyle's law, Charle's law & Gay-Lussac's law).
15. State zeroth law, 1st law& 2nd law of thermodynamics.

PART – C (06 MARKS QUESTIONS)

1. With usual notations prove that pv = nRT
2. Define thermal conductivity. Derive an equation for co-efficient of thermal conductivity (K).
3. Define specific heat of a substance. Derive an equation for specific heat of substance.
4. Describe an experiment to verify Boyle's law.
5. The volume of a gas at 27^0c at2 atmospheric pressure is 2 liters.
   If the pressure is double & absolute temperature is reduced to half.
   What will be the new volume of gas?
6. A sealed glass bulb contains air at 30^0C at normal pressure. The bulb is immersed in an oil bath &heated gradually. Find the temperature in degree centigrade at which the bulb bursts if it can withstand a maximum pressure of 3.5atm.
7. The volume of certain mass of a gas at STP is $2x10^{-4}$ m^3. Find its volume at 27 ^{0}C at pressure $2.2x10^5$ Pa.
8. The volume of a gas at 15^0C is1.25cc &755mm of mercury pressure. Calculate volume at NTP.
9. How much heat is required to raise the temperature of 5kg of copper from 27^0C to its melting point of 1063^0C? Given that specific heat of copper is 400 J/k^{0}C.
10. A hot iron ball of mass 0.2kg is dropped into 0.5g of water at 10^0C. The resulting temperature is 30^0C. Calculate the temperature of the hot ball. Specific heat of iron = 336J/kg^{0}C and specific heat of water = 4200J/kg^{0}C.
11. A silver rod 0.15m long has cross-sectional area of $0.0003m^2$. If one end is maintained at 10^0C and other end at 75^0C. How much heat will flow through the rod in 5 minutes? Given that co-efficient of thermal conductivity of silver = 406 J/ms^{0}C.

UNIT-IV: WAVE MOTION

PART – A (02MARKS QUESTIONS)

1. Define frequency and amplitude of a vibrating particle.
2. Wrote the relation between frequency and time period.
3. Define periodic motion with example.
4. Define S.H.M with example.
5. Write the equation for displacement of the particle in S.H.M.
6. Define wave motion.
7. Define wave period, wave frequency.
8. Write the relation between wave velocity, wavelength & wave frequency
9. Define non mechanical wave. Give an example.
10. Define mechanical wave. Write two types of Mechanical wave
11. Define transverse wave & give an example.
12. Define longitudinal wave & give an example.
13. Write any two differences between transverse wave and longitudinal wave.
14. Write two characteristics of transverse wave.
15. Write two characteristics of longitudinal wave.
16. Write Newton's equation for velocity of sound in a medium and name the terms involved in the equation.
17. Write the Newton's Laplace equation for velocity of sound in air
18. Write the effect of pressure on velocity of sound in air.
19. Write the effect of temp on velocity of sound in air.
20. Write the equation for velocity of sound in air at 0°c.
21. Write the effect of humidity on velocity of sound in air.
22. Define free and forced vibration.
23. Define natural frequency.
24. Define resonance.
25. Give any two practical examples of resonance.
26. Define how stationary waves are produced?
27. Write any two characteristics of stationary waves.
28. Define nodes and antinodes.
29. Write the difference between stationary waves and progressive waves.
30. Write the fundamental note in vibration of stretched string.
31. Write the formula for the fundamental frequency of vibration of stretched string.
32. State the law of tension as applied to the vibration of stretched string.
33. State the law of length as applied to the vibration of stretched string.
34. State the law of mass per unit length as applied to the vibration of stretched string.
35. Define beats.
36. Define beat frequency.
37. Write any two applications of beats.

38. Write how beat frequency can be calculated?

PART-A (05 MARKS QUESTIONS)

1. Define period, frequency & amplitude of vibrating particle.
2. Explain mechanical &non mechanical waves with examples.
3. Define longitudinal waves & transverse waves.
4. Define beat and beat frequency.
5. Obtain the relation between v, n and λ.
6. Define periodic motion & SHM with example in each.
7. Derive an expression for displacement of a particle executing SHM.
8. Define wave period, wave frequency, wave amplitude, wave length and wave velocity.
9. Distinguish between longitudinal & transverse waves.
10. Explain propagation of sound waves in air with practical example.
11. Describe Newton's formula for velocity of sound in air.
12. Explain Newton's formula for velocity of sound in air and hence Laplace correction to it.
13. Explain various factors affecting velocity of sound in air.
14. What is stationary wave? Mention the characteristics of stationary waves.
15. Why the soldiers are asked to break steps while marching across bridges.

PART- C (06 MARKS QUESTIONS)

1. Derive an expression for displacement of a particle executing SHM
2. Derive an expression for velocity of wave in terms of its frequency and wavelength.
3. Derive an expression for fundamental frequency of vibrations of stretched string.
4. Describe an experiment to determine the velocity of sound in air at room temperature by resonance air column method.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Describe an experiment to determine frequency of Turing fork by absolute method using sonometer.
7. A wave of frequency 600MHZ travels at a speed of $3x10^8$ m/s. Calculate its wavelength &calculate the frequency of same type of wave whose wavelength is 40m.
8. If the frequency of tuning fork is 500Hz & velocity of sound is 300m/s. Find how far sound travels while the fork completes 25 vibrations.
9. Calculate the velocity of sound in air at 25^0C & 75cm of mercury pressure, if the density of air at 0^0C & 76cm of mercury pressure is 1.29kgm^{-3}. (Given γ=1.41 for air).
10. Calculate the speed of sound at -50^0 C & at $+100^0$C, given speed of sound at 0^0c is 332 m/s.
11. The density of air at NTP is 1.293 kgm^{-3}&γ=1.402. Calculate the frequency of a tuning fork which emits sound of wavelength 0.75m at 26^0 c.
12. A string of length 2m is stretched by a force of 3200N. If the frequency of vibration is

100Hz. Find the mass of the string.

13. A string has length of 0.3m & weight $2x10^{-3}$kg. What must be the tension in the string so that when vibrating string transversely, it has a fundamental frequency 320 Hz?
14. A Sonometer wire of 0.5m long vibrates in two segments & is stretched by a force of 5kg wt. Calculate the frequency of the note emitted. ($g=9.8m/s^2$ linear density of the wire=0.018kg/m).
15. The frequency of Sonometer wire is doubled when the tension is increased by 12kg wt. Find the original tension.

UNIT V: MODERN PHYSICS

PART – A (02MARKS QUESTIONS)

1. Define electromagnetic waves.
2. State two characteristics of electromagnetic waves.
3. Write how electromagnetic waves are produced?
4. Define electromagnetic spectrum.
5. Write any two uses of electromagnetic spectrum.
6. Write the principle of LASER.
7. List any two types of LASER.
8. Write any two principle of LASER.
9. Write any two applications of LASER.
10. Define nanotechnology.
11. Write two advantages of nanotechnology.
12. Write two disadvantages of nanotechnology.
13. Write what do you mean by communication?
14. Write the basic elements of communication system.
15. List any two commonly used terms in electronic communication system.
16. Write two advantages of communication satellite.
17. Write two disadvantages of communication satellite.
18. Define optical fiber.
19. Write the principle of optical fiber.
20. Write two advantages of optical fiber.

PART-B (05 MARKS QUESTIONS)

1. Describe the generation of electromagnetic waves.
2. Write any five properties of electromagnetic waves.
3. Explain how electromagnetic spectrum is classified?
4. Write any five applications of electromagnetic spectrum.
5. Explain the principle of LASER. List the properties of LASER.
6. Write any five advantages of LASER.
7. Write five advantages of nanotechnology.
8. Write advantages and disadvantages of nanotechnology.

9. Write the block diagram of communication system.
10. List any five commonly used terms in electronic communication system..
11. Write five advantages of satellite communication.
12. Write any five disadvantages of satellite communication.
13. Write any five advantages of optical fiber.
14. Explain satellite communication. List any two disadvantages of satellite communication system.

PART- C (06 MARKS QUESTIONS)

1. Define electromagnetic waves. Write four properties of electromagnetic waves.
2. Define electromagnetic spectrum. Explain how electromagnetic spectrum is classified.
3. Write the applications of electromagnetic spectrum.
4. List six applications of LASER.
5. Write six advantages of nanotechnology.
6. Write what you mean by communication system. Write the block diagram of communication system..
7. Define satellite communication system. Write four advantages of satellite communication system.
8. Write the principle of optical fiber. Write four applications of optical fiber.

UNIT VI INDUSTRIAL CHEMISTRY

PART – A (02MARKS QUESTIONS)

1.Define electrolysis.
2.Define electrolyte.
3.Write any four examples of electrolyte.
4.Define strong and weak electrolyte.
5.Write any two postulates of Arrhenius theory of electrolytic dissociation.
6.State Faradays Ist law of electrolysis.
7.State Faradays IInd law of electrolysis.
8.Define corrosion.
9.List any two preventive methods of corrosion.
10.Define batteries.
11.Write any two applications of batteries.
12.Define fuel cells.
13.Write any two types of fuel cells.
14.Write any two advantages of fuel cells.
15.Define minerals.
16.Define ore.
17.Define flux.
18.Define slag.
19.Define an alloy.
20.Write any two uses of alloys.

21.Define polymers.
22.Define polymerization.
23.Write any two applications of polymers.
24.List the methods of polymerization.
25. Define composite materials.
26.Write any two types of composite materials.
27.Write two advantages of composite materials.
28. Write two disadvantages of composite materials.
29.Define solute.
30.Define solvent.
31.Define solution.
32.Define saturated solution.
33.Define unsaturated solution.
34.Define concentration of a solution.
35.Define normal solution.
36. Define molar solution.
37.Define molal solution.
38.Define pH of a solution.
39.Write any two applications of pH.
40.Write hydrogen ion concentration in case of neutral solution.

PART-B (05 MARKS QUESTIONS)

1.Explain the mechanism of electrolysis of HCl.
2.Define corrosion. Write the necessary condition of corrosion.
3.Write any five postulates of Arrhenius theory of electrolytic dissociation.
4.State Ist and IInd Faradays laws of electrolysis.
5.Write any five preventive methods of corrosion.
6. Write the classification of batteries. Write two applications of batteries.
7. Write two types of fuel cells. List any three advantages of fuel cells.
8.Define alloys. Write the purpose of making alloys.
9. Write the classification of polymers. Write any three applications of polymers.
10.Define composite material. Write any two advantages of composite materials.
11. Calculate the concentration of solution when 110gmof copper sulphate is dissolved in 550gm of a solvent.
12. Define pH of a solution. Explain acid, base, and neutral solution on the basis of pH value.

PART- C (06 MARKS QUESTIONS)

1. State and explain Faradays laws of electrolysis?
2. Explain the mechanism of electrolysis of HCL.
3. Define corrosion. Write the necessary condition for corrosion.
4. Write any six preventive methods of corrosions.
5. Explain the electrochemical theory of corrosion.

6. Mention what is battery? Write the applications of batteries.
7. Define fuel cells. Mention the types of fuel cells.
8. Write the advantages of fuel cells.
9. Define minerals, ore, flux, slag and alloys?
10. Write the composition steel. List three uses of alloys.
11. Explain any two methods of polymerization.
12. Write the applications of polymers.
13. Write the advantages and disadvantages of composite materials.
14. Define molar and normal solution. What is concentration of a solution?
15 .Write any six applications of pH.

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE

Course code: 15SC03S

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
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3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. HanumanthaNayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
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Curriculum Review Committee

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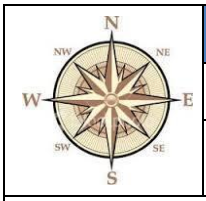
Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru



Course Title: **SURVEYING - I**		
Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE21T**
Type of Course: **Lectures, Self Study & Quiz**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Prerequisites: Knowledge of Basic Science and Mathematics in Secondary Education.

Course Objective:

1. To provide knowledge of basic Principles of surveying.
2. To develop the techniques of taking measurements and plotting the details.
3. Interpretation of data collected analyze and evaluate for the purpose of design, estimation

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Interpret the basics in surveying and chain surveying.	*R/U/Ap*	1,2,3,4,8.	10
CO2	Explain the principles of compass surveying and its applications.	*R/U/Ap*	1,2,3,4,5,8.	10
CO3	Illustrate the basics in levelling, types of levelling instruments and methods of levelling	*R/U/Ap*	1,2,3,4,8.	10
CO4	Discover the types of levelling, errors and its applications.	*U/Ap*	1,2,3, 5,7,8,10	10
C05	Explain the concept of contour, its uses and methods of contouring.	*R/U*	1,2,3,5.	05
C06	Compute area and volume of irregular figures.	*U/Ap*	1,2,3.	07
C07	Perform suggested activity related to surveying, exploring in groups and able to present it.	*U/Ap/Ay/C*	1 to 10	*
		Total sessions		52

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation
*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
SURVEYING-I	**3**	**3**	**3**	**3**	**3**	**1**	**3**	**2**	**1**	**2**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Contents

UNIT	COURSE CONTENTS	HOURS
1	INTRODUCTION Definition and objectives of surveying, primary divisions, classifications, and principle. CHAIN SURVEYING Purpose, Accessories, Principles of chain surveying, Different operations, Ranging, Cross staff survey simple problems, Plotting the chain survey, adopting suitable conventions, Errors & corrections in chain surveying, (without numerical problems)	10
2	COMPASS SURVEYING Introduction and purpose, Bearing & its type, Problems on bearings, Compass and its type, Dip and declination, Simple problems, Local attraction, Open and closed traverse, checks, Errors	10
3	LEVELLING – Terms used in leveling, types of levels, Bench marks, Temporary adjustments of level Concept of B.S, I.S, F.S, C.P, H.I and remarks, Simple leveling and differential leveling Reduction of levels i) Plane of collimation method ii) Rise and fall methods Problems on reduction of levels.	10

4	LEVELLING – APPLICATION Different types of leveling - fly leveling, check leveling, profile leveling, cross sectioning, Plotting of longitudinal and cross section, Errors in leveling and precautions, Setting grade stakes and setting out grades for sewers and problems on it.	10
5	CONTOURING Concepts of contour and terms used in contouring, characteristics of contour, uses of contours, Methods of contouring, Interpolation by arithmetical method, calculation of capacity of the reservoir.	05
6	AREAS & VOLUMES Computation of Area of Irregular figures using Trapezoidal & Simpson's rule - problems. Volumes of Irregular solids- using Trapezoidal & Prismoidal Rule - Problems on Embankment & Cutting	07
7	CASE STUDY	

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill and lifelong learning, communication, modern tool usage.

1. Prepare a spread sheet(Microsoft Excel) of Rise and fall method showing the calculation by using formula bar and present it
2. Prepare a spread sheet (Microsoft Excel) of Height of instrument method showing the calculation by using formula bar and present it
3. Compute the area of Nehru ground or any area/agriculture field by cross staff survey and present it
4. Compute the area of Nehru ground/ any area/agriculture field by Compass survey and present it
5. Chain triangulation
6. Find the volume of excavation of a drainage
7. Conduct a experiment to overcome obstacles in chaining and ranging.
8. Conduct a open traverse in chain surveying and represent the sign conventions in the field book.
9. Conduct a closed traverse in chain surveying and represent the sign conventions in the field book calculate area.
10. New Road survey
11. Survey conducted for Widening of existing road
12. Compute the capacity of reservoir/pond near by your locality
13. Sensitivity of bubble used in levelling

14. Two Peg Test
15. Three Wire Levelling
16. Permanent Adjustments of a Dumpy Level
17. Block levelling for sloped ground level and compute the volume of earth work excavation required to construct a building.
18. Layout Plan of Existing Campus
19. Contour Map of Existing Campus
20. Carryout reciprocal levelling and make a presentation
21. Presentation on Precise levelling, Digital levelling, Digital ground model, Data logger, Triangular grid model, Units of measurements used in survey from history
22. Select an irregular area/hillock conduct a block levelling and calculate the volume of earth and present it.
23. Explore and use surveying software's and present it.
24. Select an irregular area/hillock conduct a direct contouring and calculate the volume of earth and present it.

NOTE:
1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	5				
2.Fulfill team's roles & duties	2				
3.Conclusion	3				
4.Convensions	4				
Total	14				
Average=(Total /4)	14/4=3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Rubric Model- Example only:

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE*	IA	Students	Three test (average of three tests)	Test 1	20	Blue books	1,2
					Test 2			3,4
					Test 3			5,6
				Suggested activity		05	Reports	1 2 3 4,5,6,7
	SEE*	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1, 2,3, Delivery of course
	End of Course Survey			End of the course			Question naires	1,2,3, 4,5,6,7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE Cognitive Levels R	U	Ap	Marks weightage	weightage (%)	A*	B*
1	Introduction and chain surveying	10	30% **8**	30% **8**	40% **12**	28	19	1	2
2	Compass surveying	10	30% **8**	30% **8**	40% **12**	28	19	1	2
3	Leveling	10	35% **10**	30% **8**	35% **10**	28	19	2	2
4	Leveling application	10	18% **5**	35% **10**	47% **13**	28	19	2	2
5	Contouring	7	33% **6**	33% **6**	34% **7**	19	13	2	1
6	Areas and volumes	5	0% **0**	65% **9**	35% **5**	14	10	1	1
	Total	52	**37**	**49**	**59**	145	100	9	10

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A
B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**61**
2	Applying the knowledge acquired from the course	**39**

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	SURVEYING-I	20
	Year:	Course code:15CE21T	

Name of Course coordinator : Units:__
CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	II SEM	SURVEYING-I	20
	Year: 2015-16	Course code:15CE21T	

Name of Course coordinator :
Units:1, CO: 1,2.

Note: Answer all questions

	Question	M	CL	CO	PO
1	Define surveying. State the objects of surveying.	4	R	1	1,2,3,4,8.
2	Explain the following terms : a) Base line b) Check line c) Tie line.	3	U	1	1,2,3,4,8.
3	What is meant by local attraction? How it is detected and eliminated?	5	R/U	2	1,2,3,4,5,8.
4	Plot the following details of a field and calculate the area, all measurements being taken in metres. B0 8 5C A4 15 18 3D 30E	8	A	1	1,2,3,4,8.
	OR. The following bearings were observed with compass. Calculate the interior angles.			2	1,2,3,4,5,8.

Line	Fore bearing	Back bearing
AB	60° 30′	240^0 30’
BC	122^0 0’	302^0 0’
CD	46^0 0’	226^0 0’
DE	205^0 30’	25^0 30’
EA	300^0 0’	120^0 0’

TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P konetkar& S V Kulkarni
3. Plane Surveying by Dr.Alak De
4. Surveying and Levelling by S SBhavikatti
5. Surveying by Duggal
6. Surveying by R Agor
7. Fundamentals of Surveying by S K Roy
8. Surveying and Levelling by N NBasak

E-links

1. www.elearning.com/survey
2. http://nptel.ac.in/video.php?subjectId=105104101
3. http://media.sakshat.ac.in/NPTEL-IIT-Videos/
4. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
5. http://nptel.iitk.ac.in/

Model Question Paper

Code: **15CE21T**

Second Semester Diploma Examination

SURVEYING-I

Time: **3 hours]** **[Max**. Marks**: 100**

Note: 1. Answer any **SIX** questions from **Section-I**, Each question carries **5** marks
2. Answer any **SEVEN** questions from **Section-II**, Each question carries **10** marks

SECTION- I

1. Define surveying. State the objects of surveying.
2. Draw a suitable convention signs of hill, chain line, stream, benchmark,.
3. Compare Prismatic compass with surveyors compass
4. At a place the bearing of sun is measured at local noon and found to be 175^0 15'. What is the magnitude and direction of magnetic declination of the place?
5. Define the following terms
   i) Level line ii) Parallax iii) change point
6. Explain the temporary adjustments of a Dumpy level
7. What are the uses of taking L/S & C/S?
8. What are the different sources of errors in levelling?
9. What is Contour interval? List the factors affecting it.

SECTION- II

1. a) What is Reconnaissance survey and state its importance?
   b) Plot the following details of a field and calculate the area, all measurements being taken in metres.

	0	
	8	5
4	15	
	18	3
	30	

2. a) Differentiate between Check line and Tie line?

b) What is Reconnaissance survey and state its importance?

3. a) Compare WCB system and R.B. system.

b) Convert the following W.C.B to R.B

i) 10^0 ii) 45^0 15' iii) 135^0 45' iv) 315^0 15' v) 215^0 15'

4. The following bearings were observed in running a closed traverse.

Line	Fore bearing	Back bearing
AB	75^0 05'	254^0 20'
BC	115^0 20'	296^0 35'
CD	165^0 35'	345^0 35'
DE	224^0 50'	44^0 05'
EA	304^0 50'	125^0 05'

At what station do you suspect local attraction? Determine the corrected bearings

5. a) The following consecutive readings were taken with a dumpy level: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765. The first reading was taken with the staff held upon a BM of elevation 132.135. Enter the readings in level book form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points

b) Explain the method of block levelling.

6. a) Compare Rise & fall Method with Collimation method.

b) Calculate the reduce level by Rise and Fall method on a continuous sloping ground with four meter levelling staff at common interval of 30m.
0.855(onA),1.545,2.335,3.115,3.825,0.455,1.380,2.055,2.855,3.455,0.585,1.015, 1.850, 2.755,3.845 (on B);The reduced level of A was 380.500. Make the entries in a level book and apply usual checks.

7.In running Fly levels from a BM. Of RL. 384.705m the following readings were obtained :

BS: 3.215, 1.030, 1.295, 1.855

FS: 1.225, 3.290, 2.085

From the last position of the instrument, Six pegs at 25.00m intervals are to be set out on a uniformly falling gradient of 1 in 100, the first peg is to have RL of 384.500m. Work out the staff readings required for setting the top of the pegs on the given gradient.

8. Four sight rails are to be erected over points A,B,C and D 50m apart in a straight line. The invert level of sewer at d is 74.500m. The sewer is on a gradient of 1 in 200 rising from D to A. The RL of pegs on the surface of ground are 76.300, 75.500, 74.850, and 75.650 respectively from A to D. The height of sight rail at d is 1.5m. find the suitable height of the boning rod and height of the sight rail above the pegs at A, B, and C

9. a) Mention any three uses of contour.

b) The areas within the contour lines at the site of reservoir and face of the proposed dam are as follows.

Contour (m)	Area (m^2)
100	1000
103	128000
106	16600
109	18800
112	24400
115	30600
118	38400

If 100.00m is the bottom level and 118.00m is the maximum water level of the reservoir, calculate the capacity of reservoir using trapezoidal formula and Prismoidal formula.

10.A road of constant RL 120.00m runs from North to South. The GL along the centre line of the road are as follows:

Chainage	R.L.
0	117.50
30	116.25
60	115.95
90	116.65
120	117.20
150	117.85
180	115.70

Assuming no transverse slope, find the volume of earth work for a road of formation width 8.00m with side slopes 1.5 :1 by;

i) Trapezoidal method ii) Prismoidal method

Model Question Bank

CO1: Able to understand the basics in surveying and chain surveying.

LEVEL: REMEMBER QUESTIONS

1. What are the principles of surveying
2. What is the Principles of chain surveying,
3. Draw a suitable convention signs of hill, chain line, stream, benchmark

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the principles of surveying.

LEVEL: APPLICATION QUESTIONS

1. Plot the following details of a field and calculate the area, all measurements being taken in metres.

	0	
	8	5
4	15	
	18	3
	30	

CO2:. Understand the principles of compass surveying and its applications.

LEVEL: REMEMBER QUESTIONS

1. State any four instrumental and personnel errors in prismatic compass survey.

2. What are the sources of errors in compass survey and what precautions will you take to eliminate them.

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the temporary adjustments of Compass.
2. Explain prismatic compass with a neat sketch
3. Explain i) True Bearing and Magnetic bearing ii) Dip and Declination
4. Compare Prismatic compass with surveyors compass
5. Differentiate between i) fore bearing and back bearing ii) closed traverse and open traverse
6. What is meant by local attraction? How it is detected and eliminated?

LEVEL: APPLICATION QUESTIONS

1. Convert the following fore bearing to Back. Bearing
2. 125° 15’ b) N30° E c) 360° d) S45° 45’W e) N 25° 45’E
3. Compare WCB system and R.B. systems
4. Convert the following W.C.B to R.B
   a. 10^0 ii) 45^0 15’ iii) 135^0 45’ iv) 315^0 15’ v) 215^0 15’
5. Convert the following RB to WCB
6. i) N 30° 15’ W ii) N 45° 45’ E iii) S 15° 15’ W iv) S 2 5° 15’ E
7. The following bearings were observed in running a closed traverse.

8. Line	9. Fore bearing	10. Back bearing
11. AB	12. 75^0 05’	13. 254^0 20’
14. BC	15. 115^0 20’	16. 296^0 35’
17. CD	18. 165^0 35’	19. 345^0 35’
20. DE	21. 224^0 50’	22. 44^0 05’
23. EA	24. 304^0 50’	25. 125^0 05’

   a. At what station do you suspect the local attraction? Determine the corrected bearings

8.The following bearings were observed with compass. Calculate the interior angles.

7. Line	8. Fore bearing	9. Back bearing
10. AB	11. $60^{\circ}\ 30'$	12. 240^0 30’
13. BC	14. 122^0 0’	15. 302^0 0’
16. CD	17. 46^0 0’	18. 226^0 0’
19. DE	20. 205^0 30’	21. 25^0 30’
22. EA	23. 300^0 0’	24. 120^0 0’

9. At a place the bearing of sun is measured at local noon and found to be 175^0 15’. What is the magnitude and direction of magnetic declination of the place?
10. In an old survey made when the declination was 4^0W, the magnetic bearing of a given line was 210^0. The declination in the same locality is now10^0E. What is the true and present magnetic bearing of the line?

CO3:. Able to understand the basics in levelling, types of levelling instruments and methods of levelling

LEVEL: REMEMBER QUESTIONS

1. Define the following terms used levelling i) Level surface ii) level line iii) datum
2. What are the different types of levelling staff?

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the temporary adjustments of a dumpy level?
2. Comparison of HI method & Rise & Fall method of computing the levels?
3. Explain the special methods of spirit levelling.

LEVEL: APPLICATION QUESTIONS

1. The following consecutive readings were taken with a dumpy level: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765. The first reading was taken with the staff held upon a BM of elevation 132.135. Enter the readings in level book form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.
2. Calculate the reduce level by Rise and Fall method on a continuous sloping ground with four meter levelling staff at common interval of 30m.
   0.855(onA),1.545,2.335,3.115,3.825,0.455,1.380,2.055,2.855,3.455,0.585,1.015, 1.850, 2.755,3.845 (on B);The reduced level of A was 380.500. Make the entries in a level book and apply usual checks.

CO4:. Able to understand the types of levelling, errors and its applications.

LEVEL: REMEMBER QUESTIONS

What are the uses of taking L/S & C/S?

LEVEL: UNDERSTANDING QUESTIONS

1. What are the different sources of errors in levelling? How are they eliminated?

LEVEL: APPLICATION QUESTIONS

1. During the fly levelling operation the following observations were made :
   Back sight: 0.650, 2.155, 1.405, 2.655, 2.435
   Fore sight: 2.455, 1.305, 0.5555, 2.405

   The first back sight was taken on a BM of RL 100.500m. From the last back sight it is required to set four pegs each at a distance of 30m on a falling gradient of 1 in 100. Calculate the RL of these four pegs. Apply the check.
2. Four sight rails are to be erected over points A, B, C and D 50m apart in a straight line. The invert level of sewer at d is 74.500m. The sewer is on a gradient of 1 in 200 rising from D to A. The RL of pegs on the surface of ground are 76.300, 75.500, 74.850, and 75.650 respectively from a to D. The height of sight rail at d is 1.5m. find the suitable height of the boning rod and height of the sight rail above the pegs at A, B, and C.

CO 5: Concept of contour, its uses and methods of contouring.

LEVEL: REMEMBER QUESTIONS

1. What is Contour? What are the uses of Contour maps?
2. What is Contour interval? List the factors affecting it.

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the characteristics of contours with sketches
2. Mention the methods of locating Contours. Explain the method of locating contour by cross-sections
3. What is interpolation of contours? Explain arithmetical method of interpolating contours.

LEVEL: APPLICATION QUESTIONS

1. The areas within the contour lines at the site of reservoir and face of the proposed dam are as follows.

Contour (m)	Area (m^2)
100	1000
103	128000
106	16600
109	18800
112	24400
115	30600
118	38400

If 100.00m is the bottom level and 118.00m is the maximum water level of the reservoir, calculate the capacity of reservoir using trapezoidal formula and Prismoidal formula.

CO 6: Able to compute area and volume of irregular figures.

LEVEL: REMEMBER QUESTIONS

1. Write the formula to calculate the area of an irregular figure by
   a. Trapezoidal Rule
   b. Simpson's Rule
2. Write the formula to calculate the volume of an irregular figure by
   a. Trapezoidal Rule
   b. Prismoidal Rule

LEVEL: UNDERSTANDING QUESTIONS

1. Differentiate between Trapezoidal Rule and Simpson's Rule.

LEVEL: APPLICATION QUESTIONS

1. A road of constant RL 120.00m runs from North to South. The GL along the centre line of the road are as follows:

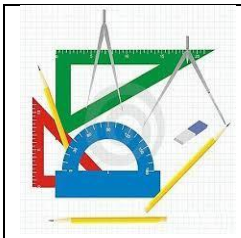
Chainage	R.L.
0	117.50
30	116.25
60	115.95
90	116.65
120	117.20
150	117.85
180	115.70

Assuming no transverse slope, find the volume of earth work for a road of formation width 8.00m with side slopes 1.5 :1 by;

ii) Trapezoidal method

iii) Prismoidal method.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru



Course Title: ENGINEERING DRAWING-II		
Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE22D**
Type of Course: **Tutorial and Drafting**	**Credit :03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

(*(Common to all Civil Engineering /Civil (Draughtsman/Environmental/Public Health Engineering/Water Technology and Health Sciences Programme)*****

Prerequisites: Student should know Engineering Drawing-I

Course Objectives

1. The course is aimed at developing Basic Drawing skills.
2. Develop Skills in Preparation of Engineering Drawings.
3. Develop Skills In Preparation of Engineering Drawings, their Reading and Interpretation

Course Outcomes

On successful completion of the course, the students should be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Draw Orthographic views of given Civil Engineering Objects.	R/U/Ap/Ay	1,2,3,4, 5,8,9,10	**15**
CO2	Develop the ability to draw the isometric view from the orthographic views of a given Building Components and vice versa.	U/Ap/Ay	1,3,8,9	**21**
CO3	Develop the perspective views for simple Civil Engineering components	R/U/Ap/Ay	1,2,3,5, 8,9	**12**
CO4	Build up the concept of developing cross sections for Building components.	R/U/Ap/Ay	1,2,3,5, 8,9,10	**09**
CO5	Develop Plan and Elevation for single and two room Buildings for sustainable development as per codal provisions	R/U/Ap/Ay	1,2,3,4 ,5,6,7,8, 9,10	**21**
			Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
ENGINEERING DRAWING-II	3	3	3	3	3	2	2	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Contents

UNITS	COURSE CONTENTS	HOURS
1	**PROJECTION OF SOLIDS** Introduction-Positioning of solids –Solid lying with base on HP- Solids lying with base or axis inclined to HP- Solids lying with one of the lateral faces on HP- Solids lying with one of their lateral edges on HP-Cylinder lying with its axis or base inclined to HP- Cone lying with its axis or base inclined to HP -Solid lying with their axis inclined to both HP and VP.	**15**
2	**CONVERSION OF ISOMETRIC VIEWS INTO ORTHOGRAPHIC VIEWS** Introduction –Guidelines for conversion of pictorial views into orthographic views-Illustrative problems.	**06**
3	**ISOMETRIC VIEWS** Principles of isometric Views Isometric views of simple solids – cube – prisms, pyramids, cylinder and cone . Conversion of orthographic views into isometric View Drawing of Isometric views of combination of solids , Civil Engineering components i.e. column footing, carpentry joints	**15**
4	**PERSPECTIVE PROJECTIONS** Technical terms used in perspective projection- one point Perspective projection and two point perspective projection for simple objects like Cube, Prism, Pyramids, combination of solids and simple civil engineering objects.	**12**
5	**CROSS SECTION OF BUILDING COMPONENTS** Conventional Representation of Civil Engineering materials. Cross section of Wall showing components of a Building from parapet to foundation through door, window, wardrobe, wall, steps & columns.	**09**
6	**BUILDING DRAWING** Draw Plan, Elevation and Section for Single ,Double Room Building and Three Room Building form the given line Diagram and Building details.	**21**
	Total	**78 Hrs**

Note: Grade exercises Plan in each unit should be as per table provided below.

Course Delivery: The course will be delivered through lectures with classroom practices and Power point presentations/ Video.

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Graded Exercises (Average of marks allotted to each graded exercise)	25	Drawing Sheets	1,2,3,4,5
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels						Marks weightage	weightage (%)	A*	B*	C*
			R	U	Ap	Ay	C	E					
1	Projection of solids	15	15% **4**	35% **10**	30.00% **7**	20.00% **5**	0.00% **0**	0.00% **0**	26	18		2	
2	Conversion of pictorial views into orthographic views	6	0% **0**	20% **2**	40.00% **5**	40.00% **5**	0.00% **0**	0.00% **0**	12	8	1		
3	Isometric projections	15	0.0% **0**	20.0% **5**	40.00% **11**	40.00% **11**	0.00% **0**	0.00% **0**	27	19		2	
4	Perspective projections	9	10.0% **2**	40.0% **7**	40.00% **7**	20.00% **3**	0.00% **0**	0.00% **0**	19	12		1	
5	Cross section of building components	9	15.00% **3**	30.00% **5**	30.00% **5**	20.00% **3**	0.00% **0**	0.00% **0**	16	12	2		
6	Building drawing	24	15.00% **6**	25.00% **10**	40.00% **16**	20.00% **8**	0.00% **0**	0.00% **0**	40	31			1
	Total	78							**140**	**100**	**3**	**5**	**1**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

A*-SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – A(any 2 out of 3)
B*- SEE QUESTIONS TO BE SET FOR (15MARKS) in PART – B(any 2 out of 5)
C*- SEE QUESTIONS TO BE SET FOR (35MARKS) in PART – C(Compulsory)

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**38**
2	Applying the knowledge acquired from the course	**31**
3	Analysis	**23**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**0**

GRADED EXERCISES

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
I	PROJECTION OF SOLIDS	5	Projection of solids	20
II	CONVERSION OF ISOMETERIC VIEWS INTO ORTHOGRAPHIC VIEWS	3	Isometric projections	15
III	ISOMETRIC PROJECTIONS	5	Isometric projections	20
IV	PERSPECTIVE PROJECTIONS	4	Perspective projections	16
V	CROSS SECTION OF BUILDING COMPONENTS	3	Cross section of building components	15
VI	BUILDING DRAWING	6	Building drawing	10
	TOTAL	**26**		**96**

TEXT BOOK

1. K.R.Gopalakrishna "Fundamentals of Drawing" Subhas Publications, 2010.
2. K.R.Gopalakrishna "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S.ChandPublishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited,2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw

Hill Publishing Company Limited, 2008.
6. Basant Agarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings

Model Question Paper

Code: **15CE22D**

II semester Diploma Examination

ENGINEERING DRAWING-II

Time: 4 Hours][Max. Marks: 100

Note: Answer Any Three full questions from Part-A, Any 3full Questions from Part B&Part C is compulsory.

Part –A(Any Two)

1. Draw the three principal views of the component as shown in the figure 1 10 marks

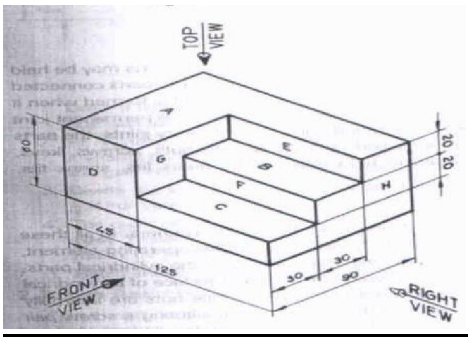


Fig-1

2. Draw the three principal views of the component as shown in the figure2

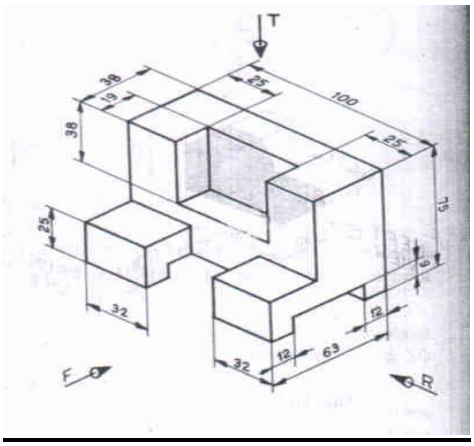


Fig.2

3.Show the conventional representation of Building materials in Section (IS: 962)10 marks
(a) Brick Masonary (b) Stone Masonary (c) Steel works (d)Wood

PART-B(Any Three)

4. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30^0 to HP. The edge on which the prism rests is inclined at 60^0 to VP. Draw its projections. 15marks

5. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections of the solid in its final position.
   15marks

6. Draw the isometric view of the following objects whose orthographic views are given Fig 3
   15 marks

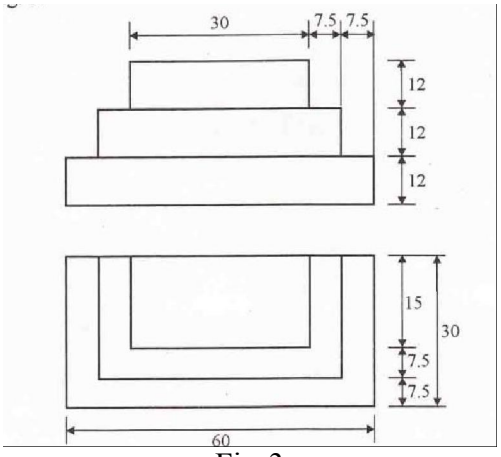


Fig-3

7. Draw the isometric view of the following objects whose orthographic views are given Fig 4

   15marks

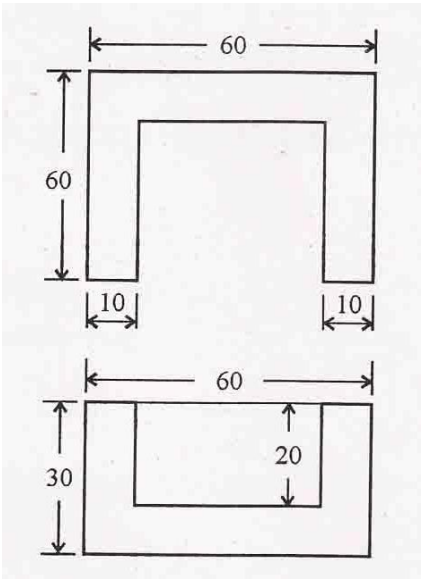


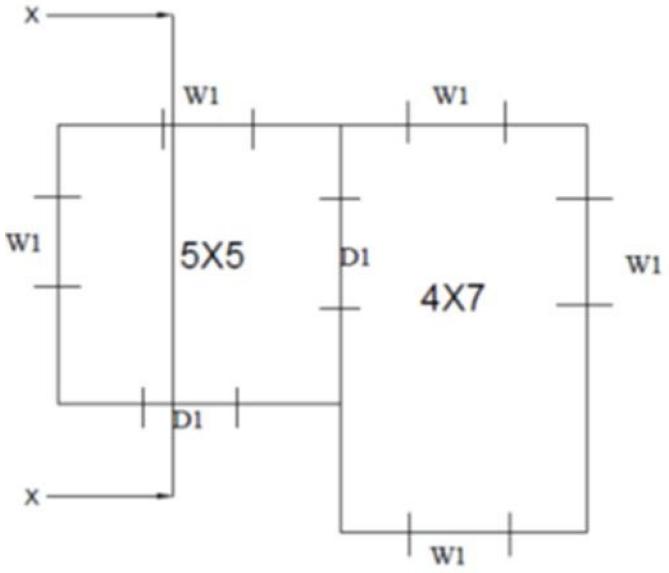
Fig-4

8. A Square based prism of 30mm side of base and height 50mm rests with its base and height 50mm rests with its base on ground such that one of the rectangular faces is touching the picture plane. The station point lies on the center line of the object, 60mm aboveground and 50mm in front of the picture plane. Draw the perspective view of the square prism.
   15 marks

PART- C(Compulsory)

9.The Line Diagram of a Two room building is shown in Fig 5.The Details and specification are as follows. 35 Marks

(a) Level of Plinth above ground - 0.5m
(b) Height of ceiling from the floor- 3m
(c) Burnt Brick Masonry wall Thickness of wall 0.3m
(d) Doors 1.0mX 2.1m
(e) Windows 1.2mX1.2m
(f) RCC Roof 0.15m thick
(g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
(h) Provide suitable Foundation of Size Stone Masonry



Draw to a scale of 1:50

(i) Plan of the Building and 15Marks
(ii) Front Elevation of the Building. 10Marks
(iii) Section along xx 10 Marks

MODEL QUESTION BANK

Course: **ENGINEERING DRAWING-I.**	Code: **15CE22D**

UNIT-I (15 Marks)

1. A hexagonal pyramid, base 30mmside and axis 60mm long has one of its triangular face containing the slant edge on which it rests are equally inclined to HP. The axis appears to be inclined at 45^0 to VP. Draw its projections when its base is nearer to the observer than its apex.

2. Draw the projection of a pentagonal prism of base side 25mm and axis length 45mm resting on a corner such that the two base edges passing through it make equal inclination with HP and its base inclined at 60° to HP and the axis appears to be inclined at 30° to VP in the top view.

3. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30^0 to HP. The edge on which the prism rests is inclined at 60^0 to VP. Draw its projections.

4. A cone of base diameter 50mm and altitude 70mm is lying with one of its generators on HP and the axis appears to be inclined to VP at an angle of 40^0 in the top view. Draw its top and front views.

5. A Hexagonal prism of 30 mm side of base and axis 60mm long is placed with one of its base edges on HP such that the axis is inclined at 35^0 to HP and 45^0 to VP. Draw its projections.

6. A Pentagonal pyramid 25mm side of base and 50mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which rests make equal inclinations with HP. The axis is inclined at 50^0 to VP and 30^0 to HP. Draw the top and front views of the pyramid.

7. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45^0 to HP and 30^0 to VP. Draw the top and front views of the cone.

8. Draw the top and front views of a right cylinder of base 50mm diameter and 70mm long when it lies on HP, such that its axis is inclined at 30^0 to HP and axis appears to be perpendicular to VP in the top view.

9. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

10. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

11. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the axis appears to be inclined at 45° to VP. Draw the projections when the base of the prism is nearer to the observer.

12. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

13. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

14. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

15. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

16. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is inclined at 30° and 45° to HP and VP respectively. Draw the top and front views.

17. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

18. Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.

19. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

20. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

21. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.
22. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.

23. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

UNIT-2(10 MARKS)

1. Draw the three principal views of the component as shown in the figure.

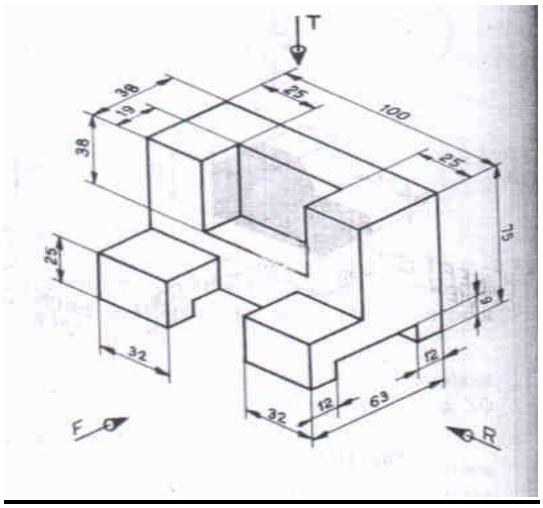


Fig-1

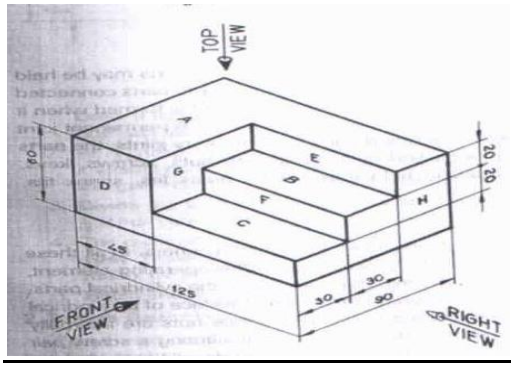


Fig-2

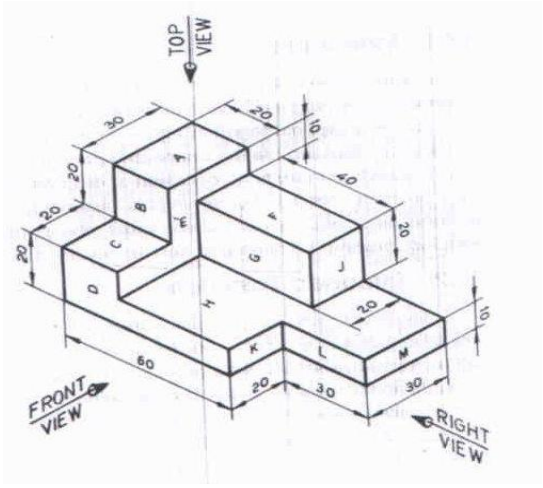


Fig-3

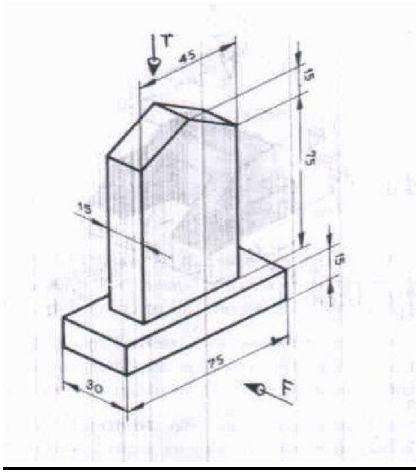


Fig-4

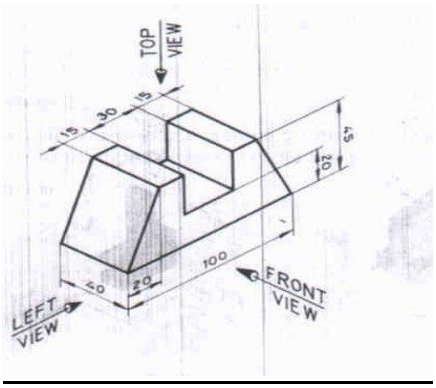


Fig-5

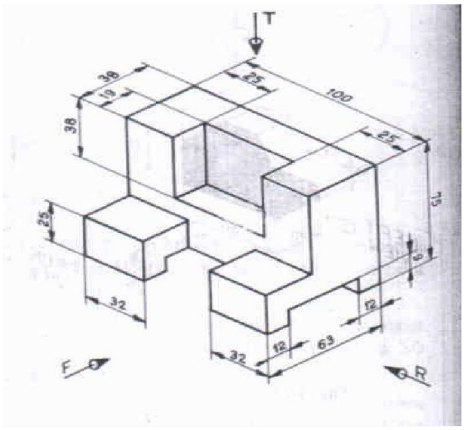
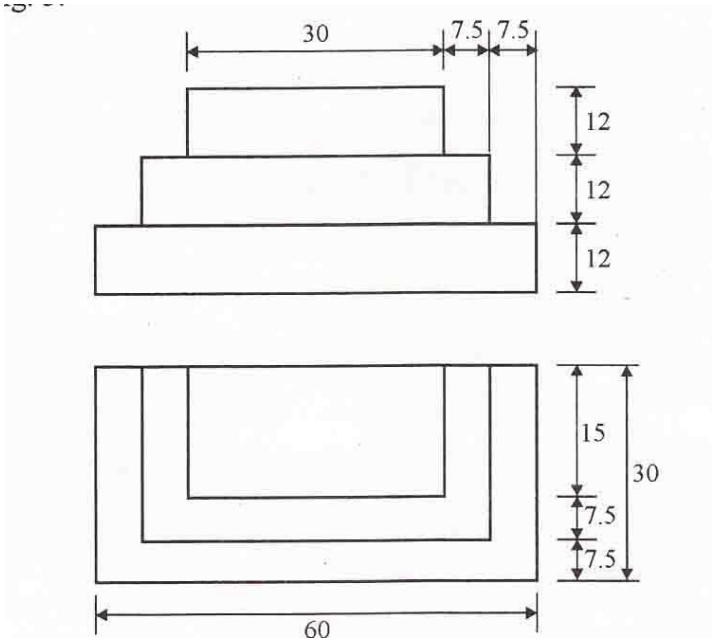


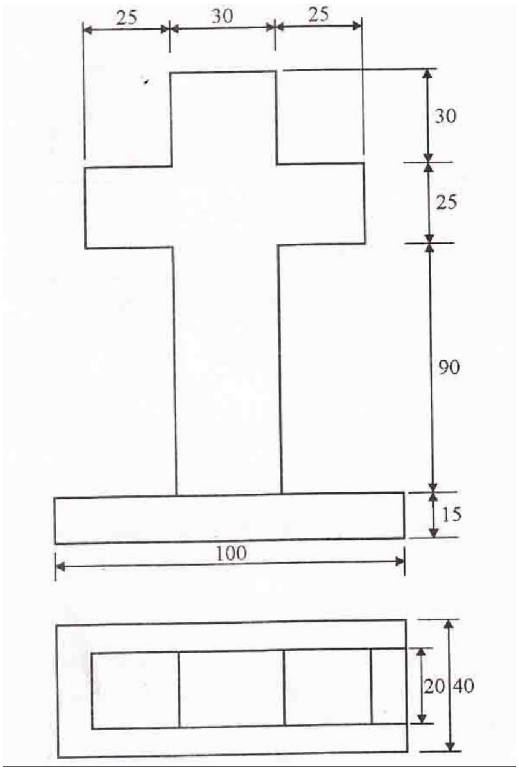
Fig-6

UNIT-3 (15 Marks)

1. Draw the isometric view of the following objects whose orthographic views are given below:



2. Draw the isometric view of the following objects whose orthographic views are given below:



3. Draw the isometric view of the following objects whose orthographic views are given below:

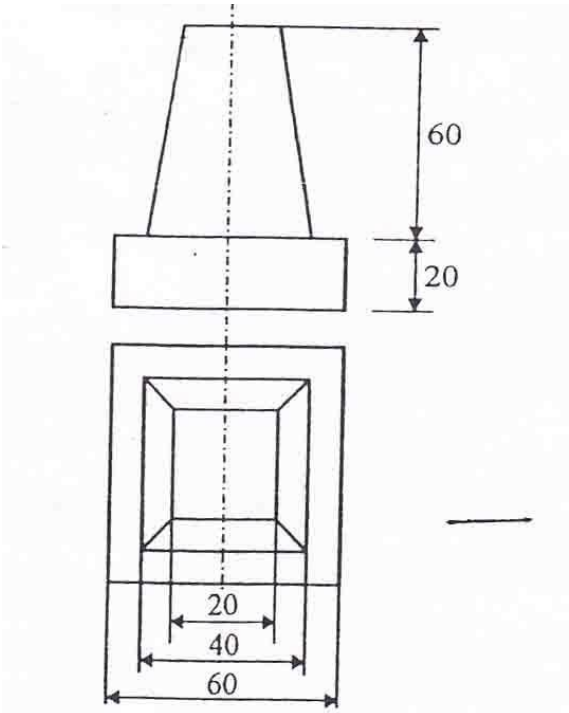


Fig. 2

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4. Draw the isometric view of the following objects whose orthographic views are given below:

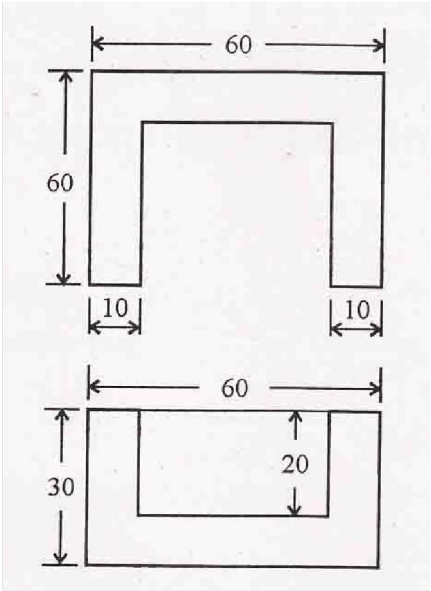


Fig-1

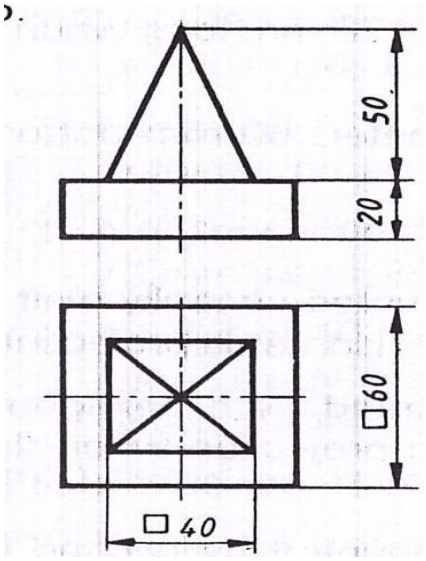


Fig-2

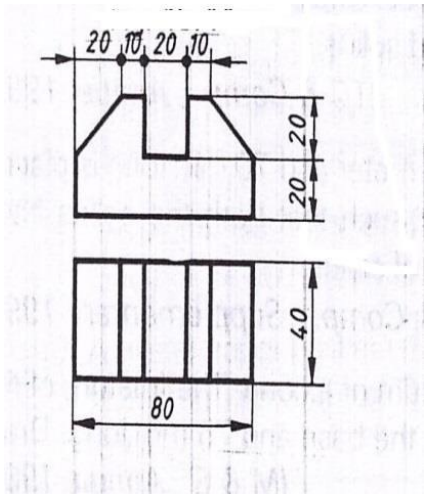


Fig-3

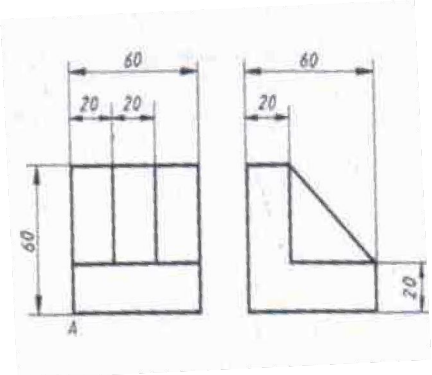


Fig-4

5. A Circular column of side 40mm and height 50mm is placed centrally on a square footing of side 100mm and thickness 25mm. Draw the Isometric projections of the combination

6. A Cube of side 50mm is resting coaxially over a circular slab of diameter 100mm and thickness 30mm.Draw the isometric view of the combination of the solid.

7. A cone having diameter of the base 60mm and height 70 mm is resting co- axially on the square slab of side 100mm and thickness 40mm. Draw the isometric view of the combination of the solid.

8. A cylinder of 50mm diameter and 50mm high is placed centrally on the rectangular footing of sides 75mm and 100mm and thickness 25mm. Draw the isometric projections of the arrangement.

9. A frustum of a cone 30mm top diameter and 60mm bottom diameter and 70mm long is placed vertically on a square block of 80mm side and 30mm thick such that both the solids have common axis. Draw the isometric of the combination of the solids.

10. A cylindrical slab 100mm diameter and 40mm thick is supporting a cube of 50mm edge. On the top of the cube rests a square pyramid of altitude 55mm and side of base 30mm such that the base edges of the pyramid are parallel to the edges of the top face. The axes of the solids are in the same straight line. Draw the isometric projection of the combination of the solids.

11. A square pyramid of base edge 50 mm and height 80 mm rests on the top of the cube of side 100 mm. Two sides of the base of the pyramid are parallel to the top edges of the cube. Draw the isometric view of the solid.

12. Three cubes of sides 60mm,40mm and 20mm are placed centrally one above the other. Draw the isometric projections of the combination.

UNIT-IV (15MARKS)

1. A Square based prism of 30mm side of base and height 50mm rests with its base and height 50mm rests with its base on ground such that one of the rectangular faces is touching the picture plane. The station point lies on the center line of the object, 60mm aboveground and 50mm in front of the picture plane. Draw the perspective view of the square prism.

2. A Cube of side 50mm side rests with its base on ground such that one of the square face is 20 mm behind the picture plane. The station point lies on the centerline of the object, 80mm above ground and 75mm in front of the picture plane.

3. A rectangular based pyramid of sides of base 30mm and 20mm, and height 35mm rests with its base edges in parallel to the picture plane and 30mm behind it. The station point is 50mm in front of the picture plane, 30mmto the left of the axis of the pyramid and 50mm above the ground. Draw the perspective view of the pyramid.

4. A model of steps has three steps of 15mm tread and rise 10mm. The steps measure 60mm widthwise. Draw the perspective view of the model when placed with its first step 25mm behind the picture plane and longer edge being parallel to it. The station point is 95mm from the picture plane, 60mm above ground and lies on the center line.

5. Draw one point parallel perspective view of the block shown below. The station point is located at 80mm to the right of the centre of the block and 100mm from the picture plane. The observers eyelevel is 60mm above the ground level.

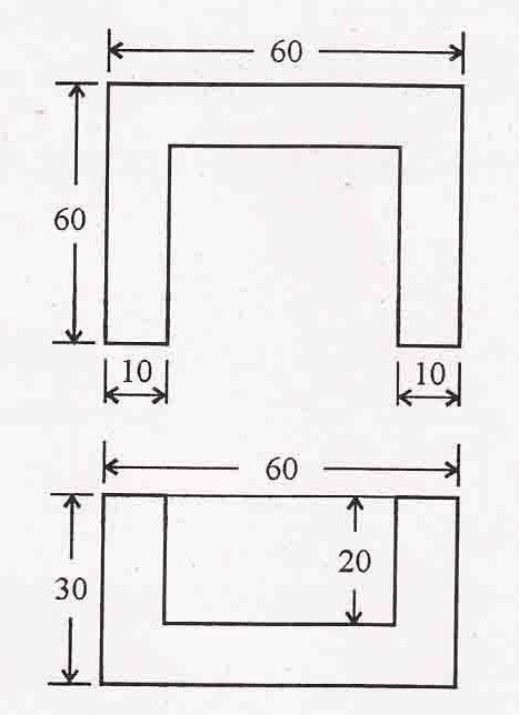


Fig-1

6. Draw the perspective view of a cube 25mm edge, resting on ground on one of its faces. It has one of its vertical edges in the picture plane and all its vertical faces are equally inclined to the picture plane. The station point is 55 mm in front of the picture plane. The station point is 55mm in front of the picture plane, 40mm above the ground and is in a central plane 9mm to the left of the centre of the cube.

7. A Square prism of 30mm side of base and height 40mm rests with its base on ground such that one of the rectangular faces is inclined at 30^0 to the picture plane. The nearest vertical edge touches the picture plane. The station point is 45mm infront of the picture plane, 65mm above ground and lies opposite to the nearest vertical edge that touches the picture plane. Draw the perspective view.

8. A cube of 45mm side of base rests on ground such that one of the square face is inclined at 25^0 to the picture plane. The nearest vertical edge touches the picture plane. The station point is 65mm in front of the picture plane, 85mm above ground and lies opposite to the nearest vertical edge that touches the picture plane. Draw the perspective view.

9. Draw one point perspective view of the block shown below. The station point is located at 80mm to the right of the centre of the block and 100mm from the picture plane. The observers eye level is 60mm above the ground level.

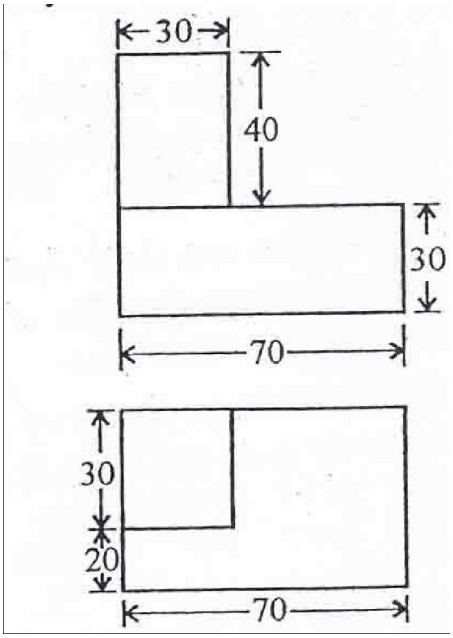


Fig-2

10. Draw the two point perspective view of the model shown in fig3 when its right touches picture plane and its longer side makes an angle of 30^0 with it. The station point is 100 mm in front of the picture plane and exactly opposite to the vertical edge touching the picture plane and the point of the sight is 120mm above the ground.

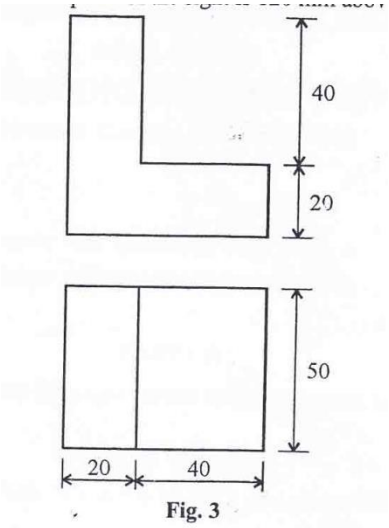


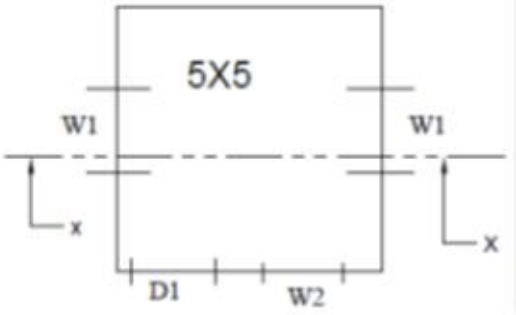
Fig. 3

UNIT-V (10 Marks)

1. Show the conventional representation of Building materials in Section (IS: 962)
2. Draw the cross section of wall from foundation to parapet for the given details.

UNIT-VI (35 Marks)

1. The Line Diagram of a Single room building is shown in Fig 1.The Details and specification are as follows.
   (a) Level of Plinth above ground - 0.5m
   (b) Height of ceiling from the floor- 3m
   (c) Burnt Brick Masonry wall Thickness of wall-0.3m
   (d) Doors 1.0mX 2.1m
   (e) Windows 1.2mX1.2m
   (f) RCC Roof 0.15m thick
   (g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
   (h) Provide suitable Foundation of Size Stone Masonary



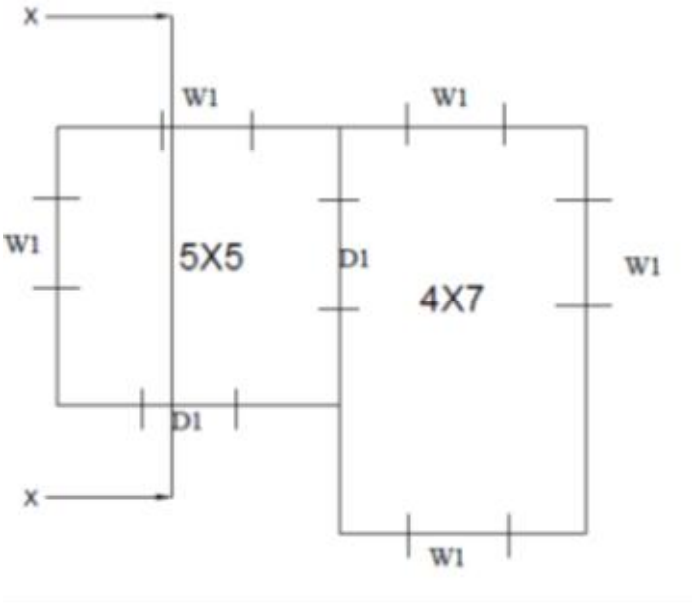
All Dimensions in Metre

.

Draw to a scale of 1:50
   (i) Plan of the Building and
   (ii) Front Elevation of the Building.
   (iii) Section along xx

2. The Line Diagram of a two room building is shown in Fig 2.The Details and specification are as follows.

   (a) Level of Plinth above ground - 0.5m
   (b) Height of ceiling from the floor- 3m
   (c) Burnt Brick Masonry wall Thickness of wall- 0.3m
   (d) Doors 1.0mX 2.1m
   (e) Windows 1.2mX1.2m
   (f) RCC Roof 0.15m thick
   (g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
   (h) Provide suitable Foundation of Size Stone Masonary



All Dimensions in metre.

Draw to a scale of 1:50
(i) Plan of the Building and
(ii) Front Elevation of the Building.
(iii) Section along xx

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	:**APPLIED SCIENCE LAB**	Course Code	: **15SC04P**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **0:2:4**	Credits	: **3** Credits
Type of course	: **Tutorial & Practical**	Total Contact Hours	: **78**
CIE	: **25 Marks**	SEE	: **50 Marks**
Programme	: **Common to all Engineering Diploma Programmes**		

Prerequisite:

Applied Science theory in the current semester.

Course objective:

1. Learn to measure different dimensions of objects accurately using measuring instruments.
2. Enhance the vectorial concepts of concurrent forces.
3. Learn the concepts of properties of fluids.
4. Enhance the practical concept of resonance.

Experiments:

PART- A

1. **Vernier Calipers**:
   a) To determine the dimensions of given solid cylinder and hence calculate its volume.
   b) To determine the dimensions of given hollow cylinder and hence calculate its volume

Activity: To calculate the density of material of given solid/hollow cylinder knowing its volume and mass.

2. **Screw Gauge**:
   a) To determine the thickness of given metal and glass plate.
   b) To determine the diameter of given thin wire and hence to calculate its volume.
   c) To determine the diameter of given metallic sphere and hence to calculate its volume.

Activity: 1.To calculate volume of such half meter length wire.
2. To calculate volume of such number (50 or 75 etc) of spheres.

3. **Laws of concurrent forces**:
   a) Verify the law of parallelogram of forces.

b) Verify the converse law of triangle of forces.
c) Verify Lami's theorem.

Activity: To determine the weight of given body using law of parallelogram of forces.

4. Moment bar:

To verify the conditions of equilibrium of coplanar parallel forces acting on a body.

Activity: To determine the weight of given body using moment bar.

PART-B

5. Viscosity:

a) To determine the co-efficient of viscosity of water by poiseuille's method(for a given radius of capillary tube)

Activity: To plot a graph of **ht** versus **V** and to find ht/**V** from slope.

6. **Sonometer**:

a) To determine the frequency of given tuning fork by comparison method.
b) To determine the frequency of given tuning fork by absolute method.

Activity: 1.Plot a graph of 'n' versus 'l' from the graph, find the frequency unknown Tuning fork

2.Plot a graph of $\sqrt{T}$versus 'l' from the slope of graph find $\sqrt{T}$/l

3.To calculate linear density 'm' by knowing$\sqrt{T}$/l and 'n'

7. Resonance:

a). To determine the velocity of sound in air at room temperature by using resonance air column apparatus. (for single resonating length)

Activity:1. To calculate velocity of sound in air at 0^0 C.

2. To determine the unknown frequency of tuning fork.

8.**Surface Tension**:

a) To determine the Surface Tension of water by capillary rise method using Travelling Microscope. (radius of capillary tube is given)

Activity: Calculate radius of the capillary tube by knowing the surface tension of the liquid and height of liquid column in capillary tube.

9. Boyle's law:

a) To verify Boyle's law using Boyle's law apparatus.

Activity:1.To plot a graph of pressure versus volume

2. To plot a graph of 1/pressure versus volume.

Course outcome:

On successful completion of the course, the student will be able to:

1. Measure the various dimensions of given objects using instruments.
2. Apply the vector concepts in engineering.
3. Apply the acquired knowledge of fluid dynamics in the field of engineering.
4. Apply the concepts of wave motion in engineering.

Mapping Course Outcomes with Program Outcomes:

CO –PO mapping

	Course Outcome	Experiment linked	PO Mapped	Cognitive Level	Lab Sessions
CO1	Measure the various dimensions of given objects using instruments.	**1,2**	**1,2,3,4,9**	**U/A**	**24**
CO2	Apply the vector concepts in engineering.	**3,4**	**1,2,9**	**U**	**16**
CO3	Apply the acquired knowledge of fluid dynamics in the field of engineering.	**5,8,9**	**1,2,3,9**	**A**	**24**
CO4	Apply the concepts of wave motion in engineering.	**6,7**	**1,2,3,9**	**U**	**14**
Total Hours of instruction					**78**

U-Understanding; A-Application;

Course outcomes –Program outcomes mapping strength

Course	**Programme Outcomes**									
	1	2	3	4	5	6	7	8	9	10
Applied Science lab	**3**	**3**	**3**	**1**	**-**	**-**	**-**	**-**	**3**	**-**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Two IA tests for Practical (Average of Two Test marks will be computed)	10	Blue Books	1 to 4
		Record Writing		Record Writing (Average of Marks allotted for each expt.)	10	Record Book	1 to4
		Class room Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	05	Log of Activity	1 to 4
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End of the Course	50	Answer Scripts at BTE	All the CO's
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 2 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 4 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	35
2	Applying the knowledge acquired from the course	45
3	Analysis	05
4	Evaluation	05
5	Creating new knowledge	10

Reference Books:

1. Practical physics by pro. J.D.Belani and N.J.Belani. Published by Nebhandas Hiranand.
2. Practical physics by C.L. Arora. Published by S. Chand and company.
3. www.jac production.co.za

Model Question Bank:

Course: APPLIED SCIENCE LAB Course Code: **15SC04P**

PART- A

1. Determine the dimensions of given Solid Cylinder using Vernier Caliper and hence calculate its volume.
2. Determine the dimensions of given Hollow Cylinder using Vernier Caliper and hence calculate its volume.
3. Determine the thickness of given metal and glass plate using screw gauge.
4. Determine the diameter of given thin wire using screw gauge and hence, to calculate its volume.

5. Determine the diameter of given metallic sphere using screw gauge and hence, calculate its volume.
6. Verify the law of parallelogram of forces.
7. Verify the converse of triangle law of forces.
8. Verify lami's theorem.
9. Verify the conditions of equilibrium of coplanar parallel forces using Moment bar.

PART- B

10. Determine the coefficient of viscosity of water by Poiseuille's method (For a given radius of capillary tube)
11. Determine the frequency of given tuning fork by comparison method using sonometer.
12. Determine the frequency of given tuning fork by absolute method using sonometer.
13. Determine the velocity of sound in air at room temperature by using resonance Air column Apparatus.
14. Determine the Surface Tension of water by capillary rise method. (For a given radius of capillary tube)
15. Verify Boyle's law using Boyle's law apparatus.

Scheme of Valuation for SEE (Semester End Examination)

Sl. no.	Performance	Max. Marks
1	Writing Observation, Tabular column, formula.	05x2=10
2	Conduction of experiment.	10x2=20
3	Calculation and Result.	05x2=10
4	Viva Voce.	10
	TOTAL	**50 Marks**

Note: The students will submit record books at the time of semester end exam.

Guidelines for Question Paper Setting

The question paper must be prepared by selecting **ONE** experiment from **PART – A** and **ONE** question from **PART – B**.

Specification of the Apparatus Required for Applied Science Lab

The following are the specification of the apparatus required for science lab, and number of apparatus required for the batch of 20 students.

Sl. No.	Name of the Apparatus	Specification	Required Number
1	Vernier calipers	With L.C 0.01cm having Metallic scale marked in cm, with objects :solid cylinder &hollow cylinder	10
2	Screw gauge	U-Shaped metallic frame with L.C 0.01mm with objects :glass plate, metal plate, thin wire and metallic sphere	10
3	Law of concurrent forces apparatus	Vertical Drawing Board fixed with pulleys. Weights 50g each with weight hangers set	10
4	Moment bar	Having two vertical metallic stands, two spring balances measuring up to 500 g .horizontal bar.	10
5	Surface tension apparatus	Traveling microscope, having L.C 0.005cm, both horizontal and vertical movement of telescope, eye piece with fine cross-wire, slow moving stand, beaker, with capillary tube	10
6	Viscosity apparatus	Aspiratory bottle, cork, capillary tube, stopwatch, measuring jar. With stand to keep Aspiratory bottle	10

7	Boyle's law apparatus	Wide bore glass tube mounted vertically in front of a scale graduated 0 to 60cm Zero corresponds to the inside of the closed (top) end of the tube Air is confined in the tube by a coloured oil contained in a metal pressure chamber Pressure chamber is fitted with a Bourdon type gauge calibrated 0 to 3.5kg cm^2 (0 to 50 lb/in^2) actual pressure A valve is fitted to the air inlet tube from the pump As the pressure in the oil chamber is increased, oil level and its actual (total) pressure are directly indicated Tube is made of extra strong glass and is securely covered with transparent plastic on the front Overall height of apparatus approx. 690mm	05
8	Sonometer	Wooden box fixed with meter scale, pulley, metallic string, weight with weight hanger (500g each)	10
9	Resonance air column apparatus	Consists of a resonance tube brass N.P. 100cms, reservoir brass N.P. 250ml & meter scale both sides millimeters, which are mounted on wooden polished board. The reservoir is caged in wooden block that has sliding facility.	10
10	Electronic balance	0.1g accuracy 500g capacity	01
11	Tuning fork set	Set of eight tuning forks of different frequency blue steel(Ragg's type)	06

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE LAB

Course code: 15SC04P

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mr. R B Pawar	Principal	Govt. Polytechnic, Bijapur
2	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. HanumanthaNayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
5	Ms. Bhagirathi B N	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru

`

Curriculum Review Committee

	Name	Designation	Institution
1	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
2	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
3	Smt. Revathi	Selection Grade Lecturer	M.E.I. Polytechnic, Bengaluru

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **SURVEYING PRACTICE - I**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE23P**
	Type of Course: **Practical and Mini-Project**	Credit **: 03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre requisites: Practical knowledge of Basic Science and Mathematics in Secondary Education

Course Objective:

1. To provide knowledge of basic Principles of surveying.
2. Develop skills in using survey instruments, taking measurements and plotting the details

On successful completion of the course, the students will be able to:

Course Outcome		Experiments linked	CL	Linked PO	Teaching Hrs
CO1	Use of instruments in chain surveying and conducting experiments.	1 to 9	**U/Ap**	1,2,3,4,8,	**24**
CO2	Use of instruments in compass surveying and conducting experiments.	10 to 13	**U/Ap**	1,2,3,4,8	**21**
CO3	Use of instruments in levelling and conducting experiments on methods of levelling.	14 to 18	**U/Ap**	1,2,3,4,8, 10.	**21**
CO4	Conduct Longitudinal and cross sectioning for the given alignment and analyze the data by Block levelling (contours) prepare the drawings.	19,20	**U/Ap**	1,2,3,4,5, 8,9	**12**
CO5	Perform suggested activity related to surveying, exploring in groups and able to present it.	Suggested activity	**U/Ap/ Ay/C**	1 to 10	*
				Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Surveying practice -I	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**1**	**2**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

Sl. No	Experiments	Hours
CHAIN SURVEYING		
1	Study of instruments required for chain surveying.	**02**
2	Ranging and chaining a line	**02**
3.	Prolongation of a survey line	**02**
4	Practice of reciprocal ranging	**03**
5	Practice of different methods of Setting out perpendiculars	**03**
6	Set out Regular Polygons and compute its area	**03**
7	Practice of cross staff survey	**03**
8	Conduct traversing and record the data in the Field book	**03**
9	Obstacles in chaining	**03**
COMPASS SURVEYING		
10	Study of prismatic compass and surveyors compass	**06**
11	Taking bearings and finding the included angles by using prismatic compass	**06**
12	Set out regular and irregular Polygons using prismatic compass	**06**
13	Find the distance between two inaccessible points using Compass	**03**
LEVELLING		
14	Study of level and its temporary adjustments	**03**
15	Taking level of various points and recording it in a level book	**03**
16	Finding the difference in elevation between two points by Simple & Differential Levelling	**06**
17	Conduct Fly leveling to establish a Temporary BM and check its accuracy	**06**
18	Finding RL of given point by taking Inverted Staff Reading	**03**
19	Conduct Longitudinal and cross sectioning for the given alignment and plot it	**06**
20	Conduct Block Levelling for an area and plot Contours	**06**
	TOTAL	**78**

Course Delivery: The course will be delivered through lectures, Demonstration and practices

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Prepare a spread sheet of Rise and fall method or height of instrument method showing the calculation by using formula bar.
2. Layout Plan of Existing Campus
3. Contour Map of Existing Campus
4. Dividing the area into plots using town planning rules, and plot it
5. Carryout reciprocal levelling and make a presentation
6. Presentation on Precise levelling
7. Presentation on Digital levelling
8. Presentation on Digital ground model
9. Presentation on Data logger
10. Presentation on Triangular grid model
11. Presentation on Units of measurements used in survey from history
12. Sensitivity of bubble used in levelling
13. Two Peg Test
14. Three Wire Levelling
15. Permanent Adjustments of a Dumpy Level

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
(Unsatisfactory **1,** Developing **2,** Satisfactory 3, Good **4,** Exemplary **5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE*	IA	Students	Two tests (average of Two tests will be computed)	Test 1	10	Blue books	1,2
					Test 2			3,4
				Graded exercises (average of marks allotted for each graded exercise)		10	Record	1 2 3 4
				Suggested activity		05	Report	1,2,3,4,5
				Total		**25**		
	SEE*	End Exam		End of the course		**50**	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3,4,5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**38**
2	Applying the knowledge acquired from the course	**30**
3	Analysis	**16**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**5**

Scheme of Valuation for End Examination

Sl No	Description	Marks
1	Writing procedure	05
2	Conducting & Performance	20
3	Calculation and results	10
4	Viva-voice	05
5	Record +suggested activity report	10
	Total	50

List of equipment:

SL NO	EQUIPMENTS	QUANTITY
1	Auto / quick setting / Dumpy level with accessories	05
2	Metric chains 30m	05
3	Arrows	50
4	Tape 15m	15
5	Tape 30 m	05
6	Ranging rods	25
7	Cross staff, French cross staff , open cross staff, line ranger, optical square, prism square,	05
8	Prismatic compass	05
9	Surveyor compass	02

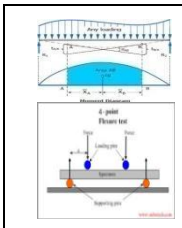
TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P konetkar & S V Kulkarni
3. Plane Surveying by Dr. Alak De
4. Surveying and Levelling by S S Bhavikatti
5. Surveying by Duggal
6. Surveying by R Agor
7. Fundamentals of Surveying by S K Roy
8. Surveying and Levelling by N N Basak
9. Advanced Surveying by R Agor

E-links

1. www.elearning.com/survey
2. http://nptel.ac.in/video.php?subjectId=105104101
3. http://media.sakshat.ac.in/NPTEL-IIT-Videos/
4. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
5. http://nptel.iitk.ac.in/

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru



Course Title: **ENGINEERING MECHANICS AND STRENGTH OF MATERIALS**		
Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE31T**
Type of Course: **Lectures, Self Study& Student activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Prerequisites: Knowledge of basic Mathematics and Science.

Course Objectives: The students shall be able to

1. Define and identify the differences among types of forces, stresses and strains.
2. Determine the geometrical properties of the structural sections and to analyze the effect of geometry on strength properties of structural elements.
3. Evaluate the response and behavior of various materials to forces, stresses and strains and to assess the properties of a material and identify its usage in structural elements.
4. Identify, formulate and solve engineering problems of structural elements subjected to flexure, shear.
5. Provide procedural knowledge to analyses of structural system, component of elements such as beams and columns subjected to various load combinations with different boundary conditions.

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Compare the various forces acting and apply the force equilibrium condition.	R/U/Ap	1,2	5
CO2	Explain the mechanical properties and describe the different types of stress, strains and elastic constants and compute the factor of safety in sustainability of material aspects.	R/U/Ap/Ay	1,2,5,6	10
CO3	Compute geometrical properties of the sections knowing the importance of geometry in structural engineering	R/U/Ap	1,2,,5,9	10
CO4	Correlate the concept of free body diagram, & analyze the different types of end conditions in supports for various loads &beams developing shear force diagram& bending moment diagram,	R/U/Ap/ Ay/ C	1,2, 3, 5,9	10
CO5	Describe Pure bending theory and applying geometrical properties of beam to calculate strength parameters& develop flexural stress and shear stress diagram of structural members (beams) for different loading conditions.	R/U/Ap/ Ay/ C	1,2,3, 5,6,7,9	8
CO6	Inspect and calculate the deformation (Slope &deflection) of basic beams	R/U/Ap/Ay	1,2,5	4
CO7	Explain the types of column and apply the eulers theory to find the parameters for different end condition	R/U/A/Ay	1,2,5,6	5
CO8	Manage the suggested or identified structural engineering problems, formulate and solve in teams, in order to improve future problem solving ability and able to present it.	U/Ay/Ap/ C	1,2,3,4, 5,6,7,8, 9,10	*
			Total sessions	**52**

Legend- R; Remember U: Understand, Ap: Application Ay: Analysis C:Creation,

*Related to Student activity beyond classroom hours.

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Strength Of Materials	3	3	2	1	3	3	1	1	3	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

UNIT	COURSE CONTENTS	HOURS
1	**INTRODUCTION TO ENGINEERING MECHANICS** Force and characteristics of a force, Force system: - Definition, classification of force system according to plane and line of action, Composition of Forces: - Definition, Resultant force, moment of a force,Principle of transmissibility of forces,Law of moments Simple Problems on forces.	6
2	**SIMPLE STRESSES AND STRAINS** Definition of rigid body, plastic body, mechanical properties of metal-(Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability) Definition of stress, strain, Classification of stress, strain, (Types of stresses -Tensile, Compressive and Shear stresses Types of strains - Tensile, Compressive and Shear strains - Elongation and Contraction - Longitudinal and Lateral strains - Poisson's Ratio) Stress-strain curve for mild steel, HYSD bar and non-ferrous materials, (yield stress/ proof stress, Hooke's law, St. Venant"s principle, Ultimate stress, breaking stress and percentage elongation. Working stress - Factor of safety - Percentage reduction in area - Significance of percentage elongation and reduction in area of cross section), Stresses in bars of composite section (Modular ratio – Problems on axially loaded composite sections like RC.C / Encased columns.) Principles of superposition, Deformation of uniform bars and bars of varying cross-section, Volumetric strain & change in volume, Relation among elastic constants Types of loading – gradual, suddenly applied load & Impact load Definition of strain energy, modulus of resilience and proof resilience. Comparison of stresses due to gradual load, sudden load and impact load. Thermal stresses.	12

3	**GEOMETRICAL PROPERTIES OF SECTIONS** Centroid, centre of gravity, Concept of moment of inertia, Centre of gravity of plane areas such as rectangle, triangle, circle, semicircle and quarter circle. Parallel axis and perpendicular axis theorem, Radius of gyration & polar moment of inertia, problems on C.G of irregular sections, M.I of symmetrical and unsymmetrical sections (I, T, C, L-section) problems,	10
4	**BENDING MOMENTS AND SHEAR FORCE** Types of beams –(simply supported, cantilever, fixed and continuous beams,)Types of loading- (Axial load, Transverse load, point load, uniformly distributed load, uniform varying load moment load) support reactions for determinate structures, End conditions, Concept of shear force and bending moment, sign convention. Relation between bending moment, shear force and rate of loading Shear force and bending moment diagrams for simply supported beams, overhanging beams and cantilever subjected to point loads, UDL, point of contra flexure.	10
5	**THEORY OF SIMPLE BENDING** Introduction – Bending stress in beam, Assumptions in simple bending theory, bending equation, neutral axis, Modulus of rupture, section modulus, flexural rigidity, moment of resistance, Problems on Bending stress distribution diagram-variation of bending stresses across the cross section of the beams only rectangular and T section. Shear Stress distribution diagram for rectangular, I, T-section beams.	6
6	**SLOPE AND DEFLECTION OF BEAMS** Introduction – Definitions of slope, deflection - Slope and deflection using Moment area method for simply supported and cantilever, subjected to symmetrical point loads and UDL.	4
7	**COLUMNS** Introduction – Short and long columns - Euler's theory on columns - Effective length, slenderness ratio - radius of gyration, buckling load - Assumptions, Euler's Buckling load for different end conditions - Limitations of Euler's theory - and problems.	4
	TOTAL	**52**

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video

SUGGESTED STUDENT ACTIVITIES

The topic should be related to the course in order to enhance the student's knowledge, practical skill, lifelong learning, communication, and modern tool usage.

1. Drawing Shear force and Bending Moment diagrams on Graph Paper simply supported beam, Cantilever and Draw the load diagram (free body diagram) by knowing SFD (each 6 problems).
2. To determine the moments of inertia of the given irregular body, composite sections, built up sections.
3. In spread sheet finding centre of gravity; I_{ZZ} and I_{YY} of I, L,T and channel sections
4. Using MS excel prepare the abstract sheet with given data and calculate moment of inertia using formula bar
5. Writing report on (any one)

a. Study on Deformation behavior of Simply Supported Beam, measurement of Young's Modulus and Deflection of Beam.
b. Conduct a experiment calculating the tensile stress of Bamboo if used as a reinforcing material
c. Calculate the tensile stress induced in the hanging rod of ceiling fan and suggest an alternate material
d. Calculate the tensile stress induced in the rope made up of jute
e. Determine the rigidity modulus of the material of the suspension wire.
f. Determine the flexural strength of the given tile by conducting a bending test
g. Conduct a deflection test on wooden beam and determine the value of Young's Modulus of wood.
h. Draw a graph "load Vs deflection".
i. Conduct a compression test on the given wooden cube and find its ultimate strength parallel to its fibres
j. Maxwell's Theorem of Reciprocal Deflection
k. Write material specifications for any two structural steels.

6. Visit the Institute's Library / internet center and list the books/journals/conference proceedings, e-books and any other resources available on the topics suggested by the teacher. Prepare references consisting name of the author, title of the book/paper, publication and place of publication, volume No.s, page numbers and year of publication(any one). Some examples:
    a) Tensometer,
    b) Strain hardening
    c) Punching shear.
    d) Comparison of Compressive strength of Bricks, Blocks and Concrete.
    e) Tension test on Mild steel and HYSD bars.
    f) Compression test of Mild Steel, Cast iron and Wood.
    g) Bending Test on Wood and Mild steel.
    h) Plastic deflection
    i) Compound stress
    j) Torsion
    k) Thick and thin cylinders
    l) Glass fibres
    m) Carbon fibres
    n) Hoop stress
    o) Varignons theorem
    p) Euler–Bernoulli beam theory
    q) Trusses
    r) Statically indeterminate structures
    s) Prismatic beam

NOTE:
1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good4, Exemplary **5**)
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**,Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1,CO2
					Test 2			CO3,CO4
					Test 3			CO5, CO6,CO7
				Activities		05	Written Report	CO8
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6,7
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1, 2,3 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3, 4 & 5, 6, 7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels					Marks weightage	weightage (%)	A*	B*
			R	U	Ap	Ay	C				
1	Introduction to engineering mechanics	5	33.33% **5**	33.33% **5**	33.34% **5**	0.00% **0**	0.00% **0**	15	10	1	1
2	Simple stresses and strains	10	20.00% **5**	20.00% **5**	40.00% **10**	20.00% **5**	0.00% **0**	25	19	1	2
3	Geometrical properties of sections	10	20.00% **5**	20.00% **5**	60.00% **15**	0.00% **0**	0.00% **0**	25	19	1	2
4	Bending moments and shear force	10	10.00% **3**	10.00% **3**	20.00% **6**	20.00% **6**	40.00% **12**	30	19	2	2
5	Theory of simple bending	8	10.00% **2**	20.00% **4**	20.00% **4**	20.00% **4**	30.00% **6**	20	15	2	1
6	Slope and deflection of beams	4	20.00% **3**	13.33% **2**	40.00% **6**	26.67% **4**	0.00% **0**	15	8	1	1
7	Columns	5	13.33% **2**	20.00% **3**	40.00% **6**	26.67% **4**	0.00% **0**	15	10	1	1
Total		**52**	**18.1%** **25**	**18.6 %** **27**	**35.9 %** **52**	**15.9 %** **23**	**12.4%** **18**	**145**	**100**	**9**	**10**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

A*-SEE questions to be set for (05marks) in Part – A

B*- SEE questions to be set for (10marks) in Part – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**37**
2	Applying the knowledge acquired from the course	**36**
3	Analysis	**16**
4	Synthesis (Creating new knowledge)	**12**
5	Evaluation	**0**

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator :			Units:__ CO's:____

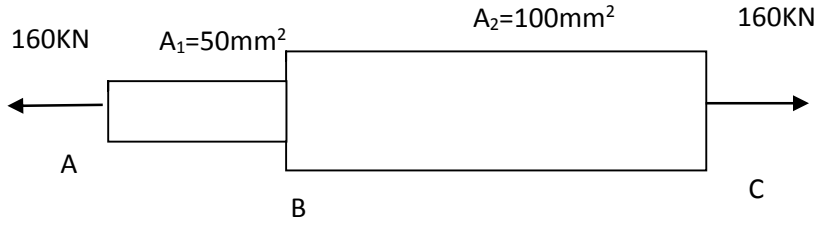
Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Model Question Paper for CIE(Tests)

Test/Date and Time	Semester/year		Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	**III SEM**		**Engineering Mechanics And Strength Of Materials**	**20**
	Year: 2015-16		**Course code:15CE31T**	

Name of Course coordinator :
Course outcome :CO1, CO2 **Note: Answer all questions**

	Question	M	CL	CO	PO
1	List different classification of force system	**4**	**R**	**1**	**1,2**
2	Differentiate between moment and couple?	**4**	**U**	**1**	**1,2**
3	Define: modulus of resilience. A ceiling fan hanging over a rod of 1.50 m long and outer diameter 20mm and thickness 2mm is subjected to an axial pull of 20 KN. If the modulus of elasticity of the material of the rod is 2 x 10^5 N/mm^2, Determine 1. Stress 2.Strain 3.Elongation of the rod. OR Define: Proof resilience. Determine the total elongation of the component, if its modulus of Elasticity is 200GPa 	**6**	**UAp**	**2**	**1,2,5**
4	Write an expression between modulus of elasticity and modulus of rigidity ?The ultimate stress for a hollow steel column which carries an axial load of 2MN is 500 N/mm2 .If the external diameter of the column is 250mm, determine the internal diameter Take the factor of safety as 2.	**6**	**R/Ap**	**2**	**1,2,6**

TEXT BOOKS

1. Ramamurtham. S., *"Strength of Materials",* 14th Edition, Dhanpat Rai Publications, 2011
2. Khurmi R S, *"Applied Mechanics and Strength of Materials ",* 5 Edition, S.Chand and company
3 S SBhavikatti, Strength of Materials.
3. Fundamentals of strength of materials by P N Chandramouli" PHI New delhi
4. Basavarajaiah and Mahadevappa, "Strength of Materials", CBS Publishers, New Delhi.
5. Ferdinand Singer, "Strength of Materials", Harper and Row Publications
6. Srinath L S, Prakash Desayi,.Srinivasa Murthy N, S.AnanthaRamu, "Strength of Materials", MacMillan, India, New Delhi.
7.

REFERENCES

1. Madan Mohan das, Mimi das Saikia, Bhargab Mohan das – Basic Engineering Mechanics And Strength of Materials- PHI Learning private limited, New Delhi.
2. Popov E.P, *"Engineering Mechanics of Solids",* 2nd Edition, Prentice-Hall of India, New Delhi, 2002.
3 Nash W.A, *"Theory and problems in Strength of Materials",*Schaum Outline Series, McGraw-Hill Book Co., New York, 1995.
4 Kazimi S.M.A, *"Solid Mechanics*", Tata McGraw-Hill Publishing Co., New Delhi, 2003.
5 Ryder G.H, *"Strength of Materials",* 3rd Edition, Macmillan India Limited, 2002.
6 Bansal R. K, "*Strength of Materials",*Laxmi Publications, New Delhi, 2012.
7 Timoshenko S.P, *"Elements of Strength of Materials",* Tata McGraw-Hill, Delhi.
8 James M. Gere, "Mechanics of Materials" - (5th Edition), Thomson Learning.
9 Beer & Johnston, "Mechanics of Materials", TATA McGraw Hill.
10 E P Popov, "Mechanics of Solids", Prentice Hall of India.
11 Relevant IS Codes

E–Learning

1. http:// nptel.ac.in
2. http://nptel.ac.in/courses/Webcoursecontents/IITROORKEE/strength%20of%20materials/homepage.htm
3. http://nptel.ac.in/courses/105105108/
4. http://theopenacademy.com/content/strength-materials
5. http://www.slideshare.net/Nuumero1/strength-of-materials-and-mechanics-of-solids-by-r-k-rajput
6. http://www.eng.uokufa.edu.iq/staff/wissam/Strength%20Material-2.pdf
7. http://www.learn2build.in/free/ebooks/appliedstrength.pdf
8. http://engineeringfreedownload.blogspot.jp/search/label/manual

Model Question Paper

Diploma in Civil Engineering

3RD semester

Course title: **STRENGTH OF MATERIALS**

Time; 3Hrs.Max.marks: 100

Part –A

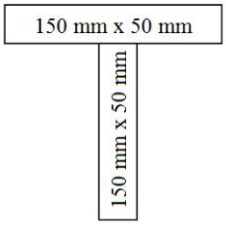
Answer any six each question carries 5 marks

1. Differentiate between moment and couple?
2. State "Parallel axis and perpendicular axis" theorem
3. Draw Stress-strain curve for mild steel? Define terms ultimate stress, working stress and factor of safety.
4. Show that cantilever beam with w kN/m UDL overall its length has maximum shear force is = wl and maximum bending moment= $\frac{wl^2}{2}$
5. Name the types of beams, loading and supports with sketches?
6. What are the assumptions in theory of simple bending?
7. State moment area method? Derive an expression for the slope and deflection for a cantilever carrying UDL w/ unit length over the span L by moment area method.
8. Calculate polar MI of square section having 200mm as side.
9. What is effective length of column? With neat sketches mention the length and crippling load of columns for different end conditions?

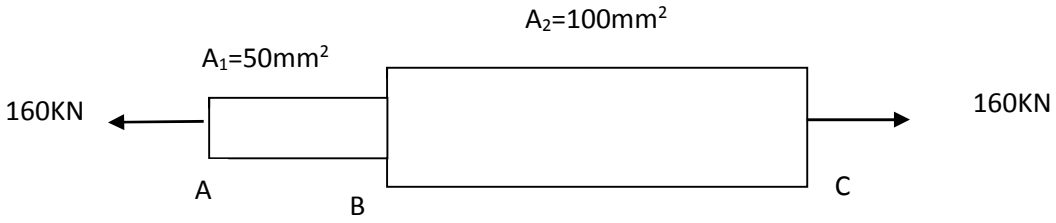
Part –B

Answer any seven each question carries 10 marks

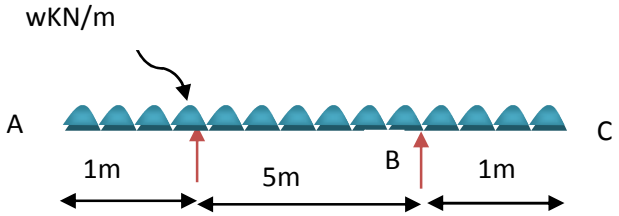
10. a) Classify force system according to plane and line of action?
    b) Find the horizontal and vertical component of following forces
    A. 20kN acting at an angle 30^{o}to the horizontal
    B. 40kN acting at an angle 60^{o}to the vertical.
11. Find radius of gyration about x-x axis of symmetrical T-section shown in figure



12. a)Compare between centroid and centre of gravity ?
    b)Find the centroid about X-axis and Y-axis for an angle section having dimensions 100 mm x 80 mm x 20 mm. where 100 mm side is vertical
13. Determine the total elongation of the component, if its modulus of Elasticity is 200GPa



14. A square bar 6mm x6mm in cross section having modulus of rigidity 0.8 x10^5 the cross section of the bar is reduced to 5.9991mm x 5.9991mm after the application of tensile load of 3600 N, Determine the modulus of elasticity and poisons ratio.
15. A simply supported beam of a span 6 m carries a udl of 10 KN/m over 4 m length from the left support and a udl of 5 KN/m over remaining length along with a point load of 20KN at 4m from the left support. Draw SF diagram.
16. Draw the bending moment and shear force diagram for the below figure



17. Sketch the bending stress distribution diagram across the cross section of a rectangular beam section 230 × 400 m subjected to 60 KNm
18. A column of timber section 150 x 200mm is 6m long, both ends being fixed. Find the safe load for the column. Use Euler's formula and allow a factor of safety of 3 Take E =17500N/mm^2
19. A cast iron beam 50mm wide and 80mm deep is simply supported on a span of 1m .the beam caries a point load of 2kN at the centre. find the deflection at the centre take E=1x 10^5 N/mm^2.

Model Questions Bank

Unit 1-Introduction To Engineering Mechanics
Cognitive level -Remember
What are the characteristics of a force? Define resultant of a force system?
Cognitive level -Understand
Differentiate between Concurrent and non concurrent force system ? Differentiate between coplanar and non-coplanar force system? Differentiate between like parallel and unlike parallel force system ? Differentiate between moment and couple ? State the principle of transmissibility of forces State the conditions of equilibrium?
Cognitive level -Application
Find the horizontal and vertical component of the following forces. A. 20kN acting at an angle 30^{o}to the horizontal B. 40kN acting at an angle 60^{o} to the vertical

Unit 2-Simple Stresses And Strains
Cognitive level -Remember
What are the Elastic Constants? Define: Resilience, proof resilience and modulus of resilience. Define stress and strain. Define Shear stress and Shear strain. Define elastic limit. Define volumetric strain. Define tensile stress and compressive stress. Define young's Modulus. Define modulus of rigidity. Define thermal stress. Define Punching shear Write an expression between modulus of elasticity and modulus of rigidity ? Define plasticity and stiffness. Define Poisons Ratio & modular of elasticity. Write an expression between modulus of elasticity and modulus What is meant by direct stress? Explain the terms ultimate stress, working stress and factor of safety.
Cognitive level -Understand
What is Hooke's Law? Define Poisson's Ratio. Distinguish between rigid and deformable bodies. Define Hardness & Brittleness. Draw stress-strain diagram for ductile material. Distinguish between lateral strain and longitudinal strain, nominal stress Distinguish between lateral strain and longitudinal strain, nominal stress Draw the stress strain curve for ductile material and explain the term ultimate stress. Define hooks law? Write relation between modulus of elasticity, modulus of rigidity and bulk modulus?

Cognitive level -Application
A rod of 1.50 m long and diameter 20mm is subjected to an axial pull of 20 KN. If the modulus of elasticity of the material of the rod is 2 x 105 N/mm2 Determine 1. Stress 2. Strain 3. the elongation of the rod. The extension in a rectangular steel bar of length 400mm and thickness 10mm is found to 0.21mm .The uniformly in width from 75mm If E for the bar is 2x 105 N/mm2 , Determine the axial load on the bar. A square bar 30mm of 2.50 m long is subjected to an axial pull of 30 KN. If the modulus of elasticity of the material of the rod is 2x 105 N/mm2 Determine 1. Stress 2. Strain 3. the elongation of the rod Find the young's modulus of a rod of diameter 30mm and of length 300mm which is subjected to a tensile load of 60 KN and the extension of the rod is equal to 0.4 mm The extension in a rectangular steel bar of length 400mm and thickness 3mm is found be 0.21mm .The bar width 60mm E for the bar is 2x 105 N/mm2 Determine the load on the bar. The ultimate stress for a hollow steel column which carries an axial load of 2MN is 500 N/mm2 .If the external diameter of the column is 250mm, determine the internal diameter Take the factor of safety as 2. A strut as an internal diameter 150mm. what should be the minimum external diameter so that it may carry a load of 1500KN with a factor of safety 4, ultimate stress of steel is 450 N/mm2. A square steel bar of hollow cross-section subjected to a tensile load of 60KN with an internal dimension 25X25mm. determine thickness of the bar if the ultimate stress in the bar should not exceed 400N/mm2 with a factor of safety 4. A square bar 6mm x6mm in cross section having modulus of rigidity 0.8 x105 the dimension of the bar is reduced to 5.9991mm x 5.9991mm after the application of tensile load of 3600 N, Determine the modulus of elasticity and poisions ratio. A BAR shown in figure is subjected to a tensile load of 150kN find the diameter of middle section if the stress is limited to 140N/mm2 also find length of the middle portion if the total elongation of the bar is to be 0.15mm take E= 2x105 N/mm2
Cognitive level -Analysis

A load of 5KN is to be raised with the help of a steel wire. Find the minimum diameter of the steel wire, if the stress is not to exceed 100MPa.

A steel wire of 5mm diameter is bending into a circular shape of 5 m radius. Determine the minimum bending stress induced in the wire. Take E=200GPa.

A hollow steel column of external dia. 260 mm is required to carry on axial load of 2000 kN. If the ultimate stress of steel is 480 N/mm2, calculate the internal dia. of column taking factor of safety as 4.

Rails of 15 m length were laid on the track when the temperature was 200C. A gap of 1.8 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free? If the temperature is raised further by 150C, what will be the magnitude and nature of stresses induced in the rails?

A steel bar 2.5m long is at a temperature of 200c. Find the free expansion of the bar when the temperature of the bar is raised to 650c. Also find the magnitude & nature of stress developed if the expansion is fully prevented.

A bar of 30 mm diameter is subjected to a pull of 60 kN. The measured extension on a gauge length of 200 mm is 0.09 mm and change in diameter is 0.039 mm. Calculate the poison's ratio and modules of elasticity.

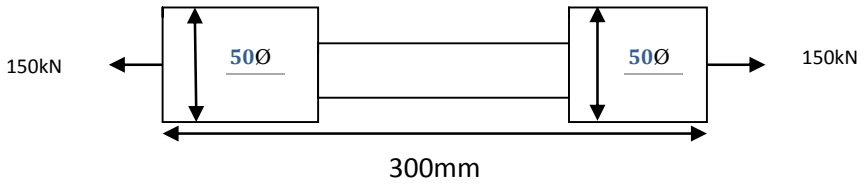
For a certain material E=K, calculate G & Poisson's ratio.

A cube 200mm side is subjected to a compressive force of 3.6MN on each face. Calculate E & K if change in volume is 5000mm3. Take $\mu = 0.28$.

A bar ABCD such that AB=0.75m long & 30mm in diameter, BC=0.5m long & 16mm in diameter, CD=0.75m long & 20mm in diameter is subjected to a tensile load of 180kN at its end. Calculate the change in length of the bar. Use E=200kN/mm2

A brass rod 300mm long & 25mm in diameter is fixed inside a steel tube having 45mm as external & 25mm as internal diameter of same length. Calculate the load sheared by each metal if the assembly is loaded with an axial pull of 120kN. Use Es=200kN/mm2, EB=110kN/mm^2

A BAR shown in figure is subjected to a tensile load of 150kN find the diameter of middle section if the stress is limited to 140N/mm^2 also find length of the middle portion if the total elongation of the bar is to be 0.15mm take E= 2x10^5 N/mm^2

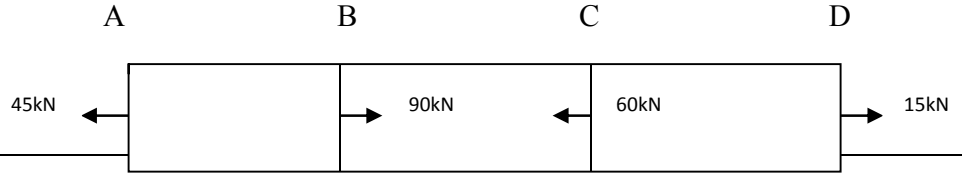


.Determine the total elongation of the component, if its modulus of Elasticity is 200GPa.

A bar 800mm long consists of 3 different cross-sectional areas, first 300mm of its length it is 30mm x 30mm square in section, second 400mm length the bar is 20mm in diameter and 40mm x 40mm square in section for the remaining length if the bar is subjected to an axial tensile load of 60KN determine the stresses in the three parts and the total extension.

A square bar 30mm x30mm in section is subjected to axial forces as shown in figure, find the total change in the bar

A square bar 30mm x30mm in section is subjected to axial forces as shown in figure, find the total change in the bar



Unit 4-Bending Moments And Shear Force

Cognitive level -Remember

Write the relationship between loading, Shear force & Bending moment.
Define with sketches types of loading and supports.
Define point of contra flexure

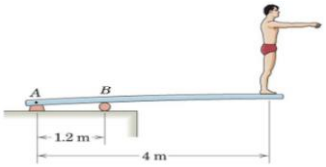
Cognitive level -Understand

Name the types of beams, loading and supports with sketches?
Come out with the relation between bending moment, shear force and rate of loading

Cognitive level -Application

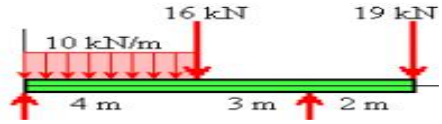
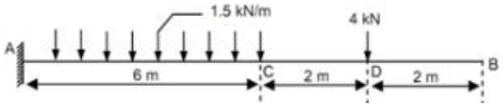
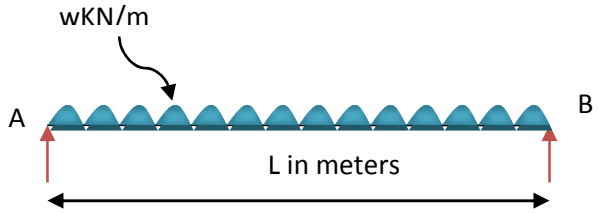
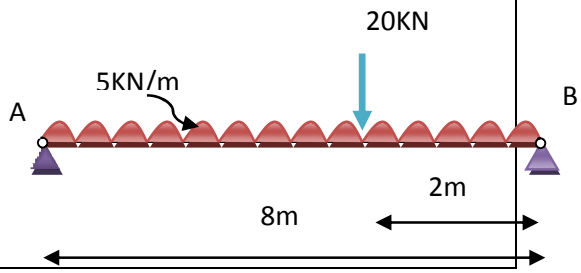
A simply supported beam of span 'L' is subjected to udl of 'w'/unit length. Draw S.F. diagram. and B.M. diagram. Find maximum shear force and maximum bending moment.
A simply supported beam of span 'L' is subjected to centrally placed W KN. Draw S.F. diagram. and B.M. diagram. Find maximum shear force and maximum bending moment.
A cantilever beam of span 'L' is subjected to udl of 'w'/u nit length. Draw S.F. diagram. and B.M. diagram. Find maximum shear force and maximum bending moment.

Draw the bending moment and shear force diagram for a given figure where weight of man is 84 kg (823.7586 Newton)

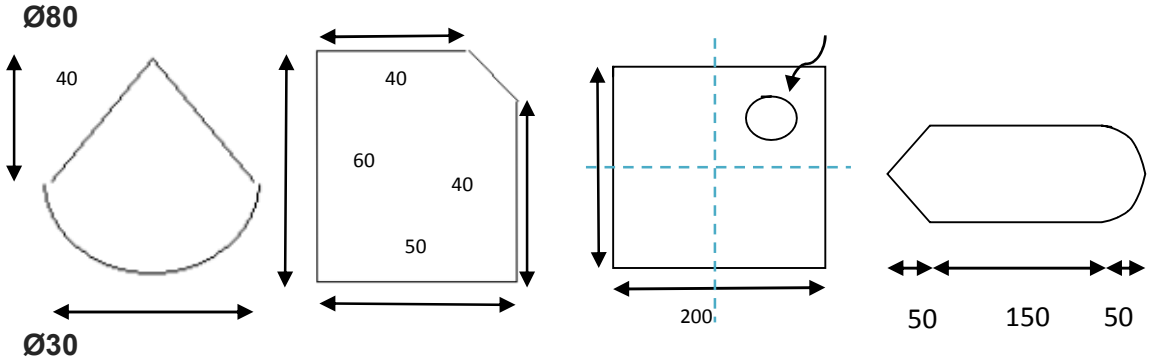


Cognitive level -Analysis

A simply supported beam of 5 meter span carrying point loads 15 KN, 30 KN, 10 KN at distances of 2m, 3m, & 4 meter respectively from the left end. Draw S.F. diagram and B.M. diagram.
State the maximum SF induced in a cantilever of span 4m & carrying a point load of 30kN at its free end.
A cantilever beam 2 meter long carries a UDL of 1.5 KN/m over a length of 1.6 m from the free end. Draw shear force and bending moment diagram for the beam.
Draw the bending moment and shear force diagram for a given figure where weight of man is 84 kg (823.7586 Newton)
Construct the S. F. D. and B. M. D. for the overhanging beam shown in Figure
A simply supported beam of a span 6 m carries a udl of 10 KN/m over 4 m length from the left support and a udl of 5 KN/m over remaining length along with a point load of 20KN at 4m from the left support. Draw SF diagram.
An overhanging beam ABC, such that span AB = 6 m & overhang BC = 2m carries a UDL of 12 KN/m over entire span ABC and two point loads 10KN at 4m from the left support A & of 5kN at free end C. Draw SF diagram. Draw BM diagram for the beam given in & calculate the point of contra flexure if any.

Cognitive level -Creation
A beam AB 10 m long has hinged supports at its ends A and B .It carries a point load of 5KN at 3 meters from A and a point load of 5KN at 7 meters from A and audl of 1KN per meter between the point loads. Draw S.F. Diagram and B.M. diagram for the beam. A cantilever beam 1.5 meter long is carrying point loads 1000N each at a distance of 0.5 meter, 1.0 meter, and 1.5 meter from the fixed end. Draw S.F. diagram and B. M. diagram for the cantilever beam. A simply supported right side overhanging beam supported at 4 meter and right side 1meter overhang. A Loaded by udl 10 KN /m over entire span. Draw S.F. diagram and B.M diagram. Construct the S. F. D. and B. M. D. for the cantilever beam shown in Figure A simply supported beam of a span 7 m carries audl of 5 KN/m over 4 m length from the left support and a point load of 50 KN at 2m from the right support. Draw SF & BM diagram. A Cantilever of span 3 m carries audl of 4 KN/m over entire span and a point load of 5 KN at 2m from the support. Draw SF and BM diagrams. Construct the S. F. D. and B. M. D. for the overhanging beam shown in Figure    Construct the S. F. D. and B. M. D. for the cantilever beam shown in Figure    a. A)For fig 1Show that maximum shear force is $= \frac{wl}{2}$ and maximum bending moment$= \frac{wl^2}{8}$ b. b) Draw SFD and BMD for figure 2 1. 2.    

Unit 3-Geometrical Properties Of Sections
Cognitive level -Remember
Define centre of gravity Define centroid
Cognitive level -Understand
State Parallel axixtheorm with neat sketch and equation State Perpendicular axixtheorm with neat sketch and equation

Cognitive level -Application
An isosceles triangular section ABC has a base width 80 mm and height 60 mm. Determine the M.I. of the section about centre of gravity of the section and the base BC. Calculate the MI of circle about XX & YY axis if MI about ZZ axis is 5 x 1012 mm4.Calculate the MI of a rectangular section of size 120mm x 80mm about its longer side. Calculate the MI of a T-section about the Centrodial axis XX. The top flange is 1200 x 200mm & web is 1800 x 200mm. Total height of the section is of 2000mm. Calculate the MI of an angle section about the Centro dial axis YY. The longer leg is 150 x 20mm & shorter leg is 100 x 20mm. The longer leg is kept vertical. Calculate the centre of gravity of the section shown in fig . Find M.I. of a square 100 mm size about their diagonal. Find M.I. about x-x axis of T-section having flange 150 mm x 50 mm and web 150 mm x 50 mm, overall depth 200 mm. An I-section have the following dimensions Top flange 60 mm x 20 mm. bottom flange 100 mm x 20 mm, web 100 mm x 20 mm, overall depth 140 mm .Find the M.I. about y-y axis. An angle section having dimensions 100 mm x 80 mm x 20 mm. Find M.I. about y-y axis, where 100 mm side is vertical. An isosceles triangular section ABC has a base width 80 mm and height 60 mm. Determine the M.I. of the section about c.g. of the section and the base BC. Calculate the centre of gravity of the section shown in fig .a,b,c,d 

Unit 5-Theory Of Simple Bending
Cognitive level -Remember
What is meant by moment of resistance and neutral axis? Draw shear stress distribution diagram for circular section and define average shear stress. Define Neutral axis. Define direct stresses & bending stresses. Define moment of resistance. Define shear stress. Write the Equation for M.I. of Hollow Shaft. Draw stress distribution diagram if a rectangular section is subjected to direct & bending stresses
Cognitive level -Understand
Differentiate between a) neutral axis and neutral layer b) Moment of resistance and bending moment State any four assumptions made in the theory of simple bending.
Cognitive level -Application

A T-beam having flange 200 x 50mm and a web of 200 x 50mm with overall height 250mm is subjected to a shear force of 120kN. Calculate the shear stresses induced in the section & draw the stress distribution diagram. Take I = 1.15x108 mm4 and $\bar{Y}$ =87.5mm from bottom. Calculate polar MI of square section having 200mm as side.
Cognitive level -Analysis
A simply supported beam of a span 5.8 m is having a cross section of 200 mm wide and 500 mm deep. Calculate the intensity of uniformly distributed load the beam can carry if the bending stress is not to exceed 25 N/mm2.
Cognitive level -Creation
For a T - section with dimensions flange width 100mm, Depth = 200mm and uniform thickness of 40mm. obtain shear stress distribution and calculate maximum and average shear stresses if it is subjected to a S.F. = 100 KN. Sketch the bending stress distribution across the cross section of a rectangular beam section 230 × 400 m subjected to 60 KNm

Unit 6-Slope And Deflection Of Beams
Cognitive level -Remember
write the relation between slope, deflection and radius of curvature. Define slope Define deflection
Cognitive level -Understand
State moment area method
Cognitive level -Application
A simply supported beam span l meters carries a uniformly distributed load of intensity w kN/m distributed all over its length. Determine the maximum deflection and compare, when same beam with point load at centre of span .

Unit 7-Columns
Cognitive level -Remember
State the effective length for both end hinged column. Define radius of gyration.
Cognitive level -Understand
Write the assumptions made in the Euler's column theory. Define slenderness ratio? state the Limitations of Euler's theory?
Cognitive level -Application
Determine the slenderness ratio for steel column of solid circular section of diameter 150mm and 3.5m effective length
Cognitive level -Analysis
A circular column having 500mm diameter is carrying a load of 180kN at an eccentricity of 300mm from the centrodial axis. Determine the maximum & minimum stresses induced in the section. A hollow cast Iron column having external dimensions 200 x 200 mm and internal dimensions 120 x 120 mm is subjected to a load acting at 50mm from the centrodial axis. Calculate the maximum load the column can carry if permissible stresses in Compression and tension are 600 N/mm2 & 30 N/mm2respectively.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **WATER SUPPLY ENGINEERING**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE32T**
	Type of Course: **Lectures, Self Study & Student activities**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites: Basic knowledge of environmental science and mathematics.

Course Objectives: It aims at enabling the student to understand the various components of environment in and around the earth crust and understand the effects of it over plants, animals, etc.

1. Understand the important concepts of good water supply system to a city/town or a village.
2. To understand the need of conservation of rain water and its applications.
3. To understand the sources, effects, prevention and control measures of water pollution and its legislative aspects.

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Relate the relations between the environment and ecology, estimating water requirement for public water supply scheme.	**R/U/A**	1,2,5,6,10	15
CO2	Ascertain the quality of water as per BIS and select the appropriate treatment method required for the water source.	**R/U/A**	1,2,3,6,10	14
CO3	Study and Establish the suitable distribution system for a locality and know the appurtenances used.	**U/A**	2,4,5,8	07
CO4	Identify and summarize the arrangement of water supply and fittings in a building.	**U/A**	2,4,6,8,9	06
C05	Determine the need of conservation of water and rural water supply.	**U/A**	1,2,4,5,6,7, 10	05
C06	Identify the sources of water pollution and suitable control measures.	**U/A**	1,5,6,7,10	05
C06	Perform suggested activity	**U/A**	1 to 10	*
		Total sessions		**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation
*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Mapping of COs with POs	PROGRAMME OUTCOME									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic Knowledge	Discipline Knowledge	Experiments & practic	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Lifelong learning
WATER SUPPLY ENGINEERING	3	3	2	2	3	3	1	2	1	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENT	HOURS
1	**ENVIRONMENT AND ECOLOGY:** Atmosphere, Lithosphere, Hydrosphere, Biosphere. Relation between Plant, Animals and Environment. Eco System, Man and Ecology. **WATER REQUIREMENT:** Necessity of water supply, Methods of population forecasting (Arithmetical, Geometrical and Incremental Increase method), Water Requirements for a) Domestic Purpose b) Industrial Use c) Fire Fighting d) Public Purpose e) Losses. Per Capita Demand and Factors affecting it. Total Quantity of Water Required for a Town. **SOURCES OF WATER:** Surface Sources - Lakes, Streams, Rivers. Impounded Reservoirs. Underground Sources - Infiltration Galleries, Infiltration Wells and Springs. **INTAKE AND CONVEYANCE OF WATER:** Types of intakes i) Reservoir intake ii) River intake iii) Canal intake, Conveyance of Water - Open Channels and Pipes. Pipe Materials - Cast Iron Pipes, Steel Pipes, Concrete Pipes, Pre-Stressed Concrete Pipes, Merits and Demerits. Pipe Joints - Spigot and Socket Joint, Flange Joint, Universal Pipe Joint, Expansion Joint, Flexible Joint, Various stages of pipe laying and its testing. Pipe corrosion and remedial measures	15
2	**QUALITY OF WATER:** Impurities of water - organic and inorganic classification and examination of water. Physical - temperature, colour, turbidity, taste and odour. Chemical - pH Value, Total Solids, Hardness, Chlorides, Iron and Manganese, Fluoride and Dissolved Oxygen. Bacteriological - E-coli, Most Probable Number (MPN), Quality Standards for Domestic purpose as per BIS. **TREATMENT OF WATER:** Flow diagram of different units of treatment, brief description of constructional details, working and operation of the	14

UNIT	COURSE CONTENT	HOURS
	following units - plain sedimentation, sedimentation with coagulation, flocculation, filtration-Slow sand filters, Rapid sand filters and pressure filters (no design) Disinfection of water, Chlorination.	
3	**DISTRIBUTION SYSTEM:** General Requirements, Systems of Distribution - Gravity System, Combined System, Direct Pumping. Methods of Supply - Intermittent and Continuous. Maintenance of required pressure in Distribution Systems. Storage - Underground, Ground Level And Overhead Service Reservoirs – Sketch, Necessity and Accessories. Types of lay-out : dead end, grid iron, radial and ring systems, their merits and demerits and their suitability **APPURTENANCES IN DISTRIBUTION SYSTEM:** Use of Sluice Valves, Check Valves, Air Valves, Scour Valves, Zero Velocity Valves, Fire Hydrants, Water Meter.	7
4	**WATER SUPPLY ARRANGEMENT IN BUILDINGS:** General lay-out of water supply arrangement for single and multi- storied buildings as per B.I.S code of practice. Pipe Materials - Plastic Pipes, High Density Polythene Pipes, Densified cast iron pipes, Merits and Demerits. Connections from water main to buildings. Water supply fittings - their description and uses, water main, service pipes, supply pipe, distribution pipe, domestic storage tank, stop cock, ferrule, goose neck, water tap, Modern systems of Potable water purification-(RO, UV, Activated carbon), Hot water supply - electric and solar water heaters.	6
5	**WATER CONSERVATION:** Conservation of rain water, roof water harvesting, recharging of ground water. **RURAL WATER SUPPLY:** Rural water supply systems, Disinfection of well water.	5
6	**WATER POLLUTION AND CONTROL:** Sources of water pollution, types and its effects, Prevention and control measures of water pollution, Legislation with regards to water pollution control.	5

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video

SUGGESTED LIST OF STUDENT ACTIVITIES

1. Collect the information about biotic and abiotic components of surrounding environment and frame relation among them.
2. Estimate the total quantity of water required for a town/locality/Institute.
3. Prepare map and written report for surface and underground sources of water in the neighbourhood.
4. Visit nearby Intake works of water of your place and collect details.
5. Charts are prepared for BIS and WHO quality standards for drinking water.
6. Visit nearby Certified Water testing laboratories and identify various tests conducted on water.
7. Visit Water Treatment Plant and collect details of unit operations and processes involved in it.
8. Study the distribution system of water supply of your locality.
9. To visit a newly constructed building for plumbing works.
10. Prepare a mini project report for roof top rain water harvesting for existing building

11. Study about Solar water heater and collect data
12. Prepare report/presentation on issues related to water pollution.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, **Good 4**, Exemplary **5**)

1. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	**Students score (Group of five students)**				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relev ant info	Has included some relev ant info	Has included many relev ant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE			Marks weightage	weightage (%)	A*	B*
			Cognitive Levels						
			R	U	Ap				
1	Environment and ecology, water requirement, sources of water, collection and conveyance of water,	15	16% **7**	35% **15**	47% **20**	42	29	2	3
2	Quality & treatment of water	14	16% **6**	35% **14**	50% **20**	39	27	2	3
3	Appurtenances and distribution system	7	0% **0**	25% **5**	75% **15**	20	13	2	1
4	Water supply arrangement in buildings	6	0% **0**	100% **17**	0% **0**	17	12	1	1
5	Water conservation, rural water supply	5	0% **0**	50% **7**	50% **7**	14	10	1	1
6	Water pollution and control	5	0% **0**	50% **7**	50% **7**	14	10	1	1
	Total	52	**5%** **13**	**49%** **64**	**45%** **68**	145	100	9	10

Legend: R; Remember, U:Understand A:Application Ay: Analysis C:Creation E: Evaluvation

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A

B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**55**
2	Applying the knowledge acquired from the course	**45**
3	Analysis	**0**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**0**

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	Test 1	20	Blue books	1,2,
					Test 2			3,4
					Test 3			5,6
				Student activities		05	Report	1,2,3,4,5,6,7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6,7
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1 & 2,3Delivery of course
	End of Course Survey			End of the course			Questionn aires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	III SEM	WATER SUPPLY ENGINEERING	20
	Year: 2015-16	Course code:15EN32T	
	Name of Course coordinator CO1,CO2 **Answer all questions**		

Question		M	CL	CO	PO
1	List the methods of forecasting population.	3	R	1	1,2,5,6,10
2	Explain with sketch Infiltration Galleries and Infiltration Wells.	7	U	1	1,2,5,6,10
3	Explain with sketches the function, constructional details, working and operations of Aeration & Slow sand filter OR Clarifier & Rapid sand filter	10	A	2	1,2,6,10

TEXT BOOKS & REFERENCES

1. Water Supply & Sanitary Engineering- by Rangwala.
2. Water Supply Engineering Vol-I - by S.K.Garg.
3. Water Supply & Sanitary Engineering- by Birde.
4. Water Supply Engineering Vol-I - by Gurucharan Singh.
5. Environmental Engg.-Vol-I –by P.N. Modi.
6. Water Supply Engg.-Vol-I – by Fair & Geir.
7. Water Supply, Waste Disposal and Environmental Pollution Engineering-(Khanna publication) A.K.chatterjee .
8. Water Supply Engineering by Dr B.C.Punmia, Jain & Jain.

MODEL QUESTION PAPER (SEE)

Code: 15CE32T

Diploma in Civil Engineering

III Semester

Course title: WATER SUPPLY ENGINEERING

Time: 3 Hours] **[Max Marks: 100]**

***Note*:** i) Answer any SIX questions from PART - A. Each question caries 05 marks.
ii) Answer any SEVEN Questions from PART - B. Each question caries 10 marks.

PART – A

1. State the factors affecting Per Capita Demand.
2. Explain(i) Hydrosphere (ii) Biosphere
3. State any five BIS standards for drinking water.
4. Describe Break point chlorination
5. Distinguish intermittent system with continuous system of water supply?
6. Explain the functions of Sluice Valves with sketches
7. Distinguish between HDP pipe and CI pipe
8. Explain rural water supply systems.
9. List the Legislative acts to water pollution control

PART – B

1. a) List the sources for pipe corrosion
   b) List the important points in any water supply
2. The following data have been observed from the census department

Sl No	Year	Population
1	1955	6000
2	1965	10000

3	1975	15000
4	1985	20500
5	1995	27000
6	2005	35500
7	2015	45000

Estimate the population for the year 2025 and 2035 by Arithmetical Increase method.

3. Explain with sketch Infiltration Galleries.
4. Summarise the merits and demerits of different systems of lay-out in a distribution system
5. Explain with sketches the function, constructional details, working and operations of Rapid sand filter
6. Explain Chemical tests conducted on water and their significances
7. Explain with sketches the following systems of lay-outs in distribution system
   i) Dead end; ii) Grid iron;
8. Sketch the constructional details and uses of following water supply fittings:
   i) Ferrule; ii) Goose neck
9. Explain the methods of Recharging ground aquifer
10. Explain the prevention and control of water pollution

MODEL QUESTION BANK

CO 1: Understand relations between the environment and ecology ,estimating water requirement for public water supply scheme.

REMEMBER LEVEL QUESTIONS

1. Define the terms Ecology and ecosystem?
2. Describe how the animals depend on plants?
3. Explain the relations between plant, animals and Environment.
4. List the important points in any water supply scheme.
5. List the methods of forecasting population.
6. State the factors affecting Per Capita Demand.
7. List the sources of water
8. State the different methods of conveyance of water.
9. List the sources for pipe corrosion

UNDERSTANDING LEVEL QUESTIONS

1. Explain Atmosphere, Lithosphere, Hydrosphere and Biosphere?
2. Explain briefly the importance of Ecosystem and ecology.
3. Explain the necessity of water supply.
4. Explain about Per Capita Demand
5. Explain the major sources of water supply scheme?
6. Explain different types of pipe materials used for conveyance of water.

7. Summarise the merits and demerits of (i) C.I pipes (ii) Concrete pipes (iii) Plastic pipes
8. Describe pipe corrosion and its effects?

APPLICATION LEVEL QUESTIONS

1. The following data have been observed from the census department

Sl No	Year	Population
1	1955	6000
2	1965	10000
3	1975	15000
4	1985	20500
5	1995	27000
6	2005	35500
7	2015	45000

Estimate the population for the year 2025 and 2035 by Arithmetical Increase method.

2. Estimate the requirement of water for various uses in a) Domestic uses b) Industrial Use c) Fire Fighting d) Public uses e) Losses.
3. Estimate the total quantity of water required for a town
4. Explain with sketch Infiltration Galleries and Infiltration Wells.
5. Explain with neat sketches, reservoir intake, river intake and canal intake.
6. Explain with neat sketches, different types of pipe joints.
7. Explain the procedure of laying pipes.
8. Explain the method of testing of pipe lines.

CO 2: Ascertain the quality of water as per BIS and select the appropriate treatement method required for the water source.

REMEMBER LEVEL QUESTIONS

1. List the impurities present in water.
2. State any five BIS standards for drinking water.
3. List the different chemicals used in the treatment of water?

UNDERSTANDING LEVEL QUESTIONS

1. Explain Chlorination and its advantages.
2. Explain different forms of chlorination and explain any one.
3. Describe Break point chlorination

APPLICATION LEVEL QUESTIONS

1. Explain physical tests conducted on water and their significances
2. Explain Chemical tests conducted on water and their significances
3. Explain Bacteriological tests conducted on water.
4. Sketch the flow diagram for the water treatment works.

5. Explain with sketches the function, constructional details, working and operations of i) Aeration; ii) Flash Mixer; iii) Flocculator; iv) Clarifier v) Slow sand filter; vi) Rapid sand filter, vii) Pressure filters viii) chlorinating chamber
6. Explain with sketch the chemical feeding devices?
7. Explain the method of determining the dosage of coagulants?
8. Estimate the quantity of alum required by 15MLD of water at treatment plants. When 12 mg/L of alum is required.
9. Calculate the amount of bleaching powder to be required per day to treat 3.0 MLD of water for a town. The percentage of chlorine in bleaching powder is 30%. The chlorine required is 0.4 mg/l to maintain residual chlorine of 0.15 mg/l.

CO 3: Study and Establish the suitable distribution system for a locality and know the appurtenances used.

UNDERSTANDING LEVEL QUESTIONS

1. Distinguish intermittent system with continuous system of water supply?
2. Explain the necessity of service reservoirs.
3. Distinguish underground service reservoirs with overhead service reservoirs
4. Summarise the merits and demerits of different systems of lay-out in a distribution system

APPLICATION LEVEL QUESTIONS

1. Explain with sketches the different systems of distribution i) Gravity distribution; ii) Combined gravity and pumping system; iii) pumping system.
2. Sketch the following i) Rectangular overhead service reservoir; ii) Intz tank showing all the accessories
3. Explain with sketches the following systems of lay-outs in distribution system i) Dead end; ii) Grid iron; iii) Radial; iv) Ring.
4. Judge the suitability of the system of lay-out for a given locality.
5. Explain the functions of the following appurtenances with sketches i) Sluice Valves ii) Check valves or reflex valves; iii) Air valves iv) Drain valves or blow-offs; v) Fire hydrants; vi) water meters.

CO 4: Know the arrangement of water supply and fittings in a building.

UNDERSTANDING LEVEL QUESTIONS

1. Explain the modern systems for portable water treatment
2. Distinguish between HDP pipe and CI pipe.
3. Describe requirements of water supply arrangement for single storied buildings as per B.I.S code of practice

APPLICATION LEVEL QUESTIONS

1. Sketch a general lay-out to show suitable water supply buildings with mains.
2. Explain interior water supply arrangements for a single and multi-storied building as per I. S. Code

3. Sketch the constructional details and uses of following water supply fittings: i) Water main; ii) Service pipe; iii) supply pipe; iv) distribution pipe; v) domestic storage tank; vi) stop cock; vii) Air gap; viii) ferrule; ix) Goose neck; x) Water tap
4. Sketch the general lay-out for hot water supply for a domestic building using both electric water heaters and solar water heaters.

CO 5: Know the conservation of water and rural water supply.

UNDERSTANDING LEVEL QUESTIONS

1. Explain rural water supply systems.

APPLICATION LEVEL QUESTIONS

1 Explain the methods of harvesting of Rain water
2 Explain the methods of Recharging ground aquifer
3 Explain disinfection of well?

CO 6: Identify the sources of water pollution and suitable control measures..

UNDERSTANDING LEVEL QUESTIONS

1 Write Water pollution control acts

APPLICATION LEVEL QUESTIONS

1 Write the causes of water pollution, Sources - Point and Non-point sources, effects on plants and animals
2 Explain the prevention and control of water pollution

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **SURVEYING – II**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE33T**
	Type of Course: **Lectures, and assignments and Student Activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisite: Knowledge of Surveying – I and Mathematics.

COURSE OBJECTIVES :

1. To provide knowledge of basic Principles and application of Theodolite surveying.
2. To develop the techniques of taking measurements using theodolite and Total Station plotting graph and drawings.
3. Setting out centre lines of Column footings of a Framed Structure by using Total Station and Theodolite.
4. Demarcation of boundary of the given land using Total station

COURSE OUTCOMES :

At the end of the course students should be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Apply the knowledge of basic concepts and principles of Theodolite.	***R,U,Ap***	1,2,3,4,5	14
CO2	Understand the usage of Theodolite in any civil engineering projects before planning and during execution.	***R,U,Ap, E***	1,2,4,5,8	05
CO3	Understand the principles and use of Tacheometric survey in rough terrain.	***R,U,Ap***	1,2,3,4,8	05
CO4	Interpret data from Theodelite and Total Station in setting out curves.	***R,U,Ap***	1,2,4,5,8	12
CO5	Understand the knowledge of basic concepts and principles of GPS and GIS in Surveying.	***R,U***	1,2,5	04
CO6	Understand the usage and apply the knowledge of Total Station in different field activities.	***R,U,A***	1,2,3,4,5,8	12
CO7	Manage the suggested or identified constructional engineering problems, formulate and solve in teams, in order to improve future problem solving ability and able to present it.	***U/Ap/ Ay/E/C***	1,2,3,4,5,6,7, 8,9,10	*
			Total sessions	**52**

Legend- R; Remember U:Understand Ap: Application Ay: Analysis C:Creation E: Evaluation
*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
SURVEYING-II	3	3	3	3	3	1	1	3	1	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENTS	HOURS
1.0	**Theodolite Surveying.** Transit Theodolite and its essential parts, terms used in Theodolite surveying, Fundamental Axes and their relations. Temporary adjustments, Measurement of Horizontal angle by Repetition and Reiteration method, Measurement of Vertical angle. Measurement of Deflection angle, Errors in Theodolite surveying. Purpose of a Theodolite Traversing, Traversing by Deflection angle and Included angle method. Checks in Closed and Open Traverse. Traverse computations, Closing error, Balancing the traverse by Bowditch and Transit rules. Omitted measurements-problems (Bearing and distance of one side, length of two sides). Simple Problems on Bowditch and Transit rule, converting Deflection angles into Bearings and interior angles into deflection angles, Computing latitude and departure, given the co ordinates of two points, finding its length and bearing, area of Traverse by independent co-ordinate method.	14
2.0	**Trigonometrical levelling** Applications, Elevations and distances of objects - base accessible and inaccessible single plane method and simple problems. Triangulation-Definition, principles, purpose and classification.	05
3.0	**Tacheometry** Principles and purpose of Tacheometry, advantages and disadvantages, Instruments-Tacheometer, stadia rods & Annalactic lense, Determination of Tacheometric constants. Fixed Hair method of Stadia system- Simple Problems.	05

4.0	**Curves:** Curves- Elements of Curves, relation between Radius and Degree of a curve. Types of curves – Horizontal and vertical curves, Types of horizontal curves-simple, compound, reverse and transition curves. Setting out simple curves by Chord Produced and Rankine's method. Definition and elements of a compound curve. Setting out Compound curve. Definition and elements of a reverse curve. Definition and elements of a Transition curves-objectives and requirements.	12
5.0	**Modern Surveying** Remote sensing – definition, basic principles and its applications, Global Positioning System (GPS) - Fundamentals, working principles, receivers, advantages and disadvantages, working principles of GPS navigator. Introduction to GIS- Objectives, applications, comparison of GIS with CAD.	04
6.0	**Total Station** Introduction – Component parts of a Total Station and Accessories - Summary & characteristic Features of total station - Advantages and disadvantages of total station - Applications, - Setting up the Total Station - Measurement (Distance, Angle, Bearing, altitudes etc.)- Field procedure for co-ordinate measurement - Setting out Lines - Setting out Curve by Rankin's method, to set building corners, to mark control and offset lines, to run a traverse survey & adjustments – Areas of field (three or more points), Linking data files.	12

COURSE DELIVERY: The course will be delivered through lectures and Power point presentations/ Video, demonstrations etc.

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. To set out sewer grades.
2. Compare the measured angles, Levels and Contours from Total station to other surveying instruments.
3. Setting out centre lines of Column footings of a Framed Structure by using Total Station and Theodolite.
4. Comparing Horizontal angles by both methods between same points.
5. Height of a building calculated by vertical angle method shall be verified by measuring the height with a tape taking BM as Plinth.
6. RL's and heights of objects like chimneys and towers shall be compared by both single plane and Double plane methods.
7. Demarcation of boundary of the given land using Total station.
8. Formation of sites in a residential layout.
9. Conduct a closed Traverse and find out the area enclosed.
10. Plot the Curves executed on site (practicals) and compare the parameters from plotted drawings and site execution.

11. Determine the height of the elevated objects by trigonometrical levelling.
12. Transferring of Centre line alignment from Ground to inside of Tunnel using Total Station and Theodolite.
13. Geographic information system
14. Gis enabled study of artificial recharge structures
15. Creation of base map for water and sewage network for your town using remote sensing and geographic information system

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5.**

2. Reports should be made available along with bluebooks to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	2				
2.Team's roles & duties	3				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3, CO4
					Test 3			CO5, CO6
				Activities		05	Written Report	CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1,2 & 3 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3, 4,5 & 6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE			Marks weightage	weightage (%)	A*	B*
			Cognitive Levels						
			R	U	Ap				
1	Theodolite Surveying	14	25.00% **10**	25.00% **10**	50.00% **20**	40	27	2	3
2	Trigonometric Levelling	5	20.00% **3**	33.00% **5**	46.66% **7**	15	10	1	1
3	Tacheometric surveying	5	13.00% **2**	20.00% **3**	67.00% **10**	15	10	1	1
4	Curves	12	12.50% **5**	12.50% **5**	75.00% **30**	40	23	2	3
5	Modern Surveying	4	50.00% **5**	50.00% **5**	0.00% **0**	10	8	0	1
6	Total Station	12	20.00% **5**	40.00% **10**	40.00% **10**	25	23	3	1
	Total	**52**	**20.1%** **30**	**26.2 %** **38**	**53.2%** **77**	**145**	**100**	**9**	**10**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

A*-SEE questions to be set for (05marks) in Part – A

B*- SEE questions to be set for (10marks) in Part – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**46**
2	Applying the knowledge acquired from the course	**52**
3	Analysis	**0**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**1**

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		

Name of Course coordinator : Units:__

CO's:____

Q. no	Question	MARKS	CL	CO	PO
1					
2					

3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL Q.P FOR -CIE (TESTS)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/ 6 th week of sem 10-11 Am	III SEM	SURVEYING-II	20
	Year: 2015-16	Course code: 15CE33T	

Name of Course coordinator : **Course Outcomes : 1 & 2**

Note: Answer all questions

	Questions	M	CL	CO	PO
1	List the fundamental lines of a theodelite and Write the relationship between them.	4	R	1	1,2,4
2	Explain the procedure to find the RL of an elevated object whose base is inaccessible when the instrument axis are at the same level.	5	U	2	1,2,3,4,5
3	Define the following terms. a) Transiting b) Swinging. c) Changing face.	3	R	1	1,2,3
4	a) Calculate latitudes, departures and closing error for the following traverse and adjust the traverse using Bowditch rule. **OR** b) An instrument was set up at P and the angle of elevation to a vane 4m above the foot of the staff held at Q was $9^0 30'$. The horizontal distance between P & Q is 2000m. Determine the RL of the Staff station Q given that RL of the instrument axis is 2650.38m by single plane method	8	A	1,2	1,2,3,4,5

Line	Length	WCB
AB	89.31	$45^0 10'$
BC	219.76	$72^0 05'$
CD	151.18	$161^0 52'$
DE	159.1	$228^0 43'$
EA	232.26	$300^0 42'$

REFERENCE TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P Kanetkar & S V Kulkarni
3. Surveying and Levelling by S S Bhavikatti
4. Surveying by Duggal
5. Surveying by R Agor

6. Fundamentals of Surveying by S K Roy
7. Sathesh Gopi, R.Sathikumar & N.Madhu, Advanced Surveying, (Total Station, GIS, Remote Sensing), Pearson Education, Chennai, 2007
8. Surveying and Levelling by N N Basak.

E-Learning

http://nptel.ac.in/video.php?subjectId=105104101
http://media.sakshat.ac.in/NPTEL-IIT-Videos/
http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
http://nptel.iitk.ac.in/
http://www.usouthal.edu/geography/allison/GY301/Total%20Station%20Setup%20and%20Operation.pdf
http://www.pentaxsurveying.com/en/pdfs/R400-MANUAL-PTL-EN.pdf
https://www.youtube.com/watch?v=QtEkZPEeeZk
https://www.youtube.com/watch?v=KQgq5xqSTUw

MODEL QUESTION PAPER
DIPLOMA IN CIVIL ENGINEERING
III SEMISTER
COURSE: SURVEYING II

Time : 3Hrs **Max. Marks : 100**

PART A
Answer any SIX questions each carries 5 marks

1. List the Fundamental lines and their relation of a theodolite.
2. Differentiate between Bowditch rule and Transit rule.
3. Explain the procedure to find the RL of an elevated object whose base is inaccessible when the instrument axes are at the same level.
4. List the advantages and disadvantages of Tacheometric Surveying.
5. Explain briefly different types of Curves with a neat sketch.
6. What is Transition Curve and what are its objects.
7. Explain the principles of Electronic Theodolite & EDM.
8. List the advantages of Total station.
9. What is a Total station? Explain the working principle of Total Station.

PART B
Answer any SEVEN questions each carries 10 marks

1. Calculate latitudes, departures and closing error for the following traverse and adjust the traverse using Bowditch rule.

Line	Length	WCB
AB	89.31	$45^0 10'$
BC	219.76	$72^0 05'$
CD	151.18	$161^0 52'$
DE	159.1	$228^0 43'$
EA	232.26	$300^0 42'$

2. The following data were recorded in running a traverse, the length of AB and CD have been omitted:

Line	Length in mts	Bearing
AB	?	$33^0 45'$
BC	300	$86^0 23''$
CD	?	$169^0 23'$
DE	450	$243^0 54'$
EA	268	$317^0 30'$

Determine the omitted quantities.

3. Define the following terms.
   a. Vertical axis
   b. Trunnion axis
   c. Line of Collimation
   d. Plate level axis and
   e. Altitude level axis

4. An instrument was set up at P and the angle of elevation to a vane 4m above the foot of the staff held at Q was $9^0 30'$. The horizontal distance between P & Q is 2000m. Determine the RL of the Staff station Q given that RL of the instrument axis is 2650.38m by single plane method.
5. The following Tacheometric observations were made with an annallatic telescope having a multiplying constant 100 on a vertically held staff.

Instrument station	HI	Staff station	Vertical angle	Stadia readings		
A	1.48	BM	$-1^0 54'$	1.02	1.72	2.42
A	1.48	P	$+2^0 36'$	1.22	1.825	2.43
Q	1.5	P	$+3^0 6'$	0.785	1.61	2.435

If the RL of BM is 100.0m, find the RL's of stations A, P & Q.

6. Explain the procedure of setting out a simple circular curve by using Total station.
7. Two tangents intersect at a chainage of 1190m, the deflection angle being 36^0. Calculate the necessary data for setting out a curve with the radius of 300m by Rankines/Deflection angle method. The peg interval is 30m
8. Two straights BA & AC are intersected by a line EF. The angles BEF and EFC are 140^0 & 145^0 respectively. The radius of the first arc is 600m and that of the second arc is 400m. Find the chainage of the tangent points and point of Compound curvature. The chainage of intersection point A is 3415m.
9. What is meant by Remote sensing and What are its basic Principles.
10. Explain the process of transferring the Data collected from Total station to Computer and plot drawing using Auto CAD.

Model Questions Bank

Unit 1- Theodolite Surveying

Cognitive level –Remember

11. List the different purposes for which the theodolite can be used.
12. List the different parts of a Transit theodolite and mention their functions.
13. Draw a neat sketch of the Theodolite and mention the parts.
14. Write the relation between Fundamental lines of a Theodolite.
15. Explain the Temporary adjustments of a Transit Theodolite.
16. What is meant by Theodolite Traversing and list their purposes.
17. Differentiate between Bowditch rule and Transit rule.
18. Differentiate between Consecutive co-ordinates and Independent co-ordinates.
19. What is meant by Balancing the Traverse and Closing error.

Cognitive level –Understand

20. Define the following terms.
    d) Transiting
    e) Swinging.
    f) Face left observation.
    g) Face right observation.
    h) Changing face.
    i) Telescope normal.
    j) Telescope inverted.
21. Define the following terms.
    f. Vertical axis
    g. Trunnion (Horizontal) axis
    h. Line of Collimation
    i. Plate level axis and
    j. Altitude level axis
22. Differentiate between
    a. Face left and Face right observation
    b. Plunging and swinging the Telescope
    c. Tribach and Trivet stage
23. Explain the method of 'Repetition and Reiteration' for measuring the horizontal angle.
24. Explain the principle of a Closed Traverse.
25. Write the procedure for the measurement of Deflection angles.
26. Briefly explain the Theodolite traversing by Included angle method.
27. Briefly explain Theodolite traversing by Deflection angle method.

Cognitive level –Application

28. Calculate latitudes and departures for the following traverse ABCDE.

Line	Length	WCB
AB	82.50	$45^0 10'$
BC	200.00	$72^0 05'$
CD	150.30	$161^0 52'$
DE	162.52	$228^0 43'$
EA	234.5	$300^0 42'$

29. Calculate latitudes, departures and closing error for the following traverse and adjust the traverse using Bowditch rule.

Line	Length	WCB
AB	89.31	$45^0 10'$
BC	219.76	$72^0 05'$
CD	151.18	$161^0 52'$
DE	159.1	$228^0 43'$
EA	232.26	$300^0 42'$

30. Find the Latitude and Departure. And Adjust the following traverse by Transit rule.

Line	Length	WCB
AB	89.31	$45^0 10'$
BC	219.76	$72^0 05'$
CD	151.18	$161^0 52'$
DE	159.1	$228^0 43'$
EA	232.26	$300^0 42'$

31. The following data were recorded in running a traverse, the length of AB and CD have been omitted:

Line	Length in mts	Bearing
AB	?	$33^0 45'$
BC	300	$86^0 23''$
CD	?	$169^0 23'$
DE	450	$243^0 54'$
EA	268	$317^0 30'$

Determine the omitted quantities.

Unit 2- Trigonometric Levelling

Cognitive level –Remember

1. Explain the basic principles of Trignometrical Levelling.
2. Differentiate between Trignometrical levelling and Ordinary levelling.
3. What is trigonometrical levelling? Where it is employed?

Cognitive level –Understand

3. What are the practical applications of Trignometrical levelling.
4. Explain the procedure to find the RL of an elevated object whose base is inaccessible when the instrument axes are at the same level.
5. Explain the procedure to find the RL of an elevated object whose base is accessible by single plane method.
6. Explain briefly the method of determining the height of an object by double plane method.

Cognitive level –Application

7. An instrument was set up at P and the angle of elevation to a vane 4m above the foot of the staff held at Q was $9^0 30'$. The horizontal distance between P & Q is 2000m. Determine the RL of the Staff station Q given that RL of the instrument axis is 2650.38m by single plane method.
8. Find the RL of the church Spire C from the following observations taken from two stations A and B, 50m apart,

   Angle BAC= 60^0
   Angle ABC= 50^0
   Angle of elevation from A to top of Spire= 30^0
   Angle of elevation from B to top of spire= 29^0
   Staff reading from A on BM= 2.5m
   Staff reading from B on BM= 0.5m
   RL of BM= 20m.

9. A transit theodolite was set up at a distance of 200m from a chimney and angle of elevation to its top was $10^0 48''$. The staff reading on a BM of RL 70.250m with the telescope horizontal was 0.977. Find the RL of top of Chimney.

Unit 3- Tacheometry

Cognitive level –Remember

1. Explain the Principle of Tacheometry.
2. What are the purpose of Tacheometry.
3. What is Anallatic lense.
4. What is a Stadia Rod.

Cognitive level –Understand

5. List the advantages and disadvantages of Tacheometry.
6. Determine the Tacheometric constants by Fixed hair method

Cognitive level –Application

7. The following readings were taken with a Tacheometer.

Stadia readings	Reading on Staff
Top hair	1.215m
Middle hair	1.650m
Bottom hair	2.085m

If the tacheometric constants K & C as 100 & 0.3m respectively , find the horizontal distance between the staff and instrument and also determine the RL of staff station. Take RL of the instrument station =99.5m & height of the inst above ground =1.220m.

Unit 4- Curves

Cognitive level –Remember

1. Draw a neat sketch of a circular Curve and show its elements.
2. Define degree of a Curve and mention its relation with the radius of curve.
3. Explain briefly different types of Curves with a neat sketch.
4. With a neat sketch define Compound curve and show its elements.
5. Sketch the elements of Reverse curve.
6. What is Transition Curve and what are its objects.
7. What are the requirements of an ideal Transition curve.
8. Explain briefly setting out of a Compound Curve.

Cognitive level –Understand

9. Describe the method of setting out Simple circular curve by deflection angle method (Rankine's method) by using Theodolite.
10. Describe the method of setting out Simple circular curve by deflection angle method (Rankine's method) by using Total Station.
11. Under what circumstances Reverse Curves are provided.
12. What are the points to be considered while setting out a Reverse curve.

Cognitive level –Application

13. Two straights intersect at chainage 2056.44m and the angle of intersection is 120^0. If the radius of simple curve is to be introduced is 600m. Find the following,
    a. Tangent distances
    b. Chainage of the point of Commencement.
    c. Chainage of point of Tangency.
    d. Length of the Long Chord.
14. Two tangents intersect at a chainage of 1190m, the deflection angle being 36^0. Calculate the necessary data for setting out a curve with the radius of 300m by Rankines/Deflection angle method. The peg interval is 30m
15. Two straights meet at an apex angle 126^0 48'and are to be joined by a circular curve of 300m radius. Calculate the data necessary to setout the curve using a 30m chord by Rankines method.
16. Two straights BA & AC are intersected by a line EF. The angles BEF and EFC are 140^0 & 145^0 respectively. The radius of the first arc is 600m and that of the second arc is 400m. Find the chainage of the tangent points and point of Compound curvature. The chainage of intersection point A is 3415m.

Unit 5- Modern Surveying

Cognitive level –Remember

1. What is meant by Remote sensing and what are its basic Principles.
2. Explain briefly the Fundamental principles of GPS
3. What are GPS Receivers and List the advantages and disadvantages.
4. What is meant by GIS and list their objectives and applications.

Cognitive level –Understand

5. List the applications of Remote sensing.
6. Explain the working principle of GPS.
7. Explain the working principle of GPS navigator.
8. Compare GIS with Auto CAD.

Unit 6- Total Station.

Cognitive level –Remember

1. Explain the principles of Electronic Theodolite.
2. Explain the principles of EDM.
3. Write a short note on Electronic Theodolite and EDM.
4. What is a Total station? Explain the working principle of Total Station.
5. What is the function of prism reflectors in total station?
6. List the advantages of Total station.
7. Write a note on Prism.

Cognitive level –Understand

8. List the various application of total station
9. Mention any two total station characteristics.
10. List the component parts and functions of a Total Station.
11. What are the points should be kept in mind while using Total station during the operation of,
    a. Levelling
    b. Measuring distances
    c. Measuring angles.
    d. Contouring.
12. Mention any one Linking software used, to transfer data files in Total station.
13. Briefly write the field procedure for co-ordinate measurement, using Total station. What is electronic note book?

Cognitive level –Application

14. Explain the procedure of setting out Building corners by Total station.
15. Explain the procedure to mark control points and offset lines by total station.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: **CONSTRUCTION TECHNOLOGY**		
Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE34T**
Type of Course: **Lectures, Self Study & Student Activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Prerequisites: Knowledge of science, Materials of Construction.

COURSE OBJECTIVES:

1. Understanding properties of soil, to know about concepts of load distribution and different types of foundation construction techniques.
2. Necessity, functions, suitability of building components and materials, construction techniques as per IS codes.
3. Exposure to dimensional aspects of openings, maintenance and repair works of building components and introduces preventive measures to be adopted in buildings located in areas prone to earth quake.

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Identify the types of soils, to know the properties, strength of soils, to suggest suitable type of foundations and to overcome the difficulties during excavation.	*R/U/Ap*	1,2,3,4,5,7,8 ,10	11
CO2	Describe the concepts of masonry buildings and to know the defects in their construction process and maintenance methods.	*U/Ap*	1,2,5,6,7,10	10
CO3	Plan the various types of openings and building components.	*R/U/Ap*	1,2,5,10	06
CO4	Explain the different types of staircases, Roofs and Floors.	*R/U/Ap*	1,2,5,10	12
CO5	Illustrate the necessity of temporary works and finishes in building construction considering the safety aspects.	*U/Ap*	1,2,5,6,7,10	07
CO6	Analyze the failure of building components, apply the concepts of maintenance and repair works to fight with extreme weather conditions and focus on the earthquake resistant buildings.	*R/U/Ap*	1,2,4,5,6,7,8 ,10	06
CO7	Manage the suggested or identified constructional engineering problems, formulate and solve in teams, in order to improve future problem solving ability and able to present it.	*R/U/Ap/ C*	1,2,3,4,5,6,7, 8,9,10	*
			Total sessions	**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation
*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Construction technology	3	3	1	2	3	3	3	2	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENTS

Course	COURSE CONTENTS	HOURS
1	**1. Soils and its Properties** 1. Types of soils and their suitability to construction of the structures. 2. Bearing Capacity and determination of safe bearing capacity of the soils by plate load test. 3. Method of improving the safe bearing capacity. 4. SBC Values for various types of Soils. **2. Foundations** 1. Definition and purpose of Foundation. 2. Shallow foundations: Spread footing, combined footing, Strap footings & Raft foundation. 3. Deep foundation: Pile foundations-End bearing piles, friction piles, Foundation in Black Cotton Soil. 4. Causes for failure of foundation and preventive measures. 5. Necessity of shoring and strutting in foundation excavation	11

	and process of dewatering.	
2	**3. Stone & Brick masonry** 1. Terms used in stone masonry and brick masonry 2. Coursed rubble masonry and Ashlar masonry. 3. Stone Cladding works for facing of walls. 4. List Bonds used in Brick masonry, Study of English bond & Flemish bond and their uses. 5. Construction of cavity walls. 6. Partition walls-bricks, Concrete block, Glass, Plywood, hard board and aluminium. **4. Dampness and Prevention of dampness** 1. Definition and causes of dampness 2. Effects of dampness and prevention of dampness 3. List the materials used for damp proof course.	10
3	**5. Lintels & Arches** 1. Necessity of lintels and arches, sunshades, sun breakers and canopy, portico. 2. RCC lintels, sun shades, sun breakers, plinth beams and grade beams. 3. Arch-Terms used, Types of arches-Flat, Segmental, and Semi-circular only. **6. Doors and Windows** 1. Definition of doors, windows and ventilator and their purpose 2. Standard size of doors, windows & ventilators for different types of building as per I.S codes. 3. Important types of doors, windows and ventilators in general use. 4. Fixtures for doors, windows and ventilators.	06
4	**Stairs** 1. Technical terms 2. Requirements of a good stair. 3. Classification of stairs, brief description & their suitability.	12

	4. Uses of Ramps, Escalators and lifts. **8.Floors** 1. Definitions and types of floors. 2. Selection of flooring material 3. Laying of Ceramic tile flooring, Vitrified flooring, Marble flooring, Wooden flooring, Vinyl flooring and Cement concrete floorings. **9. Roof** 1. Definition of roof and common types of roofs used in general. 2. Pitched roof- basic elements. 3. Steel trusses. 4. Common types of Roofing materials. 5. Flat RCC roof-advantages and disadvantages. 6. Weather proof course for flat roofs.	
5	**10. Scaffolding and Shoring** 1. Scaffolding-component parts of scaffolding, Types of scaffolding and props. 2. Use of Steel tube scaffolding 3. Types of shoring-Raking, Flying & Dead shores. **11. Plastering, Pointing and Painting** 1. Object of plastering and requirements of good plaster. 2. Method of cement plastering 3. Types of plaster finishes-Smooth, sand faced, rough cast, pebble dash, depter, scrapped, textured finish. 4. Method of pointing & types of pointing. 5. Methods of painting, distempering & varnishing on different surfaces.	07
6	**12. Ventilation systems** 1. Definition, Necessity & requirements of ventilation system 2. Types of ventilation **13. Earthquake Resistant Buildings** 1. List Earthquake zones in India. 2. Precautionary measures to be taken for buildings prone to	06

	earth quake. **14. Miscellaneous** 1. Water proofing, structural glazing, bamboo as a construction material, precast composed panel, anti-termite treatment.	

SUGGESTED STUDENT ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Collect different types of soil samples and to identify the properties.
2. Study the load distribution from structural components to soil and prepare a report.
3. Collect and study different photographs of various foundations and prepare a report.
4. Prepare a case study on foundation failure.
5. Identify different types of masonry materials and study their properties
6. Collect and study different photographs of stairs and arches.
7. Collect different types of flooring materials and prepare a report.
8. Collect and study the different types of Damp Proofing materials and prepare a report.
9. To prepare models of various types of foundations.
10. To prepare models of different types of masonry arrangements.
11. To prepare models of different types of scaffolding.
12. To prepare models of different types of roofs trusses.
13. Prepare a chart of Earth quake zones of India.
14. Understand the classification of earth quake zones of India.
15. Plan suitable schedule of openings for building works.
16. Plan a Weather proofing work for a flat roof.
17. Visit any nearby material testing laboratory and prepare a report on various tests conducted on building materials.
18. Write a report on advanced construction techniques used in civil engineering.
19. Prepare a report on prefabricated construction.
20. Watch a video on anti-termite treatment and prepare a presentation on anti- termite treatment.
21. Visit any nearby construction site and write a report on various construction activities.
22. Prepare a report on the use of modern construction equipment's in construction.
23. Studies on the strength of stabilised mud block masonry and burnt brick masonry using cement soil quarry dust mortar
24. Comparison of risk assessments for underground construction projects
25. Study of copper tailing as a plastering material
26. A study on preparation of bricks using copper tailing waste
27. Report of sandwiched panel elements as a partitioning wall material
28. Load bearing capacity of unreinforced brick masonry vault
29. Enhancement of characteristic strength and durability of brick masonry
30. Report of brick and brick masonry strength for your district.
31. Size effect of masonry joint on compressive strength of stabilised mud blocks

32. Case report on building cracks and causes and its prevention
33. Some studies on the use of strength booster low cost additives in burnt brick manufacture
34. Experimental investigation on brick masonry domes
35. Stabilised copper tailing blocks
36. Low cost roofing tiles
37. Some studies on the strength behaviour of fly ash bricks
38. Report and manufacture of masonry blocks different machines with different materials
39. Size effect of masonry joint on compressive strength of stabilised mud blocks
40. Liqueconss floors and roofs
41. Strength analysis of cement stabilised soil blocks a case report
42. Low cost bricks making
43. Appropriate technology to manufacture common building burnt brick
44. Behaviour of masonry wall subjected to dynamic load
45. Development of b.c soil stabilised building blocks using lime and fly ash
46. A laboratory report on the utilisation of red mud in pavements and as building material
47. Fly ash mosaic flooring tiles
48. Analysis of hyperbolic paraboloid shell foundation
49. Characteristic report of BC soil of village
50. Flexural behaviour of gfrp wrapped masonry beams
51. Fly ash bricks
52. Bioclimatic building design in three climate zones in state
53. Earthquake resistant wooden house Design procedure for pile caps
54. Control Of Corrosion On Underwater Piles
55. Deep Foundations Case Histories
56. Design of Shallow Foundations
57. Analysis Of Stability Of existing Slopes
58. Development Of BC Soil Stabilised Building Blocks Using Lime And Flyash
59. DIAGRID
60. Soil Nailing

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary 5

2. Reports should be made available along with bluebooks to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	2				
2.Fulfill team's roles & duties	3				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course delivery: The course will be delivered through lectures, site visits, models and Power point presentations/ Videos.

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3, CO4
					Test 3			CO5, CO6
				Activities		05	Written Report	CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3, 4 & 5, 6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels R	U	Ap	Marks weightage	weightage (%)	A*	B*
1	Soil and its Properties, Foundation	11	17% **5**	50% **15**	33% **10**	30	21	2	2
2	Stone & Brick masonry, Dampness and its Prevention	10	0% **0**	67% **20**	33% **10**	30	19	2	2
3	Lintels & Arches, Doors and Windows	6	33% **5**	33% **5**	33% **5**	15	12	1	1
4	Stairs , Floors, Roofs	12	14% **5**	71% **25**	14% **5**	35	23	1	3
5	Scaffolding and Shoring, Plastering, Pointing and Painting	7	0% **0**	75% **15**	25% **5**	20	13	2	1
6	Miscellaneous	6	33% **5**	33% **5**	33% **5**	15	12	1	1
Total		52	**14%** **20**	**59%** **85**	**28%** **40**	145	100	9	10

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

A*-SEE questions to be set for (05marks) in Part – A

B*- SEE questions to be set for (10marks) in Part – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**73**
2	Applying the knowledge acquired from the course	**28**
3	Analysis	**0**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**0**

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QP FOR CIE

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/ 6 th week of sem 10-11 Am	**III SEM**	**CONSTRUCTION TECHNOLOGY**	**20**
	Year: 2015-16	**Course code: 15CE34T**	
Name of Course coordinator :			**Units:1,2 CO: 1,2**
Note: Answer all questions			

Question		CL	CO	PO
1	a) List the objectives of foundation? **OR** b) Explain with the help of sketch the Raft foundation.	**R** **U**	**1**	**1,2**
2	a) Explain the determination of safe bearing capacity of soils by plate load test. **OR** b) What are the points to be observed while construction of brick masonry?	**A** **U**	**1,2**	**1,2**
3	a) What are the effects of Dampness? **OR** b) Distinguish between Rubble stone masonry and Ashlar masonry.	**A** **U**	**2**	**1,2**

TEXT BOOKS & REFERENCES

1. Building construction—B.C.Punmia; Ashok Kumar Jain; Arun Kumar Jain, Firewall Media, 2005
2. Building Construction- P.C.Varghese, PHI Learning Pvt. Ltd.2009
3. Building construction—S.C.Rangwala, Charotar Publishing House Pvt. Limited, 2009
4. Building construction and Materials —Gurucharan Singh, Jain Book Agency
5. Building construction—Sushil kumar, Standard Publishers Distributors Delhi, 2001

IS Codes

1. IS 2720: Methods of tests for soils.
2. IS 1904-(1986): Code of Practice for Design and Construction of Foundations in Soils: general requirements.
3. IS 1080-(1985): Code of Practice for Design And Construction of Shallow Foundations in Soils.
4. IS 2212-(1991): Code of practice for brick works.
5. IS 1597-1 &2(1992): Construction of Stone Masonry-Code of practice.
6. IS 4326 (1993) Code of practice for Earth quake resistant design of structures.
7. IS 1893-1 (2002) Criteria for Earth quake resistant design of structures

E –Learning

1. https://www.youtube.com/watch?v=rPlOd2qUcCI
2. https://www.youtube.com/watch?v=nMIl3krK-GI
3. https://www.youtube.com/watch?v=ob4oOtx9m40
4. https://www.youtube.com/watch?v=6mncKCIl8pI
5. https://www.youtube.com/watch?v=6OAHO9zgeXM
6. https://www.youtube.com/watch?v=C1byOuqC684
7. https://www.youtube.com/watch?v=j1bL_1NBvIc
8. https://www.youtube.com/watch?v=cQGDP8kWEMM
9. https://www.youtube.com/watch?v=NxNoH86WJjI
10. https://www.youtube.com/watch?v=rh1Z-i14-h0
11. https://www.youtube.com/watch?v=veF4uSUtrEY
12. https://www.youtube.com/watch?v=USat6LdENzU
13. https://www.youtube.com/watch?v=OYjEUXON8cY
14. http://www.nicee.org/EQTips.php

MODEL QUESTION PAPER

III Semester Diploma Examination.

CONSTRUCTION TECHNOLOGY

TIME: 3 Hours Max. Marks: 100

PART A

Answer any six questions out of nine. Each question carries 5 marks: (5x6=30)

1. What are the different methods of improving the bearing capacity of soils? Explain any three methods.
2. Briefly discuss the causes for failure of foundation.
3. Explain the following terms a) frog b) quoins c) jambs d) reveals e) copings
4. What are the causes of dampness in buildings? Explain any one method of preventing the dampness?
5. Sketch and label the various components of an arch.
6. Briefly explain the different types of fittings used in doors.
7. Enumerate the merits and demerits of concrete flooring.
8. Explain with a neat sketch a) closed couple roofs.
9. List the Earth quake zones of India.

PART B

Answer any seven questions from a set of ten questions each question carries 10 marks: - (10x7=70)

1. Explain the determination of safe bearing capacity of soils by plate load test.
2. Explain with a neat sketch. i) Combined footing ii) Raft foundation
3. a)Explain with neat sketch ashlar masonry.
   b)Explain the following; i) Glass partition, ii) Aluminium partition
4. a) Explain with a neat sketch English bond for 1½ brick thick wall.
   b) Define cavity wall. Explain the construction of cavity wall.
5. a)Explain with a neat sketch a) Bay window b) louvered windows,
   b) Distinguish between a spiral staircase and a helical stair case.
6. a)Draw a neat sketch of a dog legged staircase.
   b)Enumerate the merits and demerits of concrete flooring.
7. a) With a neat sketch explain Queen post roof truss.
   b) What are the advantages and disadvantages of flat roofs?
8. Explain with a neat sketch: i) Single or Brick layers scaffolding ii) Cantilever or Needle scaffolding.
9. Explain the procedure of painting of plastered walls with plastic emulsion paint.
10. a) What are the requirements of a good ventilation system?
    b) What are the advantages of pre-cast composed panels?

MODEL QUESTION BANK

Code: 15CE34T

Diploma in Environmental Engineering

III Semester

Course title: CONSTRUCTION TECHNOLOGY

CO 1: Identify the types of soils, to know the properties, strength of soils, to suggest suitable type of foundations and to overcome the difficulties during excavation.

REMEMBER LEVEL QUESTIONS

1. List out the different types of soil and which type of soil is most suitable for building construction.
2. Define bearing capacity of soil.
3. What are the requirements of a good foundation?

UNDERSTANDING LEVEL QUESTIONS

1. Explain the methods of improving the safe bearing capacity of soils?
4. Define foundation. Discuss various functions served by foundations.
5. What is the difference between a shallow foundation and a deep foundation?
6. Briefly explain the common types of shallow foundations with a neat sketch.
7. Explain with the help of sketches the following types of foundation
   a) Stepped footing b) Combined footing c) Raft foundation
   d) Pile foundation
8. Explain the situations in which pile foundation is preferred.
9. Classify the various types of piles based on i) function and ii) materials and composition.
10. What is the difference between end bearing pile and a friction pile?
11. What are the causes for failure of foundation?
12. Suggest the prime preventive measures to failure of foundation.
13. Under which circumstances the shoring is necessary.
14. Distinguish between the shoring and strutting in foundation.
15. Explain in brief the process of dewatering during excavation.

APPLICATION LEVEL QUESTIONS

1. Explain the determination of safe bearing capacity of soils by plate load test.

CO 2: Understand the concepts of masonry buildings and to know the defects in their construction process and maintenance methods.

UNDERSTANDING LEVEL QUESTIONS

1. Write short notes on i) header bond ii) stretcher bond iii) Dutch bond iv) garden wall bond
2. Define cavity wall. What are its advantages?
3. Define a partition wall. Enumerate various requirements to be fulfilled by a partition wall.
4. Differentiate between the following:
   a) Header and stretcher b) king closer and queen closer c) sill and lintel d) cornice and corbels
5. Explain the following terms a) frog b) quoins c) jambs d) reveals e) copings d) throating e) Freeze
6. How do you lay stone cladding work for facing of walls?

7. Differentiate between English bond and Flemish bond.
8. Explain with the help of sketches general features of a cavity wall.
9. Explain various causes of dampness in buildings.
10. What are ill effects of dampness in buildings?
11. Explain various methods of damp proofing?
12. What are the requirements of an ideal material for damp proofing?
13. List out the different materials used in damp proof course.

APPLICATION LEVEL QUESTIONS

14. Explain the following; a) Glass partition b) Aluminium partition c) plywood partition d) Hard board partition e) brick partition
15. Explain with a neat sketch English bond for 1½ brick thick wall.
16. Explain with a neat sketch Flemish bond for 1½ brick thick wall.
17. Explain with neat sketch coursed rubble masonry.
18. Explain with neat sketch ashlar masonry.

CO 3: Plan the various types of openings and building components.

REMEMBER LEVEL QUESTIONS

1. List the different types of windows used in general.
2. Define the following terms i) mullion ii) transom iii) reveal iv) style v) horn.
3. Classify the lintels based on the materials used.

UNDERSTANDING LEVEL QUESTIONS

4. What are lintels? Sketch a lintel and combined sunshade for an external doorway.
5. Explain briefly the RCC lintel with chejja.
6. Distinguish between Intrados and extrados.
7. Write short notes on a) spandrel of an arch b) flat arch c) segmental arch d) semi-circular arch
8. Distinguish between through lintel and cut lintels.
9. Write a note on i) sliding door ii) revolving door iii) collapsible door.

APPLICATION LEVEL QUESTIONS

1. Sketch and label the various components of an arch.
2. Explain with a neat sketch the following types of Windows i) Louvered window ii) bay window iii) lantern window iv) sky light
3. Explain with a neat sketch the following types of Doors i) Flush doors ii) Louvered doors.
4. Briefly explain the different types of fittings used in doors.
5. What are the functions of a ventilator? How it is different from a window.

CO 4: Understand the different types of staircases, Roofs and Floors.

REMEMBER LEVEL QUESTIONS

1. State briefly the requirements of a good stair case.

2. State the circumstances under which you use the following types of stairs i) Dog legged stair ii) open newel stair iii) half turn geometrical stair iv) spiral stair
3. List out the various special staircases.
4. Define Flooring. What are the different types of Floorings?
5. List the common types of roofing materials.

UNDERSTANDING LEVEL QUESTIONS

6. Explain the following terms i) Landing ii) Nosing iii) Winders iv) Stringer v) Newel vi) Hand rail
7. Distinguish between a spiral staircase and a helical stair case.
8. Indicate the situation where you would recommend a) ramp b) escalators
9. Write a short note on a) escalator b) lift
10. What are the types of lifts?
11. Enumerate the merits and demerits of concrete flooring.
12. What are the characteristics of a good flooring material?
13. Explain the following terms a) Pitch b) Eaves c) Gable d) Ridge e) Valley
14. Briefly explain the classification of roofs.
15. What are the advantages and disadvantages of flat roofs?

APPLICATION LEVEL QUESTIONS

1. Draw a neat sketch of a dog legged staircase.
2. Explain the method of laying of cement concrete flooring.
3. Explain the method of laying wooden flooring.
4. Explain the method of laying marble flooring.
5. Explain with a neat sketch a) Lean to Roofs b) Couple Roofs
6. Explain with a neat sketch a) Closed couple roofs b) Collar Roofs c) Purlin Roofs
7. With a neat sketch explain Queen post roof truss.
8. With a neat sketch explain King post roof truss
9. Explain the procedure for weather proofing of flat roofs.
10. Explain with a neat sketch any one type of steel trusses.

CO 5: Necessity of temporary works and finishes in building construction considering the safety aspects.

UNDERSTANDING LEVEL QUESTIONS

1. What do you understand by scaffolding? What are the essential requirements a good scaffolding?
2. Explain the terms a) Putlogs b) Braces c) Toe board d) Ledgers e) Standards
3. Explain steel tube scaffolding with a neat sketch.
4. What is the necessity of shoring? List the different methods of shoring.
5. What are the objectives of plastering and pointing?
6. What are the characteristics of good plastering materials?
7. List the tools used for plastering.
8. Briefly explain the method of cement plastering.

9. Briefly explain sand faced type of plaster finishing.
10. Briefly explain pebble dash type of plaster finishing.
11. Write a note on various defects in plastering.
12. List the different methods of pointing? Explain rubbed pointing.
13. What are the objects of painting?

APPLICATION LEVEL QUESTIONS

1. Explain with a neat sketch Single or Brick layers scaffolding.
2. Explain with a neat sketch cantilever or needle scaffolding.
3. Explain with a neat sketch double or masons scaffolding.
4. Explain with a neat sketch Raking type of shoring.
5. Explain with a neat sketch flying type of shoring.
6. Explain with a neat sketch dead type of shoring.
7. Explain briefly the procedure of painting of plastered walls with plastic emulsion paint.
8. Explain briefly the procedure of painting of new wood work with synthetic enamel paint.
9. Explain briefly the procedure of painting with dry distemper.
10. Briefly explain the method of polishing wood work using varnish.

CO 6: Analyze the failure of building components, apply the concepts of maintenance and repair works to fight with extreme weather conditions and focus on the earthquake resistant buildings.

REMEMBER LEVEL QUESTIONS

1. List the Earth quake zones of India.
2. Write a note on termites and their attack on buildings.
3. Write a short note on bamboo construction.

UNDERSTANDING LEVEL QUESTIONS

4. What are the reasons for providing ventilators in buildings?
5. What are the requirements of a good ventilation system?
6. Briefly explain the method of water proofing in buildings.
7. What is the meaning of structural glazing? Explain briefly.
8. What are the advantages of pre-cast composed panels.

APPLICATION LEVEL QUESTIONS

1. Explain how you reduce earth quake effects in important buildings.
2. Explain how preconstruction anti termite treatment is carried out.
3. Explain how post construction anti termite treatment is carried out.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

Course Title: **BUILDING PLANNING AND DRAWING**		
Credits (L:T:P) **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE35D**
Type of Course: **Practical, Case study**	**Credit :03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Pre-requisite: Basic knowledge of Engineering Drawing, ability to visualise 2D and 3D views.

Course objectives:

1. Know various building components, their need and location in a building.
2. Be aware of the influence of climatic parameters on buildings, orient the building accordingly and plan sustainable water supply and energy requirement of the building.
3. Use National Building Code and local bye laws, select and use the relevant bye law according to the geographical location of the building.
4. Be aware of principles of building planning and to draw plan, elevations and section of residential and public buildings showing maximum details.
5. Be able to prepare building services drawings such as staircases, lifts and fire escapes. Prepare electrical, water supply and sanitary layout for buildings.
6. Measure an existing building using both conventional and SI units, check for deviations from local bye laws, prepare a case study and suggest remedies with relevance to cost effective building technologies.

On successful completion of the course, the student should be able to attain the following Course Outcomes:

COURSE OUTCOMES		CL	Linked PO	Teaching Hrs
CO1	Apply the concepts of building planning considering climatic parameters, building bye laws, classification of buildings and design buildings.	R/U/A	1,2,5,6,7	9
CO2	Draw site plan, plans, elevations and sectional views of residential, commercial and public buildings, showing maximum details of various building components using the available construction area effectively according to codal provisions and standard units.	R/U/A/An	1 to 9	42
CO3	Prepare building services drawings.	R/U/A/An/C	1 to 9	18
CO4	Apply his knowledge to evaluate existing projects, suggest economical modifications for sustainable development and strengthen his professional skills through self-employability and lifelong learning.	R/U/A/An/C/E	1 to 10	9

Legend: R: Remember, U: Understand, A: Apply, An: Analyse, S: Synthesise, E:Evaluate

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
BUILDING PLANNJNG & DRAWING	3	3	3	3	3	3	3	3	3	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Detailed Course Content

UNIT	COURSE CONTENT	HOURS ALLOTED
1	**Introduction** 1.1Building Planning- Factors Shape size and topography of site, Climatic conditions of the site, Functional requirements of the building, Local Bye laws-requirements of size of different components, setbacks, neighbourhood, Owner :– Status-Choices-Preferences, Economy 1.2 Building Planning- Principles Aspects, Prospects, roominess, furniture requirements, groupings, circulation, privacy, elegance, lighting & ventilation, sanitation, flexibility, economy, practical considerations. 1.3 Building Bye Laws Means of access, internal and external open spaces, floor area ratio, height of building, safety precautions. Building Sanction procedures-key plan (layout plan), site plan, building plan, working plan, validity of sanction, completion certificate.	9

UNIT	COURSE CONTENT	HOURS ALLOTED
2	**Site Plan &Planning of Buildings** 2.1 Drawing of site plan showing setbacks, Floor Area Ratio, Height of Building, and Minimum Distance from Power line, as per National Building Code (NBC). 2.2 Given the floor area or carpet areas of rooms, plan the building and draw a Single line diagram of building. a) Residential building b) School Buildings c) Hostel Buildings d) Primary Health Centre 2.3 Draw the Plan, Elevation and Sectional views for the following types of buildings. a) Residential buildings. b) School Buildings c) Hostel Buildings d) Primary Health Centre e) Canteen Building f)Two storied residential building g)Small work shop Building	42
3	**Building Basic Services** 3.1 Preparation of water supply Layout for residential building. 3.2 Preparation of Electrical Layout for residential building. 3.3 Preparation of Sanitary Layout for residential building. 3.4 Preparation of Shallow Well Rain Water Harvesting Method for Building. 3.5 Preparation of Fire Fighting layout for buildings.	18
	Case study	09
	Total	**78**

Course Delivery:

- The course will be delivered using models and Videos

SUGGESTED STUDENT ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage. For every plan prepared calculate the Floor Area Ratio.

1. Prepare a case study of nearby small public buildings verify and draw the various views and judge the prevailing bye-laws.
2. Prepare a plan, elevation and section of a residential building with split floors and roofs (Split floors and roofs have different floor and roof levels).
3. Develop a plan of rain water harvesting, ground water recharge and solar harvesting for your institution/any other building.
4. Develop a plan of solar harvesting for your institution/any other building.
5. Prepare a plan of temporary construction shed and draw various views.
6. Prepare a plan of bus stand and draw various views.
7. Prepare a plan of cycle stand and draw various views.

8. Study the difference between framed structure and a load bearing structure and present it.
9. Incorporate the concepts of Green building technology in your institute building.
10. Draw the plan elevation and sectional views of a pitched roof residential building.
11. Draw the plan and sectional views of a soak pit and septic tank.
12. Study of economising the cost of openings in bulding
13. Roof rainwater harvesting - a case study

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

(Unsatisfactory **1,** Developing **2,** Satisfactory **3, Good4,** Exemplary**5**)

2. Reports should be made available to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	**Students score (Group of five students)**				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1,** Developing **2,** Satisfactory **3,** Good **4,**Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relev ant info	Has included some relev ant info	Has included many relev ant info	Has included all relevant info needed
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

TEXT BOOKS

1. Building Planning and Drawing- S.S. Bhavikatti, M.V.Chitawadagi, I.K International Publishing House Pvt.Ltd
2. Civil Engineering Drawing and design – D.N.Ghose (CBS Publishers)
3. A text Book of Draughtsman Civil(Theory and Practical) – R.S. Mallik and G.S.Meo (Asian publishers, New Delhi)
4. Building Drawing – Shah,Kale and Patki(Tata McGraw Hill Publishers)
5. Civil Engineering Drawing – Gurucharan Singh
6. Building planning and drawing - Dr. N. Kumara Swamy and A. Kameswara Rao-Charotar Publishing House Pvt.Ltd
7. Civil Engineering Drawing and House Planning - B.P.Verma, Khanna Publishers

IS-CODE

1. IS 962: 1989- Code of Practice for Architectural and Building Drawings.
2. National Building Code of India 2005

COURSE CONTENT AND EVALUATION CHART FOR SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels						Marks weightage	weightage (%)	A*	B*	C*
			R	U	Ap	Ay	C	E					
1	Introduction	9	25%	25%	25.00%	25.00%	0.00%	0.00%	16	12	8		
			4	**4**	**4**	**4**	**0**	**0**					
2	Site plan and planning of building	42	10%	35%	35.00%	10.00%	10.00%	0.00%	70	54		1	1
			6	**25**	**25**	**7**	**7**	**0**					
3	Building basic services	27	10.0%	10.0%	30.00%	20.00%	30.00%	0.00%	40	35			2
			4	**4**	**12**	**8**	**12**	**0**					
Total		78	**15.0%**	**23%**	**30.0%**	**18%**	**13.3%**	**0.0%**	126	100	8	1	3
			14	**33**	**41**	**19**	**19**	**0**					

A*-SEE QUESTIONS TO BE SET FOR (2 MARKS) in PART – A
(Answer5 out of 8 Questions, Answers to Part A should be written on drawing sheet only
B*- SEE QUESTIONS TO BE SET FOR (50MARKS) in PART – B (compulsory)

C*- SEE QUESTIONS TO BE SET FOR (20MARKS) in PART – C (any one)

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**38**
2	Applying the knowledge acquired from the course	**30**
3	Analysis	**18**
4	Synthesis (Creating new knowledge)	**14**
5	Evaluation	**0**

Course Assessment and Evaluation Chart:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Graded Exercises	10	Drawing Sheets	1to 4
				Student activities Case Study	15	Report + Drawings	1 to 4
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1 to 4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	Delivery of course
	End of Course Survey			End of the course		Questionnaires	Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. Rubrics to be devised appropriately by the concerned faculty to assess Case study / Student activities.

Model Question Paper

III Semester Diploma In Civil Engineering

PART-A (Compulsory)

Answer any five Questions (5 x 2 =10)

1. Define working plan.
2. What is the meaning of roominess and what is the desired value.
3. State various factors that influence building planning?
4. What is Floor Area Ratio?
5. At what level are ventilators provided in bathrooms and water closets? Why?
6. Expand NBC
7. What should be the floor to floor height for Residential and public building ?
8. Mention the minimum width of landing in residential building and public building ?

PART-B

9. The line diagram shown in the figure for a proposed Residential Building with clear dimensions between inside walls (All dimensions are in mm). Draw to a scale of 1:100 the following views

a) Plan	20
b) Section on AA	20
c) Front Elevation	10

Foundation:Foundationshall be of C.C. 1:4:8 mix, 1000 wide and 300 thick laid at 1100 below G.L. for all mainwalls and verandah retaining wall. It consists of two footings of size 700 X 400 and 500 X 400 in C.M. 1:6

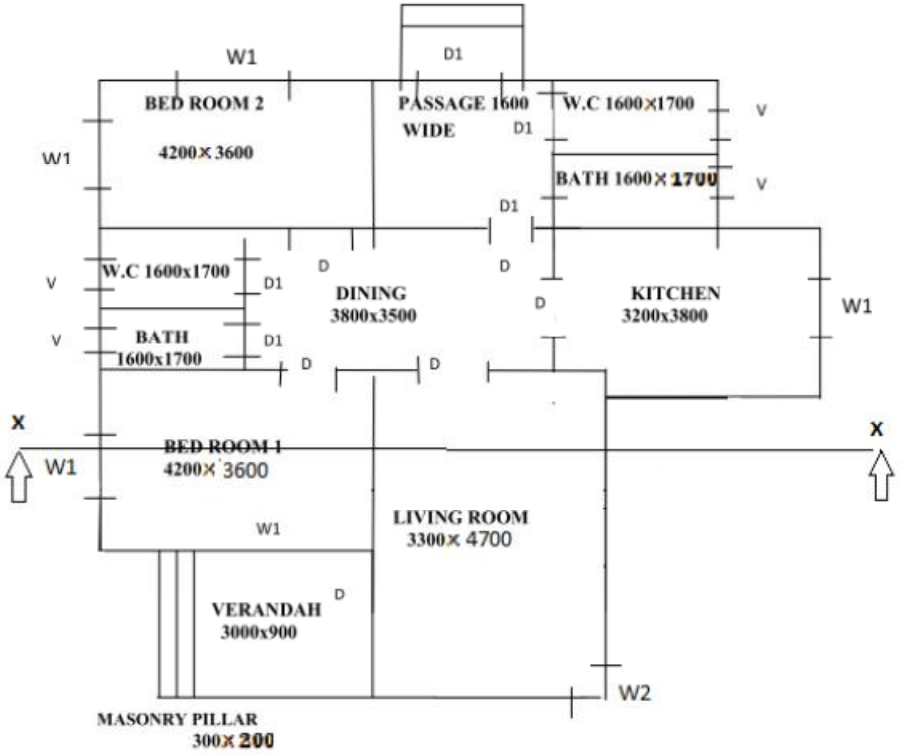
Basement:Thebasement will be in brick work in C.M. 1:5, 300 mm wide and 600 thick above G.L. A DampProof course in C. M. 1:3, 20 thick will be provided for all walls.

SuperStructure:Allmain walls will be in brick work in C.M. 1:5, 200 mm thick. The inner partition walls in toilet will be100 mm thick. The height of all the walls will be 3000 mm above floor level.

Roofing:The roofing will be R.C.C. 1:2:4 mix, 120 mm thick flat slab. Verandah slab will be of R.C.C. 1:2:4 mix, 100 thick at a height of 2600 mm from verandah floor level. A weathering course in brick jelly lime concrete plastered with mortar 1:5:9 mix, 75 mm thick will be provided.

Lintels:R.C.C. lintel 120 thick over all the openings shall be provided. Suitable sunshades for all external openings shall be provided.

Flooring:Theflooring will be in C.C. 1:4:8, 120 mm thick plastered smooth with C.M. 1:3, 20 mm thick for allthe portions.
Steps:Provide steps of rise 150mm and tread 250 mm



SCHEDULE OF OPENINGS		
D	FLUSH DOOR	1000 X 2100
D1	PANELLED DOOR	900 X 2100
W1	WINDOW GLAZED	1200 X1200
V	VENTILATOR	900X300
W2	CORNER WINDOW (GLAZED)	1000x1200

PART-C

10. Draw the site plan to a scale of 1:50 and prepare a single line diagram for a residential building providing suitable room dimensions.

    Site No- 50

    Site Dimension – 9 m x 12 m

    Orientation-

    East – 30 m Road
    West - Site No 115
    North – Site No 51
    South- Site No 49

    Building Coverage 75 % 20

11. Draw the water supply layout for the given line diagram of the building

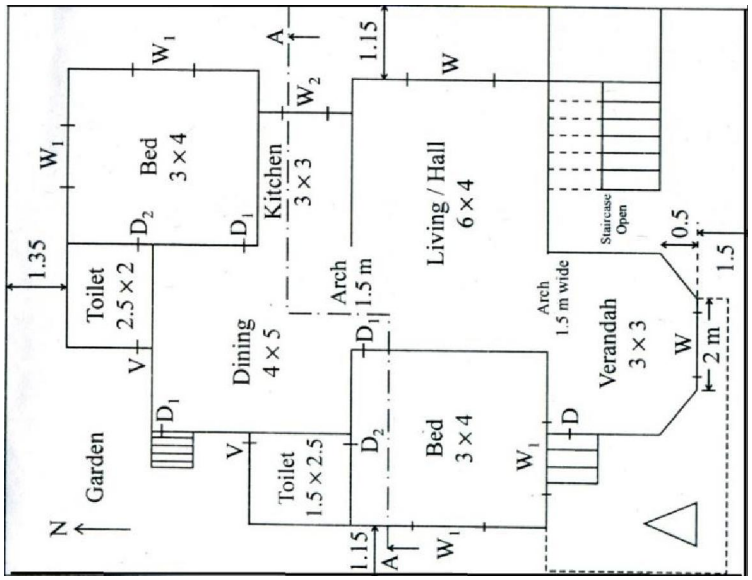
    OR

    Draw the plan of Shallow Well Rain Water Harvesting Method for the given line diagram of the Building. 20

MODEL QUESTION BANK

1. List the various factors to be considered for planning a residential building.
2. Why rectangular the shape of the room is preferred in buildings.
3. Mention the advantages of the site on the top of a hill or on the slope of a hill.
4. Mention the disadvantages of the site on the top of a hill.
5. What is the range of bearing capacity of the soil suitable for residential building?
6. What are the things to be avoided near the buildings?
7. What are the disadvantages of the building near to the sea shore?
8. Explain how the buildings are to be oriented in the following division of the India
   a) Hot arid region b) hot humid zone c) tropical hilly region
9. What is the minimum area required for the proper ventilation.
10. Why the colour of walls, roofs, doors and windows should be lighter.
11. What is the meaning of roominess and what is the desired value.
12. What is the aspect of a kitchen in Indian residential building?
13. Where the bedroom is to be located in a building?
14. What is meant by Circulation in a building? Give guidelines for suitable circulation in a building.
15. Briefly explain the methods of ensuring natural lighting and ventilation in a building site.
16. State various factors influencing building plan.
17. What are the objectives of the building byelaws?
18. What do you mean by the means of access for a building?
19. What should be the minimum front open space for a building where the width of street fronting the plot is 7.5m?
20. What should be the minimum front open space for a building having a fronting street width less than 7.5m?
21. What should be the minimum rear open space of the building?
22. For a detached building what should be the minimum open space recommended.
23. What should be the minimum open space prescribed for a building of a height 10m.
24. What is Floor Area Ratio?
25. What is the standard specified height of the plinth from the ground level?
26. What should be the minimum height of a parapet wall?
27. What should be the maximum height of a compound wall?
28. What is the minimum grade of concrete for RCC work?
29. What should be the minimum thickness of the load bearing wall?
30. What is the minimum thickness of a slab?
31. What is the minimum size of a concrete column? Also mention the number and size of the rebar's?
32. Why the windows or ventilators are provided at higher level in bathrooms and water closet?
33. What is the difference between the key plan and site plan?
34. What do you mean by a habitable room? What are its minimum standards?
35. What do you mean by hazardous building? Give an example.
36. What is the main factor to be considered while planning?
37. Specify the minimum dimension for a living room in residential building as per the NBC standards
38. Draw the single line diagram for the given site measurements and setbacks.

39. Draw the single line diagram for the given site measurements and percentage of built up area.
40. The line diagram shown in the figure for a proposed Residential Building with clear dimensions between inside walls. Draw to a scale of 1:50 the following views
    a) Plan 20
    b) Section on AA 20
    c) Front Elevation 10



Construction details & Specifications are as follows

Foundation: 900mm wide & 1000mm deep with Concrete bed 1:4:8 200mm thick and two courses of size stone masonry in CM 1:8, 400mm depth of each course

Basement: Dressed size stone masonry in CM 1:6, 450mm wide 600mm depth includes 150mm PCC 1:3:6

Super structure:

BBM in CM 1:6 of 230mm thick for all walls

Sill 100mm thick of PCC 1:3:6

RCC Lintel 200mm thick of CC 1:2:4

RCC Chejja 600mm wide, 150mm thick at support and 50mm thick at end

RCC roof slab 150mm thick of CC 1:2:4 at 3000mm ceiling height

WPC 100mm thick average

Granite flooring 20mm thick over a CC 1:4:8 bed of 100mm thick

BBM in CM 1:6 Parapet wall of 150mm thick, 600mm height

Steps: Provide Suitable rise & tread

Schedule of Openings for Doors, Windows and Ventilators

Opening	Size
D	1100 x 2100 mm
D1	1000 x 2100 mm
D2	900 x 2100mm
W	1800 x 1200 mm
W1	1500 x 1200 mm
W2	1200x 750 mm
V	900 x 600 mm

39. Draw thewater supply/sanitary layout/ electrical layout for the given plan of the building.

40. Draw the plan of Shallow Well Rain Water Harvesting Method for the given plan of the Building.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: **SURVEYING PRACTICE - II**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: 15CE36P
	Type of Course: **Practical's & Student Activity**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre requisite: Knowledge of Surveying Practice – I & Surveying-II

Course Objective:

1. To provide knowledge of Total Station & advanced surveying instruments.
2. Develop skills in using Total Station & advanced surveying instruments and analyse data.
3. Develop skills to set out Curves in the field using both Total Station and Theodolite.
4. Develop skills to conduct traverse survey & to find the area

COURSE OUTCOMES :

On successful completion of this course student will be able to

Course Outcome		Experiments Linked	CL	Linked PO	Teaching Hrs
CO1	Use and operate Theodelite in the field.	1,2,3,4,5,6	U/Ap/E	1,2,3,4,8,9	21
CO2	Apply the knowledge of Theodolite in different operations in civil engineering projects.	7,8	U/Ap/E	1,2,3,4,8,9	06
CO3	Apply the knowledge of principles and purpose of Tacheometry in finding out the constants.	9,10,11	U/Ap	1,2,3,4,8,9	09
CO4	Formulate the setting out of curve by linear and angular methods.	12,13,14	U/Ap	1,2,3,4,8,9	09
CO5	Use total station in the fireld of civil engineering land survey.	15,16,17,18,19	U/Ap	1,2,3,4,5,8,9,10	27
CO6	Summarize the basic principles of GPS and GIS in civil engineering.	20,21,22	U/Ap	1,2,3,4,5,8,9,10	06
CO7	Manage the suggested or identified constructional problems, solve in teams, in order to improve future problem solving ability and able to present it.	Student activity	R/U/Ap /Ay/E/C	1,2,3,4,5,6,7,8,9,10	*
				Total sessions	**78**

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
SURVEYING PRACTICE-II	3	3	3	3	3	1	1	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

GRADED EXERCISES		HOURS
1. Theodolite		
Experiment 1	Study of parts of a Transit Theodolite and its temporary adjustments	3
Experiment 2	Measurement of horizontal angle by Repetition method	3
Experiment 3	Measurement of horizontal angle by Reiteration method	3
Experiment 4	Measurement of vertical angle	3
Experiment 5	Open traversing using theodolite and plotting	3
Experiment 6	Conducting a Closed traverse of a given area and balancing it by a. Bowditch rule & b. Transit rule	6
2. Trigonometric Levelling		
Experiment 7	Determination of height of an object whose base is accessible	3
Experiment 8	Determination of height of an object whose base is inaccessible (single plane method instrument axes at different levels only-two cases)	3
3. Tachometric Surveying		
Experiment 9	Determination of Stadia constants	3
Experiment 10	Determine horizontal distance by Horizontal sight	3
Experiment 11	Determine Horizontal distance and elevation for inclined sight with staff held vertical by Stadia hair method	3
4. Curves		
Experiment 12	Setting out simple curve by Offsets from Long chord method	3
Experiment 13	Setting out simple curve by Rankines method using Theodolite	3

GRADED EXERCISES		HOURS
	and Total station	
Experiment 14	Setting out Compound curves given two Radii by Deflection angle method	3
5. Total Station		
Experiment 15	Total station-general commands used- instrument preparation and setting-reading distances and angles	6
Experiment 16	Measurement of distances and coordinates of given points, using a) EDM b)Total station	6
Experiment 17	Measurement of altitudes of given elevated points, using total station	3
Experiment 18	Run a closed traverse using Total station and plotting the traverse	6
Experiment 19	Determination of areas of field (enclosed three or more points) by total station	6
6. Global Positioning System		
Experiment 20	Study of hand held GPS	6
Experiment 21	Measurement of latitude, longitude and altitude using hand held GPS	
Experiment 22	Selection and marking of routes using hand held GPS	

Course Delivery: The course will be delivered through lectures, demonstration, site visits, expert lectures**.**

SUGGESTED STUDENT ACTIVITY

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Road survey (at least for 100m) by total station.
2. Conduct a traverse survey of a given plot and find out the area.
3. Prepare the contour maps of the given area in your locality.
4. Set out a center line of a given building using theodolite.
5. Find out the parameters of a curve for an existing road in your locality.
6. Locate a permanent structure using GPS in your locality and prepare a map.
7. Prepare a topographical map by using total station.
8. Detailed study report on telescope used in surveying instrument.
9. To set out two parallel lines along both the sides of an obstacle by using total station.
10. To find the distance between two inaccessible points by using total station.
11. Make a presentation on refraction error, curvature error caused by telescope.
12. Prepare a report on any one of the following. Arial survey, photogrammetric survey, hydrographic survey, military survey and mine survey.

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	2				
2.Fulfill team's roles & duties	3				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Two test (average of Two tests)	10	Blue books	1,2,3,4,5,6
				Graded Exercise(Record)	10	Record	1,2,3,4,5,6
				Student activity	05	Report	CO7
	SEE	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 & 3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**20**
2	Applying the knowledge acquired from the course	**50**
3	Analysis	**10**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**10**

TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Fundamentals of Surveying by S K Roy
3. Surveying and Levelling by T P Kanetkar & S V Kulkarni
4. Surveying and Levelling by S S Bhavikatti vol 1 & 2
5. Surveying by Duggal
6. Surveying by R Agor
7. Surveying and Levelling by N N Basak
8. Advanced Surveying by R Agor

E-links

http://nptel.ac.in/video.php?subjectId=105104101
http://media.sakshat.ac.in/NPTEL-IIT-Videos/
http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
http://nptel.iitk.ac.in/
http://www.slideshare.net/Ehabtariq/surveying-by-using-digital-theodolite
http://www.tcd.ie/civileng/Staff/Brian.Caulfield/3A1/3A1%20Lecture%206.pdf
http://madinpoly.com/pdf/labmanual/1/surveying%20practical-ii%28317%29.pdf

SCHEME OF EVALUATION

SL NO	DESCRIPTION	MARKS
1	Writing procedure	05
2	Conducting & Performance	20
3	Calculation and results	15
4	Viva-voce	10
	Total	**50**

LIST OF EQUIPMENTS

SL NO	EQUIPMENTS	QUANTITY
1	THEODOLITE WITH 20" LC	10
2	EDM	06
3	TOTAL STATION	06
4	HAND HELD GPS NAVIGATOR	05
5	LEVELLING STAFF	10
6	PRISM AND PRISM POLE AND ELECTRONIC BOOK	06
7	LINKING SOFTWARE	02

VIVA QUESTIONS

Theodolite

1. Difference between a Transit Theodolite and a Dumpy level.
2. Difference between Swinging and Transiting.
3. Difference between Telescope normal and Telescope inverted.
4. Difference between Repetition method and Reiteration method.
5. What is meant by size of Theodolite.
6. What is the function of Levelling head and shifting head.
7. Define the term Changing face.
8. What are the uses of a Theodolite.
9. What are the fundamental lines of a Theodolite and how they are Related.
10. What are the errors in Theodolite work.

Theodolite traversing

1. What is meant by Theodolite traversing.
2. Difference between open traverse and closed traverse.
3. Difference between independent co-ordinates and consecutive co-ordinates.
4. Define the term Lattitude and Departure.
5. What is meant by Closing error and Balancing the Traverse.
6. Difference between Bowditch rule and Transit rule.
7. What are the Principles of a Closed traverse.
8. What is meant by Ommitted measurements.
9. Difference between Included angle and Deflection angle.

Trigonometric levelling.

1. What is meant by Trigonometrical levelling.
2. Under what circumstances Trignometrical levelling is adopted.
3. What is meant by single plane method.

Tacheometry

1. Explain the principle of Tacheometry.
2. Under what circumstances Tacheometric surveying is adopted.
3. List the advantages and disadvantages of Tacheometer.
4. What are Tacheometric constants and how to eliminate additive constant zero.
5. What is Annalatic lense and where it is used and what is its purpose.
6. How horizontal distances and elevations are determined by Stadia hair method.

Curves

1. Define the following terms
   a. Point of commencement.
   b. Point of tangency
   c. Length of Curve
   d. Length of long chord.
   e. Degree of curve.
2. What is the relation between degree of curve and radius of curve.
3. Under what circumstances the following curves are adopted.
   a. Simple Circular curve
   b. Compound curve.
   c. Reverse Curve
   d. Transition curve
   e. Valley curve
   f. Summit curve.
4. What are the precautions to be taken while introducing reverse curve.
5. What are the functions and objectives of transition Curve?
6. What are the importance of Curves?

Total Station.

1. What is a Total station.
2. What are the advantages of total station.
3. What are the applications of total station.
4. What is meant by Electronic Theodolite.
5. What are the principles of an electronic theodoloite.
6. What is the Brain of Total Station.

GPS & GIS

1. What is meant by Remote sensing and What are its basic Principles.
2. What are the applications of Remote sensing.
3. What are GPS receivers?
4. What is meant by GIS and what are its applications.
5. Compare GIS with Auto CAD.
6. What are the uses of GPS Navigators.

	Course Title: **BASIC COMPUTER AIDED DRAFTING IN CIVIL ENGINEERING**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: 15CE37P
	Type of Course: **Practical, Drawing, Student Activity**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre-requisites: Basic computer Skills, Engineering Drawing.

Course Objective: To develop 2D civil engineering drawings of simple building elements and 3D drawings of simple objects.

Course Outcomes

At the end of the course, the students should be able to

Course Outcome		Experiments Linked	CL	Linked PO	Teaching Hrs
CO1	Interpret the basic concept and usage of CADD software. Compare the utilities of alternate drafting software from open source.	***1***	***R,U***	1,2,3,4,5,7, 8,9	06
CO2	Setup CADD workstation and demonstrate basic commands of Computer Aided Design and Drafting Software.	***2***	***R,U,Ap***	1,2,3,4,5,7, 8,10	09
CO3	Prepare and plot 2D drawings of Building Components.	***3,4,5,6,7,8***	***U,Ap***	1,2,3,4,5,7, 8,9,10	18
CO4	Create and plot 2D objects.	***9,10***	***U,Ap***	1,2,3,4,5,7, 8,10	33
CO5	Create and plot 3D objects.	***11,12***	***U,Ap***	1,2,3,4,5,7, 8,10	12
CO6	Perform in teams and explore new ideas to interpret the existing models	***Suggested activity***	***U,A,C***	1,2,3,4,5,7, 8,10	*
				Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Basic computer aided drafting in civil engineering	3	3	3	3	3	-	1	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	MAJOR TOPICS	MARKS ALLOTTED
1. Introduction to CADD		
Experiment1	General features of CADD, CADD work station, Hardware and Software requirements, Advantages of using CADD, Starting CADD, Understanding CADD Editor Screen- title bar, menu bar, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar.	06
2. Demonstration of commands in CADD		
Experiment 2	Commands- Command Entry Options using -Command Line, Menus (File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. Understanding the use of CADD Menus and Tool Bars, CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, Absolute Polar coordinates, Relative Polar Coordinates, Direct distance entry and line command, Picking coordinates on the screen and line command.	09

UNIT	MAJOR TOPICS	MARKS ALLOTTED
3. Creating a new drawing		
	Using a wizard, using a template, starting from scratch. Selection of units, Selection of paper space, Setting up of limits Draw 2D drawings of simple building components and Print/ Plot the following drawings using Plot Settings.	
Experiment 3	Draw the Elevation and cross section of fully panelled Door	3
Experiment 4	Draw the Elevation and cross section of fully panelled Window and glazed Window	3
Experiment 5	Draw the Cross Section through Wall	3
Experiment 6	Draw the sectional Elevation of Spread footing	3
Experiment 7	Draw the sectional Elevation and Plan showing Reinforcement details of Column footing.	3
Experiment 8	Draw the plan and sectional Elevation of Dog-Legged Staircase.	3
4. Developing 2D drawings of Buildings		
Experiment 9	Draw Plan, Elevation and Sectional View of Single Room Building. Print/ Plot the above drawings using Plot Settings.	33
Experiment 10	Drawing Plan, Elevation and Sectional View of Two Room Residential Building. Print/ Plot the above drawings using Plot Settings.	
5. Developing Isometric and 3D drawings		
Experiment 11	Develop isometric drawings of Simple Objects such as Steps, Footings etc. Print/ Plot the above drawings using Plot Settings.	12
Experiment 12	Develop a 3D Model for a Single Room Building.	
	Total	**78**

SUGGESTED STUDENT ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Plot the different line styles used in Civil Engineering drawing.
2. Collect and measure the dimensions of different paper sizes available in market.
3. Prepare a plan, elevation and sectional view of a single room building and plot on different paper sizes.

4. Develop a 3D model of simple objects like cube, prism, cylinder and cone.
5. Measure the dimensions of a beam and column develop 3D model.
6. Measure the dimensions of your classroom/any other room and create a 3D model.
7. Prepare a plan showing arrangements of steps spiral stairs.
8. Develop a conic section
9. Object of drawing models non-dissected and dissected

   Rectangular prism, Rectangular pyramid,
   Triangular prism and pyramid, Square prism and pyramid,
   Pentagonal prism and pyramid, Hexagonal prism and pyramid ,
   Octagonal prism and pyramid, Decagonal prism and pyramid,
   Cube, cone sphere, cylinder, half cylinder, quarter cylinder,
   Semi, cylinder, tetrahedron, octahedron

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, and Exemplary 5.

2. Reports should be made available along with bluebooks to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary**5**				
1.Organisation	4				
2.Fulfill team's roles & duties	3				
3.Conclusion	2				
4.Convensions	5				
Total	14				
Average=(Total /4)	14/4=3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Course Delivery: The course will be delivered through lectures and Demonstration and CAD practices**.**

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Twice test (average of two tests)	Test 1	10	Blue books	1,2,3
					Test 2			3,4,5
				Record		10	CAD exercises	1,2,3,4,5
				Student activity		05	Reports/ Presentations	1,2,3,4,5,6
	SEE	End Exam		End of the course		50	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		---	Feedback forms	1,2,3,4,5,6 Delivery of course
	End of Course Survey			End of the course		---	Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**30**
2	Applying the knowledge acquired from the course	**40**
3	Analysis	**10**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**10**

TEXT BOOKS

1. CAD in Civil Engineering a Laboratory Referrel- Dr M.A.Jayaram, D.S.Rajendra Prasad, Sapna Book House
2. Sham Tickoo-CADD: A Problem-Solving Approach Thomson LearningEMEA, Limited
3. George Omura- Mastering Auto CAD BPB Publication

4. Arshad N Siddique, Zahid Khab, Mukhtar Ahmed- Engineering Drawing withCADD

E-Learning:

http://www.sketchup.com
http://www.autodesk.in/products/3ds-max/overview
http://www.we-r-here.com/cad/tutorials/index.htm
http://www.cadtutor.net/tutorials/CADD/
http://www.caddprimer.com/CADD_training_tutorial/CADD_training_lessons.html
http://www.CADDmark.com/
http://www.CADDtutorials.net/

SCHEME OF END EXAMINATION

1	Record + viva on Suggested activity Report	05 +05 marks
2	Concept of CADD work station and Demo of commands	10 marks
3	Drawing and taking print out of given 2D problem	15 marks
4	Isometric drawing/3D drawings	15 marks
	Total	**50 marks**

Equipment List

1. Computers with Latest Configuration (One Computer per student in practical session).
2. Latest licensed Computer Aided Drafting Software.
3. Plotter of size A0
4. LCD Projector
5. UPS 5KVA

KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.													
TEACHING AND EXAMINATION SCHEME FOR KANNADA COURSE IN DIPLOMA PROGRAME													
SEMESTER: III			COMMON TO ALL DIPLOMA PROGRAMMES										C-15 Curriculum
SL.N0	COURSE NAME	Teaching Department	COURSE /QP CODE	Teaching scheme Contact hours					Examination scheme				
				TH	TU	PR	TOTAL	Credit	Exam paper duration in Hrs	End exam Max marks	End exam Min marks	Maximum CIE Marks (IA+SA)	Minimum Marks for passing. (IA + SA)
	THEORY												
1	KANNADA KALI-1	KA	15KA3NT	2	-	-	2	2	-	-	-	50	20
2	TANTRIKA KANNADA -1	KA	15KA3KT	2	-	-	2	2	-	-	-	50	20

CIE- Continuous Internal Examination: SEE-Semester End Examination: IA-Internal Assessment Tests: SA- Student Activity.

Note: 1. Candidates studied Kannada as one subject in 10th standard shall take Tantrika Kannada 1 &2. Others may take "Kannada Kali-1&2".

2. In 3rd Semester- Assessment is only by CIE and no SEE. Average marks of three I A tests shall be rounded off to the next higher digit. Rubrics to be devised appropriately to assess student activity.

KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.													
TEACHING AND EXAMINATION SCHEME FOR KANNADA COURSE IN DIPLOMA PROGRAME													
SEMESTER: IV			COMMON TO ALL DIPLOMA PROGRAMMES										C-15 Curriculum
SL.N0	COURSE NAME	Teaching Department	COURSE /QP CODE	Teaching scheme Contact hours					Examination scheme				
				TH	TU	PR	TOTAL	Credit	Exam paper duration in Hrs	Sem End Exam Max Exam Marks	Sem End Exam Min Passing Marks	Maximum CIE Marks (IA+SA)	Minimum Marks for passing. (IA + SA)
	THEORY												
1	KANNADA KALI-2	KA	15KA4NT	2	-	-	2	2	2	50	20	-	-
2	TANTRIKA KANNADA -2	KA	15KA4KT	2	-	-	2	2	2	50	20	-	-

CIE- Continuous Internal Examination: SEE-Semester End Examination: IA-Internal Assessment Tests: SA- Student Activity.

Note: In 4th Semester- Assessment is only by SEE and no CIE. To award diploma certificate, passing in Kannada course is mandatory. However Kannada course is not included in the eligibility criteria for promotion to the higher semester.

3ನೇ ಸೆಮಿಸ್ಟರ್ ಕನ್ನಡ–1 (ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಪರಿಚಯ)

3rd Semester	**Course: Kannada Kali-1**	**Course Code:15KA3NT** (2016-17)
	No. of Credits:02	**No. of teaching hours/week:02** No. of teaching hours/Semester:26
	Mode of Assessment and Evaluation: Continuous Internal Evaluation (CIE)only. I.A Tests:30 Marks (3 Tests) Student activities: 20 Marks	**Maximum Marks: 50 (CIE only) Minimum Passing marks:20** (IA Tests + Student activities)

ಉದ್ದೇಶ:

1. ಕೇಳುವುದು, ಗ್ರಹಿಸುವುದು, ನಿರರ್ಗಳವಾಗಿ ಮತ್ತು ಸ್ಪಷ್ಟವಾಗಿ ಓದುವ ಮತ್ತು ಮಾತನಾಡುವ (ಅಭಿವ್ಯಕ್ತಿಸುವ) ಸಾಮರ್ಥ್ಯವನ್ನು ಬೆಳೆಸುವುದು.
2. ಜ್ಞಾನಾರ್ಜನೆ, ಸಾಹಿತ್ಯಾಭಿರುಚಿ, ಚಿಂತನೆ ಮತ್ತು ಆನಂದಕ್ಕಾಗಿ ಸ್ವತಂತ್ರವಾಗಿ ಓದಲು, ಬರೆಯಲು ಮತ್ತು ಮಾತನಾಡಲು ಸಮರ್ಥರಾಗುವಂತೆ ಮಾಡುವುದು.
3. ಪದ ಸಂಪತ್ತನ್ನು ಹೆಚ್ಚಿಸಿಕೊಂಡು ಸ್ಪಷ್ಟ ಉಚ್ಚಾರಣೆಯೊಡನೆ ಲಿಖಿತ ಮತ್ತು ಮೌಖಿಕ ಚಟುವಟಿಕೆಗಳನ್ನು ಮಾಡಿಸಿ, ಸ್ವತಂತ್ರವಾಗಿ ಭಾಷೆಯ ಬಳಕೆ ಮಾಡುವುದು.
4. ನಾಡು–ನುಡಿ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ಸಾಹಿತ್ಯಗಳ ಪರಿಚಯ ಮತ್ತು ಆತ್ಮೀಯ ಭಾವಾಭಿಮಾನವನ್ನು ಬೆಳೆಸುವುದು.
5. ಕ್ರಿಯಾತ್ಮಕ ಚಟುವಟಿಕೆಗಳಿಂದ ಭಾಷಾ ಕೌಶಲ್ಯದ ಸರಳ ಪ್ರಯೋಗ ಮಾಡಿಸುವುದು./ಕಲಿಸುವುದು.
(ಕ್ರಿಯಾತ್ಮಕ ಚಟುವಟಿಕೆ ಎಂದರೆ, ವರ್ಣಮಾಲೆ ಪರಿಚಯ, ವ್ಯಾಕರಣದ ಸರಳ ಪರಿಚಯ, ಗುಣಿತಾಕ್ಷರ, ಸಂಯುಕ್ತಾಕ್ಷರಗಳು, ನಾಮಪದ, ಲಿಂಗ, ವಚನ, ಪ್ರತ್ಯಯಗಳು, ವಾಕ್ಯರಚನೆ (ಕರ್ತೃ, ಕರ್ಮ, ಕ್ರಿಯಾಪದ) ಇತ್ಯಾದಿ)

ಪಠ್ಯಕ್ರಮ ಮತ್ತು ಸರಳ ಭಾಷಾ ಕೌಶಲ್ಯ

(ಕನ್ನಡ ಕಲಿ–ಪಠ್ಯಪುಸ್ತಕ –ಶ್ರೀ ಲಿಂಗದೇವರು ಹಳೇಮನೆ – ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ ಪ್ರಕಾಶನ)

ಭಾಗ–1

ಪಾಠಗಳ ಕ್ರಮಾಂಕ Lesson No	ಪಠ್ಯವಸ್ತುವಿನ ವಿವರ – Curriculum Content	ಸೆಮೆಸ್ಟರ್ ಬೋಧನ ಅವಧಿ Total no.of Classes /Sem
	ಕನ್ನಡ ಭಾಷೆಯ ಪರಿಚಯ/ವರ್ಣಮಾಲೆ/'ಕನ್ನಡ ಕಲಿ'ಯುವ ವಿಧಾನ ಕುರಿತ ಮಾಹಿತಿ	**02**
1	Introducing each other Personal Pronouns, Possessive forms and Interrogative words 1. ನಾವು ಮತ್ತು ಭಾಷೆ 2. ಅಕ್ಷರಗಳಿಂದ ಪದಗಳು	03
2	Introducing each other Personal Pronouns, Possessive forms – Yes/No Type Interrogative	02
3	About Ramayana. Possessive forms of nouns, dubitive question, Relative nouns. ಪದಗಳಿಂದ ವಾಕ್ಯಗಳು	02
4	Enquiring about college. Qualitative and quantitative adjectives.	02
5	Enquiring about room. Predicative forms,	02

	locative case.	
6	Vegetable Market. Dative case, basic numerals.	02
7	About Medical college. Ordinal numerals, plural markers.	02
8	In a cloth shop. Color adjectives, defective verbs	02
9	Plan to go for picnic - imperative, permissive and hortative	02
10	Enquiring about one's family, Verb iru, and corresponding negation ಕನ್ನಡ ಚಿತ್ರಪಟಗಳಲ್ಲಿನ ಅಕ್ಷರಗಳನ್ನು ಗುರುತಿಸಿ ಓದಿ ದಿನಪತ್ರಿಕೆ ಓದುವ ಹವ್ಯಾಸ--ಸಂವಹನ ಮಾಧ್ಯಮದ ಬಗ್ಗೆ ಪರಿಚಯ	02
	ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆಗಳು	03
	ಒಟ್ಟು ಗಂಟೆಗಳು	**26**

ಸೂಚನೆಗಳು:

- ಈ ಪಠ್ಯದ ಮೂಲ ಉದ್ದೇಶ ಕನ್ನಡೇತರ ವಿದ್ಯಾರ್ಥಿಗಳು ಸರಳ ಕನ್ನಡ ಭಾಷೆಯಲ್ಲಿ ವ್ಯವಹರಿಸುವಂತೆ ಮಾಡುವುದಾಗಿದೆ. **"ಕನ್ನಡ ಕಲಿ"** ಪುಸ್ತಕದ ಮೇಲಿನ ಪಾಠಗಳ ಜೊತೆಗೆ **"ಕ್ರಿಯಾತ್ಮಕ ಚಟುವಟಿಕೆ"**ಯಿಂದ ಗಳಿಸುವ ಅಕ್ಷರ ಜ್ಞಾನದಿಂದ ಪದ ಸಂಪತ್ತು ಹೆಚ್ಚಿಸಿ, ಪದಗಳಿಂದ ಸ್ವಂತ ವಾಕ್ಯಗಳ ರಚನೆ ಮಾಡಿಸುವುದು. (ಅಮ್ಮ, ಮೊಬೈಲ್, ಕನ್ನಡ ಭಾಷೆ, ಕವಿಗಳು, ನಾಟಕ, ಜನಪದ ಕಲೆ, ನಾಡಿನ ಪ್ರಸಿದ್ಧ ವ್ಯಕ್ತಿಗಳು, ಸಹೋದರ, ಸ್ನೇಹಿತ, ತರಕಾರಿ, ದೋಸೆ, ತಿಂಡಿ, ನಿದ್ದೆ, ಬಿಸಿ, ಚಳಿ, ಆಕಾಶ, ಓದು, ಇತ್ಯಾದಿ ನಿತ್ಯ ಬಳಕೆಯ ಸರಳ ಪದಗಳಿಂದ ವಾಕ್ಯರಚನೆ ಮತ್ತು 25–50 ಪದಗಳ ಕಿರು ಲೇಖನ ರಚನೆ).
- **ತರಗತಿ ಚಟುವಟಿಕೆಗಳ ಪುಸ್ತಕದಲ್ಲಿ (ಕ್ಲಾಸ್ ಅಸೈನ್‌ಮೆಂಟ್) ಕನ್ನಡ ವರ್ಣಮಾಲೆಯ ಸ್ವರ, ವ್ಯಂಜನಗಳ ಅಕ್ಷರಗಳ ಬರವಣಿಗೆ ಅಭ್ಯಾಸ, ವ್ಯಂಜನಗಳಿಗೆ ಸ್ವರಗಳನ್ನು ಸೇರಿಸುವಿಕೆ, ಅಕ್ಷರಗಳಿಂದ ಪದರಚನೆ, ಪದಗಳಿಗೆ ಪ್ರತ್ಯಯಗಳನ್ನು ಸೇರಿಸುವುದು(ಗೆ, ಯಿಂದ, ಅನ್ನು, ಅಲ್ಲಿ, ಗಳು, ಎಂದು.....ಇತ್ಯಾದಿ ಪಠ್ಯದಲ್ಲಿ ಬರುವ ಪದಗಳಿಗೆ ನಿತ್ಯ ಬಳಕೆಯ ಪ್ರತ್ಯಯಗಳನ್ನು ಸೇರಿಸುವುದು) ಪದಗಳಿಂದ ವಾಕ್ಯ ರಚನೆ. ಮಾಡುವುದು. ಮತ್ತು ಪಾಠ 1–10ರ ಪಠ್ಯಾಂತ್ಯದಲ್ಲಿ ಬರುವ ಅಭ್ಯಾಸಗಳಲ್ಲಿ ಆರಿಸಿದ ಅಭ್ಯಾಸ ಭಾಗಗಳನ್ನು ಬರೆಸುವುದು. ಮತ್ತು ಪಾಠ–20 ರ ಸ್ಕ್ರಿಪ್ಟ್– ಅನ್ನು ಆಧಾರವಾಗಿಟ್ಟುಕೊಂಡು ಅಭ್ಯಾಸ ಮಾಡಿಸುವುದು.**

ಆಕರ ಗ್ರಂಥಗಳು:

1. **ಕನ್ನಡ ಕಲಿ–ಶ್ರೀ ಲಿಂಗದೇವರು ಹಳೇಮನೆ – ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.**
2. ಪ್ರಾಥಮಿಕ ಶಾಲೆಯ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕಗಳು
3. ಸರಳ ಕನ್ನಡ ವ್ಯಾಕರಣ ಪುಸ್ತಕಗಳು– ಎಂ.ವಿ ನಾಗರಾಜರಾವ್/ಇತರೆ ಲೇಖಕರು.
4. ಪ್ರಯೋಗ ಪ್ರಣತಿ–ಪ್ರಥಮ ಪಿಯುಸಿ ಪೂರಕ ಪಠ್ಯ.
5. ಸರಳ ಪತ್ರವ್ಯವಹಾರದ ಪುಸ್ತಕಗಳು

ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ವಿಧಾನ (3ನೇ ಸೆಮಿಸ್ಟರ್)

ನಿರಂತರ ಅಂತರಿಕ ಮೌಲ್ಯಮಾಪನ– Continuous Internal Evaluation (CIE) only.

ಕ್ರ.ಸಂ.	ಚಟುವಟಿಕೆಗಳು	ವಿವರ	ಗರಿಷ್ಠಾಂಕ	ಉತ್ತೀರ್ಣತೆಗೆ ಕನಿಷ್ಠಾಂಕ
01	**ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ (I A Tests)**	**ಮೂರು ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆಗಳು (ಸರಾಸರಿ ಅಂಕಗಳನ್ನು ಪರಿಗಣಿಸುವುದು)**	**30**	
02	**ಕನ್ನಡ ಭಾಷಾ ಕೌಶಲ್ಯಾಭಿವೃದ್ಧಿ ಚಟುವಟಿಕೆಗಳು (Student Activities)**	**ಮೂರು ಚಟುವಟಿಕೆಗಳು (ಸರಾಸರಿ ಅಂಕಗಳನ್ನು ಪರಿಗಣಿಸುವುದು)**	**20**	
		ಒಟ್ಟು ಅಂಕಗಳು	**50**	**20**

Course outcome:

1. Developing listening and speaking skills.
2. Easy Interaction with peers.
3. Students can use the language at ease in daily life situations

ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆಗಳ ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗಳು:

ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆಗಳಿಗೆ ಈ ಕೆಳಗಿನ ಮಾದರಿಯಲ್ಲಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಿ ನಡೆಸುವುದು ಮತ್ತು "ಕನ್ನಡ ಕಲಿ" ಪಠ್ಯದ ಕಲಿಕೆ ವಿವರಣೆ (ಭಾಷಾಭ್ಯಾಸ) ಸಂಭಾಷಣಾ ಭಾಗಗಳು ಮತ್ತು ಅಂತ್ಯದಲ್ಲಿ ಅಭ್ಯಾಸ ಪುಸ್ತಕದಲ್ಲಿ ಬರುವ ಪ್ರಶ್ನೆಗಳ ವಿಧಾನವನ್ನು ಪರ್ಯಾಯವಾಗಿ ಬಳಸಿಕೊಂಡು ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗಳನ್ನು ತಯಾರಿಸಿಕೊಳ್ಳಬಹುದು.

ಡಿಪ್ಲೋಮಾ 3ನೇ ಸೆಮಿಸ್ಟರ್–ಕನ್ನಡ ಕಲಿ–1 (ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಪರಿಚಯ)

ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆ

ಸಮಯ: 60 ನಿಮಿಷಗಳು ಅಂಕ: 30

I. Fill in the blanks using the appropriate words.(Any FOUR) 1X4=04

i) nimma raajya.....?
ii) adu.....pustaka?
iii) avana ..... hesaru suratkal injiniyaring kaaleju.
iv) ondu ruupaayige.....paise.
v) aval.ige hindustaani sanita tumba.....
vi) nanage ninna sahavaasa khanDitaa.....
vii) avanu nimma ....?

II. Use the following words (any FOUR) in your own sentences. 1X4=04

1.adhyaapaki 2.snehita 3. Vyaapaara 4.keTTa 5. Hasiru 6.angadi 7.taaja

III. Answer the following questions (any FOUR) 1X4=04

(a) nimma uuru yaavudu?
(b) nivu diploma vidyaarthinaa?
(c) nimma pennige estu ruupaaye?
(d) nimma maatrubhaashe yaavudu?
(e) nimage tingalige eshtu ruupaayi beeku?
(f) nimma mane/ruumu elli ide?

IV. Translate the following sentence in Kannada. (any FOUR) 4X2=08

1. Kannada is the language of Karnataka.
2. My book is in my house.
3. We have two houses in Bangalore.
4. How much is this Pumpkin weighs?
5. I want two packets of biscuits.
6. How much do you pay rent for your room?
7. What else do you want?

V. ಕೆಳಗಿನವುಗಳನ್ನು ಹೊಂದಿಸಿ ಬರೆಯಿರಿ. (Match the following) 1X4=04

1. ನೀವು ಯಾವಾಗ ಮನೆಯಲ್ಲಿ	1.ಇದೆ
2. ಪುಸ್ತಕ ಮೇಜಿನ ಮೇಲೆ	2.eldest son
3. Jaaga-ಜಾಗ	3.ಇತ್ತೀರಿ
4. Hiri maga	4.space

VI. (1) Change into interragative using the underlined word. (Any Three) 1X3=03

1. Ivattu guruvaara.
2. evattu hattanee taariku
3. Aval hesaru liila.
4. Avara maatrabhaashe telagu alla.
5. Vavige ippttaydu ruupaayei beeku.
6. Adu maalatiya mane.

(2) change into Interrogate. (Any THREE) 1X3=03

1.ಹೌದು, ಇದು ಪುಸ್ತಕ.
2. ಆಗಲಿ, ಹೋಗೋಣ.
3. ಈಗ ಒಂದೂವರೆ ಗಂಟೆ.
4. ಅವರು ಮನೆಗೆ ಬರುತ್ತಾರೆ.
5. ನಾವಿ ಮನೆಗೆ ಹೋಗೋಣ.
6. ಅವರು ಮನೆಗೆ ಹೋಗಲಿ.

ಕನ್ನಡ ಪಠ್ಯಕ್ರಮ ರಚನಾ ಸಮಿತಿ

- **ಸಂಪಾದಕೀಯ ಸಮಿತಿ:**

1. ಶ್ರೀ ಟಿ ಎಲ್ ರವೀಂದ್ರ, ಉಪನ್ಯಾಸಕರು, ಸರ್ಕಾರಿ ಜಿ.ಆರ್.ಐ.ಸಿ.ಪಿ ಬೆಂಗಳೂರು.
2. ಶ್ರೀ ಟಿ. ತಿಮ್ಮಪ್ಪ, ಉಪನ್ಯಾಸಕರು(ಆಯ್ಕೆ ಶ್ರೇಣಿ), ಯಾಂತ್ರಿಕ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಪಾಲಿಟೆಕ್ನಿಕ್, ತುಮಕೂರು.

- **ಸಲಹಾ ಸಮಿತಿಯ ಬಾಹ್ಯ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು.**

1. ಪ್ರೊ. (ಡಾ.) ಡಿ. ಪಾಂಡುರಂಗ ಬಾಬು, ಕುಲಸಚಿವರು, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
2. ಪ್ರೊ. (ಡಾ.) ಅಶೋಕ್ ಕುಮಾರ್ ರಂಜರೆ, ಪ್ರಾಧ್ಯಾಪಕರು, ಪ್ರಸಾರಾಂಗ ವಿಭಾಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
3. ಪ್ರೊ. (ಡಾ.) ಕೆ ವೈ ನಾರಾಯಣ ಸ್ವಾಮಿ, ಸಹ ಪ್ರಾಧ್ಯಾಪಕರು, ಸ್ನಾತಕೋತ್ತರ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಕಲಾ ಕಾಲೇಜು, ಬೆಂಗಳೂರು.
4. ಪ್ರೊ. (ಡಾ.) ಜೆ ಬಾಲಕೃಷ್ಣ, ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗು ಮುಖ್ಯಸ್ಥರು, ಕನ್ನಡ ಭಾಷಾ ಅಧ್ಯಯನ ವಿಭಾಗ, ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾಲಯ, (ಜಿಕೆವಿಕೆ) ಹೆಬ್ಬಾಳ, ಬೆಂಗಳೂರು.

ಡಿಪ್ಲೋಮಾ–ತಾಂತ್ರಿಕ ಕನ್ನಡ–1 (ಕನ್ನಡ ಬಲ್ಲವರಿಗಾಗಿ)

3ನೇ ಸೆಮಿಸ್ಟರ್ – ತಾಂತ್ರಿಕ ಕನ್ನಡ –1 (ಸಾಹಿತ್ಯ ಮತ್ತು ಭಾಷಾ ಕೌಶಲ್ಯ ಪ್ರಯೋಗ)

ಪಠ್ಯಕ್ರಮ

3rd Semester	**Course:** **ತಾಂತ್ರಿಕ ಕನ್ನಡ –1**	**Course Code:15KA3KT** (2016-17)
	No. of Credits:02	**No. of teaching hours/week:02** No. of teaching hours/Semester:26
	Mode of Assessment and Evaluation: Continuous Internal Evaluation (CIE)only. I.A Tests:30 Marks (3 Tests) Student activities: 20 Marks	**Maximum Marks: 50 (CIE only)** **Minimum Passing marks:20** (IA Tests + Student activities)

ಪಠ್ಯ ಪ್ರಕಾರ	ಪಾಠ	ಪಠ್ಯದ ಹೆಸರು/ಲೇಖಕರು/ಪ್ರಕಟಣೆ	ಸೆಮಿಸ್ಟರ್ ಬೋಧನಾವಧಿ ಗಂಟೆಗಳು
ಇತಿಹಾಸ	1	'ಸಂಸ್ಕೃತಿ'– ದೇ.ಜೆ.ಗೌ (ನಾಟ್ಯ ಸಂಸ್ಕೃತಿ–ದೇ.ಜೆ.ಗೌ)	02
ಸಂಸ್ಕೃತಿ	2	ನಮಗೆ ಬೇಕಾಗಿರುವ ಇಂಗ್ಲಿಷ್– ಕುವೆಂಪು	02
ಪರಿಸರ	3	ಆನೆ ಹಳ್ಳದಲ್ಲಿ ಹುಡುಗಿಯರು – ಬಿ ಜಿ ಎಲ್ ಸ್ವಾಮಿ	02
ಕ್ರೀಡೆ/ಜೀವನಕಲೆ	4	ಸೋಲೆಂಬುದು ಅಲ್ಪವಿರಾಮ – ನೇಮಿಚಂದ್ರ	02
ಯಶೋಗಾಥೆ/ವ್ಯಕ್ತಿಚಿತ್ರಣ	5	ಬದುಕನ್ನು ಪ್ರೀತಿಸಿದೆ ಸಂತ – ಎಚ್.ಆರ್.ರಾಮಕೃಷ್ಣ (ಕಲಾಂರ ವ್ಯಕ್ತಿ ಚಿತ್ರ)	02
ತಂತ್ರಜ್ಞಾನ	6	ಮಂಗಳನ ಅಂಗಳದಲ್ಲಿ – ಜೆ.ಬಾಲಕೃಷ್ಣ	02
ಭಾಷಾ ಕೌಶಲ್ಯ ಚಟುವಟಿಕೆಗಳು	7	*<u>ಮೌಖಿಕ ಅಭಿವ್ಯಕ್ತಿ:</u> ಸಹಜ ಭಾಷಾ ಬಳಕೆ: <u>.ಆಶು ಭಾಷಣ</u>> ವಿವಿಧ ರಚನಾತ್ಮಕ/ದೈನಂದಿನ ಬಳಕೆ ವಸ್ತು, ವ್ಯಕ್ತಿ, ಭಾವನೆಗಳ ಮೇಲೆ. ಒಂದು ಸಣ್ಣ ಏಕಾಂಕ (5–10 ನಿಮಿಷ) ನಾಟಕ. ಮಾದರಿ ಸಂದರ್ಶನ (ನೇಮಕಾತಿಗಾಗಿ ಸಂದರ್ಶನ)	06
ಲಿಖಿತ ಚಟುವಟಿಕೆಗಳು	8	**ವಿಸ್ತರಣೆ:** ನುಡಿಗಟ್ಟುಗಳು–ಪದಗಳನ್ನು ಬಳಸಿಕೊಂಡು ಸಣ್ಣ ವಾಕ್ಯಗಳ ರಚನೆ ಪರ್ಯಾಯ ಪದಗಳನ್ನು ಬರೆಯುವುದು(ಉದಾ: ಬಳಸು=ಉಪಯೋಗಿಸು, ಕಾಯು= ನಿರೀಕ್ಷಿಸು, ಚಿಂತಿಸು=ಯೋಚಿಸು, ಕೂಡಿಸುವಿಕೆ=ಸೇರಿಸುವಿಕೆ.....ಇತ್ಯಾದಿ)	06
		ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆಗಳು	02
		ಒಟ್ಟು ಗಂಟೆಗಳು	26

ತಾಂತ್ರಿಕ ಕನ್ನಡ–1

3ನೇ ಸೆಮಿಸ್ಟರ್ ಡಿಪ್ಲೋಮಾದ ಕನ್ನಡ ಪಠ್ಯ (ಕನ್ನಡ ಬಲ್ಲವರಿಗಾಗಿ)

1. ಪಠ್ಯರಚನಾ ಸಮಿತಿ
2. ನಿರ್ದೇಶಕರ ಮುನ್ನುಡಿ
3. ಪಠ್ಯ ರಚನಾ ಸಮಿತಿ ಮಾತುಗಳು
4. ಪಠ್ಯಕ್ರಮ

ಪರಿವಿಡಿ

<u>ಗದ್ಯ ವಿಹಾರ</u>

1. ನಾಟ್ಯ ಸಂಸ್ಕೃತಿ (ಇತಿಹಾಸ) – ದೆ.ಜೆ.ಗೌ
2. ನಮಗೆ ಬೇಕಾಗಿರುವ ಇಂಗ್ಲಿಷ್ (ಸಂಸ್ಕೃತಿ) – ಕುವೆಂಪು
3. ಸೋಲೆಂಬುದು ಅಲ್ಪವಿರಾಮ (ಕ್ರೀಡೆ/ಜೀವನಕಲೆ) – ನೇಮಿಚಂದ್ರ
4. ಆನೆ ಹಳ್ಳದಲ್ಲಿ ಹುಡುಗಿಯರು (ಪರಿಸರ) – ಬಿ.ಜಿ.ಎಲ್.ಸ್ವಾಮಿ
5. ಬದುಕನ್ನು ಪ್ರೀತಿಸಿದ ಸಂತ (ಯಶೋಗಾಥೆ/ವ್ಯಕ್ತಿಚಿತ್ರಣ) – ಎಚ್.ಆರ್.ರಾಮಕೃಷ್ಣ
6. ಮಂಗಳನ ಅಂಗಳದಲ್ಲಿ..... – ಡಾ:ಜೆ.ಬಾಲಕೃಷ್ಣ

<u>ಭಾಷಾ ಕೌಶಲ್ಯ–ಚಟುವಟಿಕೆಗಳು</u>

7. ಮೌಖಿಕ ಅಭಿವ್ಯಕ್ತಿ ಚಟುವಟಿಕೆಗಳು
8. ಲಿಖಿತ ಅಭಿವ್ಯಕ್ತಿ ಚಟುವಟಿಕೆಗಳು

Course outcome:

1. Developing listening and speaking skills.
2. Easy Interaction with peers.
3. Students can use the language at ease in daily life situations

ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ವಿಧಾನ (3ನೇ ಸೆಮಿಸ್ಟರ್)

ನಿರಂತರ ಅಂತರಿಕ ಮೌಲ್ಯಮಾಪನ– Continuous Internal Evaluation (CIE) only.

ಕ್ರ.ಸಂ.	ಚಟುವಟಿಕೆಗಳು	ವಿವರ	ಗರಿಷ್ಠಾಂಕ	ಉತ್ತೀರ್ಣತೆಗೆ ಕನಿಷ್ಠಾಂಕ
01	**ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ (I A Tests)**	**ಮೂರು ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಪರೀಕ್ಷೆಗಳು (ಸರಾಸರಿ ಅಂಕಗಳನ್ನು ಪರಿಗಣಿಸುವುದು)**	**30**	
02	**ಕನ್ನಡ ಭಾಷಾ ಕೌಶಲ್ಯಾಭಿವೃದ್ಧಿ ಚಟುವಟಿಕೆಗಳು (Student Activities)**	**ಮೂರು ಚಟುವಟಿಕೆಗಳು (ತಾಂತ್ರಿಕ ಪ್ರಬಂಧ/ಅಶುಭಾಷಣ/ಚರ್ಚೆ/ತಾಂತ್ರಿಕ ಕ್ಷೇತ್ರಗಳಲ್ಲಿನ ಅವಿಷ್ಕಾರಗಳ ಬಗ್ಗೆ ವಿಶ್ಲೇಷಣೆ ಇತ್ಯಾದಿ.) (ಸರಾಸರಿ ಅಂಕಗಳನ್ನು ಪರಿಗಣಿಸುವುದು)**	**20**	
		ಒಟ್ಟು ಅಂಕಗಳು	**50**	**20**

ಸೂಚನೆ:
ಭಾಷಾ ಚಟುವಟಿಕೆಗಳಿಗಾಗಿ ತರಗತಿ ಚಟುವಟಿಕೆಗಳ ಪುಸ್ತಕದಲ್ಲಿ (ತರಗತಿಯ ಪ್ರಗತಿಪರ ಮೌಲ್ಯಮಾಪನ). ಗಾದೆಗಳ ವಿಸ್ತರಣೆ, ನುಡಿಗಟ್ಟುಗಳು, ಸಂಭಾಷಣೆ ಮಾದರಿಗಳು ಮತ್ತು ಪಠ್ಯದ ಸಾಹಿತ್ಯ ಭಾಗದ ಪಾಠಗಳ ಮೇಲೆ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರ–ಟಿಪ್ಪಣಿ ಮತ್ತು ಶಬ್ದಾರ್ಥದಲ್ಲಿ ಬರುವ ಪದಗಳಿಂದ ವಾಕ್ಯ ರಚನೆ ಮಾಡಿಸುವುದು.

- **ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ**

3ನೇ ಸೆಮಿಸ್ಟರ್– ತಾಂತ್ರಿಕ ಕನ್ನಡ–1 (ಕನ್ನಡಬಲ್ಲ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ)

ಸಮಯ: 1.00 ಗಂಟೆ ಅಂಕಗಳು:30

ಸೂಚನೆ: ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಸೂಚನೆಗಳ ಪ್ರಕಾರ ವ್ಯಾಕರಣದೋಷವಿಲ್ಲದಂತೆ ಉತ್ತರಿಸಿ.

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1. ಈ ಕೆಳಗಿನ 04 ಪ್ರಶ್ನೆಗಳಿಗೆ ಒಂದು ಪೂರ್ಣ ವಾಕ್ಯದಲ್ಲಿ ಉತ್ತರಿಸಿ. 1*4=04

(ಅ) ನಾಟ್ಯ ಯಾವಾಗ ಹುಟ್ಟಿಕೊಂಡಿತು?
(ಆ) ಆನೆ ಹಳ್ಳದ ಕಾಡಿನಲ್ಲಿ ನಾಪತ್ತೆಯಾದ ಹುಡುಗಿಯರ ಹೆಸರುಗಳನ್ನು ತಿಳಿಸಿ.
(ಇ) ರಾಷ್ಟ್ರಪತಿಯಾಗಿ ಆಯ್ಕೆಯಾದಾಗ ಕಲಾಂ ಅವರು ಮೊದಲು ಹೇಳಿದ ಮಾತುಗಳೇನು?
(ಈ) ಮಂಗಳನ ಅಂಗಳ ತಲುಪಿದ ಮೊದಲ ಅಂತರಿಕ್ಷ ನೌಕೆ ಯಾವುದು?
(ಉ) 'ಹಗಲುಗನಸು' ನುಡಿಗಟ್ಟನ್ನು ಬಳಸಿ ಸ್ವಂತ ವಾಕ್ಯವನ್ನು ರಚಿಸಿ.
(ಊ) 'ಸಿಹಿಕಹಿ' ಜೋಡುಪದವನ್ನು ಒಂದು ವಾಕ್ಯದಲ್ಲಿ ಬಳಸಿ.

2. ಕೆಳಗಿನ ಯಾವುದೇ ನಾಲು ಪ್ರಶ್ನೆಗಳಿಗೆ ಕನಿಷ್ಟ ಐದಾರು ವಾಕ್ಯಗಳಲ್ಲಿ ಉತ್ತರಿಸಿ. 4*4=16

(1) ಕುವೆಂಪು ಅವರು ಇಂಗ್ಲಿಷ್ ಕಲಿಯುವವರನ್ನು ಎಷ್ಟು ವಿಭಾಗವಾಗಿ ಹೇಗೆ ವಿಂಗಡಿಸಿದ್ದಾರೆ?
(2) ಕಲಾಂ ಅವರ ಯಶಸ್ಸಿನ ಮಂತ್ರಗಳೇನು?
(3) ಗಾದೆಗಳ ಮಹತ್ವವೇನು? ನಿಮಗೆ ಗೊತ್ತಿರುವ ಯಾವುದೇ ಎರಡು ಗಾದೆಗಳನ್ನು ಹೆಸರಿಸಿ.
(4) ಸಂವಹನ ಸಂದರ್ಭದಲ್ಲಿ ಬಳಸುವ ಭಾಷೆ ಹೇಗಿರಬೇಕು?
(5) ನೇಮಿಚಂದ್ರರ 'ಸಾವಿನತ್ತ ಒಂದು ಹೆಜ್ಜೆ ' ಕತೆ ಓದಿದ ಹುಡುಗಿ ತನ್ನ ಸೋಲಿನಿಂದ ಹೊರಗೆ ಬಂದದ್ದು ಹೇಗೆ?
(6) ಸಂದರ್ಶನ ಎಂದರೇನು? ವಿವರಿಸಿ.

3. ಯಾವುದೆ ಎರಡು ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ. 2*5=10

(1) ನಾಟ್ಯಕಲೆಯಲ್ಲಿ ಯಕ್ಷಗಾನ ಕಲೆ ಪ್ರಮುಖವಾದುದು. ಇದರ ಹುಟ್ಟು ಮತ್ತು ವ್ಯಾಪ್ತಿ ಬಗ್ಗೆ ತಿಳಿಸಿ.
(2) ಮಂಗಳಯಾನದ ಮುಖ್ಯ ಉದ್ದೇಶಗಳೇನು?
(3) 'ಮಾನವೀಯ ಮೌಲ್ಯಗಳು', ಅಂತರಜಾಲ – ಎರಡರಲ್ಲಿ ಒಂದಕ್ಕೆ ಸುಮಾರು ಒಂದು ಪುಟದಷ್ಟು ಪ್ರಬಂಧ ಬರೆಯಿರಿ.
(4) ಉದ್ಯೋಗದ ಸಂದರ್ಶನಕ್ಕೆ ಹೋಗುವಾಗ ಮಾಡಿಕೊಳ್ಳಬೇಕಾದ ಪೂರ್ವಸಿದ್ಧತೆಗಳೇನು?.

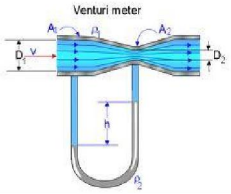
ಕನ್ನಡ ಪಠ್ಯಕ್ರಮ ರಚನಾ ಹಾಗು ಪಠ್ಯಪುಸ್ತಕ ಸಮಿತಿ

- **ಸಂಪಾದಕೀಯ ಸಮಿತಿ:**

1. ಶ್ರೀ ಟಿ ಎಲ್ ರವೀಂದ್ರ, ಉಪನ್ಯಾಸಕರು, ಸರ್ಕಾರಿ ಜಿ.ಆರ್.ಐ.ಸಿ.ಪಿ ಬೆಂಗಳೂರು.
2. ಶ್ರೀ ಟಿ. ತಿಮ್ಮಪ್ಪ, ಉಪನ್ಯಾಸಕರು(ಆಯ್ಕೆ ಶ್ರೇಣಿ), ಯಾಂತ್ರಿಕ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಪಾಲಿಟೆಕ್ನಿಕ್, ತುಮಕೂರು.

- **ಸಲಹಾ ಸಮಿತಿಯ ಬಾಹ್ಯ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು.**

1. ಪ್ರೊ. (ಡಾ.) ಡಿ. ಪಾಂಡುರಂಗ ಬಾಬು, ಕುಲಸಚಿವರು, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
2. ಪ್ರೊ. (ಡಾ.) ಅಶೋಕ್ ಕುಮಾರ್ ರಂಜರೆ, ಪ್ರಾಧ್ಯಾಪಕರು, ಪ್ರಸಾರಾಂಗ ವಿಭಾಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
3. ಪ್ರೊ. (ಡಾ.) ಕೆ ವೈ ನಾರಾಯಣ ಸ್ವಾಮಿ, ಸಹ ಪ್ರಾಧ್ಯಾಪಕರು, ಸ್ನಾತಕೋತ್ತರ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಕಲಾ ಕಾಲೇಜು, ಬೆಂಗಳೂರು.
4. ಪ್ರೊ. (ಡಾ.) ಜೆ ಬಾಲಕೃಷ್ಣ, ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗು ಮುಖ್ಯಸ್ಥರು, ಕನ್ನಡ ಭಾಷಾ ಅಧ್ಯಯನ ವಿಭಾಗ, ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾಲಯ, (ಜಿಕೆವಿಕೆ) ಹೆಬ್ಬಾಳ, ಬೆಂಗಳೂರು.

	Course Title: HYDRAULICS		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE41T**
	Type of Course Delivery: **Lectures and Student activity**	**Credit :4**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

(*(Common to all Civil/Civil (Draughtsman/Environmental/Public Health Engineering/Water Technology and Health Sciences Programme)*****

Prerequisites: **Engineering Mathematics and Applied Science**

Course Objectives

1. Understand the principles and properties of fluid under static and dynamic state.
2. Measurement and computation of discharge of water.
3. Introduction to hydraulic machines.

At the end of the course the students should be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Define the terminology related to fluid properties, pressure and its measurements and compute forces on immersed vertical plane surfaces.	***R/U/Ap***	1,2,3,4,5,6	**10**
CO2	Apply the hydraulic principles in solving problems on discharge and pressure measurements using flow measuring devices. To analyse the forces and its head.	***R/U/Ap***	1,2,3,4,5,6	**10**
CO3	Determine the discharge and coefficients of discharge for Notches, Orifices and Weirs.	***R/U/Ap***	1,2,3,4,5,6	**13**
CO4	Verify the flow parameters related to pipes to measure the various losses of head through pipes.	***R/U/Ap***	1,2,3,4,5,6	**07**
C05	Analyse the flow parameters related to channels and to design most economical channel sections and also to measure the discharge.	***R/U/Ap***	1,2,3,4,5,6	**08**
C06	Summarize the principles of pumps and Turbines.	***R/U***	1,2,3,4,5,6	**04**

C07	Manage the suggested or identified problems on hydraulics and solve in teams, in order to improve future problem solving ability and able to present it.	**R/U/Ap/Ay/C**	1 to 10	*
		Total sessions		**52**

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Hydraulics	3	3	3	3	3	3	1	1	1	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENTS

UNITS	CONTENT	HOURS
1	**FLUIDS, PRESSURE & ITS MEASUREMENTS AND HYDROSTATICS** **Fluid**-definition, types and properties (simple problems). **Pressure and its measurements**-Definition of fluid pressure, intensity of pressure and pressure head, Pascal's law, atmospheric pressure, gauge pressure, absolute pressure, vacuum pressure and their relations, Measurement of pressure: Piezometer, Manometer, differential manometer, (simple problems). **Hydrostatics**-Total pressure and centre of pressure on vertical planes like, triangular , rectangular and circular plane surfaces (simple problems).	**10**
2	**FLOW OF FLUIDS** Definition of discharge, Types of flow and their comparison, uniform and non-uniform flow, steady and unsteady flow, stream line and turbulent flow, rotational and irrotational flow, compressible and incompressible flow. Continuity equation- simple problems. Energies in fluid motion and their heads- Potential, Kinetic and Pressure head Bernoulli's theorem (without proof), assumptions and its limitations–simple problems. Horizontal venturimeter, theory and simple problems.	**10**
3	**FLOW THROUGH ORIFICES, NOTCHES AND WEIRS.** Definition, types of orifices, vena contracta, hydraulic co-efficient and their relationship (simple problems), Flow through only circular orifice (simple problems without derivation), Definition and types of mouthpiece (only theory). Definition of notch, and its types, discharge calculation for rectangular, triangular and trapezoidal notch (simple problems without derivation). Definition of weir, types, discharge over rectangular and cippolitte weir (simple problems without derivation)	**13**
4	**FLOW THROUGH PIPES** Loss of fluid friction, Types of losses-major and minor losses, Darcy's and Chezy's formula for head loss due to friction (simple problems). Hydraulic gradient and Total Energy Line. Flow through single pipe, Flow from one reservoir to another reservoir through single pipe, (simple problems). Water hammer, surge tanks (only theory).	**07**
5	**FLOW THROUGH CHANNELS** Definition and classification of channels. Discharge through channels using Chezy's and Manning's formula (no derivation – simple problems only). Most economical sections for rectangular and trapezoidal channels (simple problems).	**08**
6	**PUMPS AND TURBINES** Working principle of Reciprocating and centrifugal pumps (Only Theory) Turbine, types and its working principle of Pelton and Francis turbine (Only Theory)	**04**
	Total	**52**

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video.

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Prepare/Download a dynamic animation to illustrate the following:
2. Working principle of hydraulic pumps.

3. Working of different types of hydraulic devices (applications).
4. Download the catalogue of Hydraulic devices.
5. Arrange visit to nearby Hydraulic equipment based industries.
6. To visit an industry and submit a report on pressure measuring devices.
7. To prepare a report on pressure measuring devices available in market with its specifications
8. To carryout market survey for pipes of different sizes and materials available.
9. To visit & submit a report on nearby canal/irrigation structures/dam site to know the usage of notches and weirs.
10. To assess conditions of water supply mains of your locality and quantify the damages and remedial measures to be taken.
11. Types of pumps available in market and its uses.
12. Hydrological aspects of drought in your district
13. Hydrological aspects of small hydels in western ghats
14. Hydrological status of a few tanks in and around district a study using gis and remote sensing
15. Proposed mini hydel project near by your locality
16. Hydraulic floor crane, hydraulic four wheel jack, hydro power, hydraulic car lift, water wheel, hydraulic regenerative braking system

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**.

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	**Students score (Group of five students)**				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	3				
2.Fulfill team's roles & duties	2				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3, CO4
					Test 3			CO5, CO6
				Student Activities		05	Written Report	CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1,2 & 3 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3, 4,5, 6, 7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1	Remembering and Understanding	48% weightage
2	Applying the knowledge acquired from the course	52% weightage
3	Analysis	0% weightage
4	Evaluation	0% weightage
5	Creating new knowledge	0% weightage

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels R	U	Ap	Marks weightage	weightage (%)	A*	B*
1	Fluids, pressure & its measurements and hydrostatics	10	16.66% **5**	33.33% **10**	50.00% **15**	30	19	2	2
2	Flow of fluids	10	16.66% **5**	16.66% **5**	66.66% **20**	30	19	2	2
3	Flow through orifices, notches and weirs	13	13.00% **5**	28.57% **10**	57.14% **20**	35	25	1	3
4	Flow through pipes	7	25.00% **5**	25.00% **5**	50.00% **10**	20	13	2	1
5	Flow through channels	8	25.00% **5**	25.00% **5**	50.00% **10**	20	15	2	1
6	Pumps and turbines	4	50.00% **5**	50.00% **5**	0.00% **0**	10	8	0	1
	Total	52	**20.9%** **30**	**27.6%** **40**	**51.7 %** **75**	145	100	9	10

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

A*-SEE questions to be set for (05 marks) in Part – A

B*- SEE questions to be set for (10 marks) in Part – B

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal Choice may be given in each CO at the same cognitive level (CL).

Model Question Paper for CIE :

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	IV SEM	Hydraulics	20
	Year: 2015-16	Course code:15CE41T	

Name of Course coordinator : **Course Outcome : 1,2**
Note: Answer all questions

Question		M	CL	CO	PO
1	1. State the different principles of measurement of pressure.	3	R	1	1,2,3
2	2. Differentiate between specific weight and specific gravity of an oil.	4	U	1	1,2,3
3	3. Define Bernoulli's theorem.	2	R	2	1,2,3,4
4	4. State the difference between uniform flow and non-uniform flow & steady and unsteady flow	4	U	2	1 to 6
5	a) A simple Manometer containing mercury is used to measure the pressure of water flowing in a pipe line. The mercury level in the open tube is 60mm higher than that in the left tube. If the height of water in the left tube is 500mm, determine the pressure in the pipe in terms of head of water. **OR** b) Water is flowing through a pipe of 100mm diameter with an average velocity of 10m/s. Determine the rate of discharge of the water in litres/salsa determine the velocity of water at the other end of the pipe, if the diameter of the pipe is gradually changed to 200mm.	7	A	1 ,2	1 to 6

TEXT BOOKS

1. Hydraulics and Fluid Mechanics - Dr. P.N.Modi and DrS.M.Seth
2. Hydraulics and Fluid Mechanics - Dr. JagadishLal
3. Hydraulics and Fluid Mechanics - Abdulla Sheriff
4. Hydraulics and Hydraulic Machinery V. Thanikachelam T.T.T.I Madras - 600 113
5. Hydraulics, Fluid Mechanics and Fluid Machines - S.Ramamrutham.
6. Hydraulics, Fluid Mechanics and Fluid Machines Bansal A R.
7. Hydraulics, Fluid Mechanics and Hydraulic Machines R S Khurmi

Model Question Paper

Diploma in Civil Engineering

4TH semester

Course title: **HYDRAULICS**

Time: 3Hrs. **Max. marks : 100**

Part –A

Answer any six questions each carries 5 marks

1. Distinguish between gauge pressure and absolute pressure.
2. What is Manometer? Explain differential manometer with a neat sketch.
3. Draw a neat sketch of Venturimeter and name the parts.
4. State the limitations of Bernoulli's theorem.

5. Define Hydraulic coefficients and give the relation between them.
6. List different major and minor losses in pipe flow.
7. What is water hammer?
8. Define most economical section & state the conditions for a rectangular channel.
9. Explain the term open channel & list the various types of open channels.

Part –B

Answer any seven each question carries 10 marks

1. a) Define Pressure head and Total Pressure.
   b) A rectangular tank 3mx4m in size contain water upto a depth of 2.5m. Calculate the total pressure on the base of the tank and also intensity of pressure at the base of the tank.

2. The right limb of a simple U-tube manometer containing mercury is open to the atmosphere, while the left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 120mm below the level of mercury in the right limb. Find the pressure of fluid in the pipe, if the difference of mercury level in the two limbs is 200mm.

3. a) State a Bernoulli's theorem.
   b) A pipe 300m long has a slope of 1 in 100 and tapers from 1.0m diameter at the higher end to 0.50m at the lower end. The quantity of water flowing is 900lit/sec. If the pressure at the higher end is 70KPa, find the pressure at the lower end.

4. A venturimeter with a 150mm diameter at inlet and 100mm at throat is laid with its axis horizontal and is used for measuring the flow of oil specific gravity 0.9. The oil mercury differential monometer shows a gauge difference of 200mm. Assume coefficient of the meter as 0.98. Calculate the discharge in litres per minute.

5. a) What is an orifice? Mention its different types.
   b) A jet of water issues from an orifice of diameter 20mm under a head of 1m.What is the 'Cd' for the orifice, if actual discharge is 0.85lit/sec?

6. a) List the advantages of a triangular notch over a rectangular notch.
   b) During an experiment in a laboratory, 280lit of water flowing over a right angled triangular notch was collected in one minute. If the head of water over the sill is 100mm, calculate the 'Cd' of the notch.

7. a) Differentiate between a notch and a weir.
   b) A Trapezoidal notch of 1.2m wide at top and 0.45m at bottom is 0.3m high. Find the discharge through notch if head over notch is 225mm.Take C_d=0.6

8. a) State Darcy's equation for determination of loss of head due to friction in pipe.
   b) A reservoir has been built 4km away from a new extension area having 5000 population. Water is to be supplied from the reservoir to the new extension area. It is estimated that each person will consume 200litres of water per day, and that half of the daily supply is pumped within 10hours.Calculate the size of the supply main, if the loss of head due to friction in the pipeline is 20m.Take co-efficient of friction for the pipe line is 0.008

9. a) Define most economical channel section.
   b) Calculate the bed slope of trapezoidal channel of bed width 9m,depth of flow 1.2m and side slope 2H to 1V if the discharge is 8 m^3/s and Chezy's constant C=50.

10. a) With a neat sketch explain the main parts of a Reciprocating pump.
    b) Write any five differences between impulse turbine and reaction turbine.

MODEL QUESTION BANK

CO I : Fluids, pressure & its measurements and hydrostatics

Cognitive level –Remember

1. What is meant by pressure head? Derive an expression for it.
2. State the different principles of measurement of pressure.
3. Define the density of a liquid.
4. Define atmospheric pressure, gauge pressure, absolute pressure.
5. What is Manometer? Mention types of manometer.
6. State the difference between simple and differential manometer.
7. Define total pressure, centre pressure.

Cognitive level -Understand

8. Distinguish between gauge pressure and absolute pressure
9. Differentiate between specific weight and specific gravity of an oil.
10. Distinguish between compressibility and capillarity of water.
11. What do you understand by the term intensity of pressure? State its units.

Cognitive level -Application

12. A simple Manometer containing mercury is used to measure the pressure of water flowing in a pipe line. The mercury level in the open tube is 60mm higher than that in the left tube. If the height of water in the left tube is 500mm, determine the pressure in the pipe in terms of head of water.
13. A differential Manometer connected at the two points A and B at the same level in a pipe containing an oil of specific gravity 0.85, shows a difference in mercury level as 150mm.Determine the difference in pressure at the two points, the level of mercury in the left limb is lower than that in the right limb.
14. Determine the total & centre of pressure on an isosceles triangular plate of base 4m and altitude 4m, when it is immersed vertically in an oil of Sp.Gr. 0.9.The base of the plate coincides with the free surface of oil.
15. Find the intensity of pressure on diver working, at a depth of 200m under the sea, if the specific gravity of sea water is 1.025.

CO II : Apply the hydraulic principles in solving problems on discharge and pressure measurements using flow measuring devices.

Cognitive level –Remember

1. Define Bernoulli's theorem.
2. Give the equation for continuity of flow.
3. State the limitations of Bernoulli's theorem.
4. 4.Draw a neat sketch of Ventuimeter and name the parts.

5. What is Venturimeter?

Cognitive level -Understand

6. State the difference between uniform flow and non uniform flow & steady and unsteady flow.

Cognitive level -Application

7. A circular pipe of 250mm diameter carries an oil of specific gravity 0.8 at the rate of 120lit/sec and under a pressure of 20kpa.Calculate the total energy in meters at point which is 3m above datum line.
8. Water is flowing through a pipe of 100mm diameter with an average velocity of 10m/s. Determine the rate of discharge of the water in litres/salsa determine the velocity of water at the other end of the pipe, if the diameter of the pipe is gradually changed to 200mm.
9. A venturimeter with a 150mm diameter at inlet and 100mm at throat is laid with its axis horizontal and is used for measuring the flow of oil specific gravity 0.9. The oil mercury differential monometer shows a gauge difference of 200mm.Assume coefficient of the meter as 0.98. Calculate the discharge in litres per minute.
10. A pipe 300m long has a slope of 1 in 100 and tapers from 1m at the higher end to 0.5m at the lower end. Discharge through pipe is 5400litre per minute, if pressure at the higher end is 70KN/m^2, find the pressure at the lower end.

CO III : Understand and able to determine the discharge and coefficients of discharge for Notches, Orifices and Weirs.

Cognitive level –Remember

1. Define veena contracta.
2. What is an orifice? Give the classification.
3. Define Hydraulic coefficients and give the relation between them.
4. List the types of notches.
5. List the advantages of a triangular notch over a rectangular notch.

Cognitive level -Understand

6. Differentiate between a notch and a weir.
7. What is a cipplottei weir? How does it differ from a rectangular weir?

Cognitive level -Application

8. A right angled V-notch was used to measure the discharge of a pump if the depth of water over the notch is 200mm,calculate the discharge if C_d=0.62.
9. A Trapezoidal notch of 1.2m wide at top and 0.45m at bottom is 0.3m high. Find the discharge through notch if head over notch is 225mm.Take C_d=0.6.
10. A weir, 8m long is to be built across a rectangular channel to discharge a flow of 9m^3/sec. If the maximum depth of water on the upstream side of the weir is limited to 2mts maximum, what must be the height of the weir? Take C_d=0.62.
11. A jet of water issues from an orifice of diameter 20mm under a head of 1m.What is the 'Cd' for the orifice, if actual discharge is 0.85lit/sec?

CO IV : Analyze the flow parameters related to pipes to measure the various losses of head through pipes.

Cognitive level –Remember

1. List the types of losses in the pipe flow.
2. Give the Darcy's formula for head loss due to friction.
3. What is water hammer?
4. What is hydraulic mean depth?

Cognitive level -Understand

5. Explain Hydraulic gradient line & Total energy line with neat sketch.
6. Explain the surge tank with sketch.

Cognitive level -Application

7. A town having a population of 100000 is to be supplied with water from a reservoir at 5km distance. It is stipulated that one half of the daily supply 150lts/head should be delivered within 8. Hour that must be the size of the pipe to furnish the supply, if head available is 12m and C=45.

CO V : Analyze the flow parameters related to channels and to design most economical channel sections and also to measure the discharge.

Cognitive level –Remember

1. Give the Chezy's formula and Manning's formula.
2. State the conditions of the most economical section of a rectangular and Trapezoidal channel.

Cognitive level –Understand

3. Explain the term open channel & list the various types of open channels.

Cognitive level -Application

4. A rectangular channel has a cross section of $50m^2$.Determine the discharge through the most economical section, if bed slope is 1 in 1000 take Chezy's constant C=52.5.

CO VI : Understand the principles of pumps and Turbines

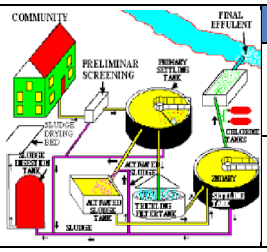
Cognitive level –Remember

1. What are the different types of pumps?
2. What is a turbine?
3. How turbines are classified?

Cognitive level -Understand

4. Explain the working principle of a centrifugal pump with sketch.
5. Explain the working principle of a reciprocating pump with sketch.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

<table>
<tr><td rowspan="2">  </td><td colspan="3">Course Title: SANITARY ENGINEERING</td></tr>
<tr><td>Credits (L:T:P) : 4:0:0</td><td>Total Contact Hours: 52</td><td>Course Code: 15CE42T</td></tr>
<tr><td></td><td>Type of Course: Lectures, Self Study & Student activities</td><td>Credit :04</td><td>Core/ Elective: Core</td></tr>
<tr><td colspan="2">CIE- 25 Marks</td><td colspan="2">SEE- 100 Marks</td></tr>
</table>

Prerequisites: Basic knowledge of environmental science, mathematics.

Course Objectives: It aims at enabling the student to understand the urban and rural sanitation.

1. Understand the need of sewage treatment and disposal of a city/town.

Course Outcomes: (CO's)

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Explain the concept of waste, types of sewage, sewerage system and appurtenances. Estimate the quantity of sewage of a town/city.	***R/U/A***	1,2,3,5,6,8	**06**
CO2	Analyse the Sewage samples using standard test procedures and understand the sewerage systems	***U/A***	1,2,3,4,5,6, 10	**08**
CO3	Compute the quantity of storm water flow in different types of surface drains and appurtenances.	***U/A***	2,4,5,6,10	**10**
CO4	Compare various methods of Sewage treatment and sewage/sludge disposal methods.	***U/A***	2,3,5,6,7, 9,,10	**14**
CO5	Demonstrate the arrangement of sanitary fittings in a building.	***U/A***	2,4,5,6,8	**06**
CO6	Identify the sources, effects and preventive measures of air and noise pollution.	***U/A***	1, 2,5,6,7,10	**08**
CO7	Suggested activity	***R/U/A/C***	1 to 10	*
		Total sessions		**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E:Evaluvation
***Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
WASTE WATER ENGINEERING	3	3	3	3	3	3	2	2	1	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNIT	COURSE CONTENT	HOURS ALLOTTED
1	**INTRODUCTION:** Definition of sullage, sewage, sewerage, sewer, refuge, garbage. Aims and objectives of sewerage work, systems of refuge disposal and water carriage system. **QUANTITY OF SEWAGE:** Domestic and industrial sewage, volume of domestic sewage, variability of flow, limiting velocities-Self cleansing and Maximum velocities of sewer. Simple problems on design of sewers.	06
2	**CHARACTERISTICS AND ANALYSIS OF SEWAGE:** Strength of Sewage, Sampling of Sewage to analyze for Physical, Chemical and Biological Parameters. Decomposition of sewage. Analysis of Sewage - Significance of the following Tests for i) Solids ii) Dissolved Oxygen iii) B.O.D iv) C.O.D v) pH value vi) Chlorides vii) Nitrate **SEWARAGE SYSTEMS:** Types of Sewerage System and their Suitability - Separate, Combined and Partially Separate Systems Brief Description and Suitability of the following Types of Sewers Stoneware, Cast Iron, Cement Concrete, AC Pipes, Pre-Cast Sewers, PVC sewer (SWR grade), and laying of sewers	08
3	**SURFACE AND STORM WATER DRAINAGE:** Determination of Storm Water Flow, Run-Off Co-Efficient, Time of Concentration, Empirical Formulae for Run-Off Simple Problems on Design of Storm Water Sewers Ssystems. Surface Drains - Requirements, Shapes, Laying and Construction. (No Design) **SEWERAGE APPURTENANCES:** Brief description, Location, Function and Construction of Manholes, Drop Manholes, Inlets Catch Basin, Traps, Flushing Tanks, Regulators.	10

4	**SEWAGE TREATMENT AND DISPOSAL :** **Preliminary Treatment** - Brief Description and Functions of - i) Screens ii) Skimming Tanks iii) Grit Chambers. **Primary Treatment -** Brief Description and Function of the Sedimentation and Septic Tanks **Secondary Treatment** - Brief Description of i) Trickling Filters ii) Activated Sludge Process Oxidation Ponds, Oxidation Ditches, Aerobic Lagoons, Anaerobic Lagoons, Rotary Biological Disc. **Tertiary treatment –** Activated sand filter and chlorination. **Sewage Disposal**- Dilution, Self purification of streams, factors affecting self purification. Disposal in Sea water, Disposal on Lands,. Recycle of wastewater(Grey water technology) **Sludge treatment & Disposal -** Sludge treatment & disposal methods. Sludge digestion tank, Sludge drying bed.	14
5	**SANITATION IN BUILDINGS AND SANITARY FITTINGS** Importance and Requirement of Building Drainage, General Lay-out of Sanitary Fittings and House Drainage Arrangements for Single and Multi- Storied Buildings as Per B.I.S Code of Practice. Dual pipe system. Sanitary Fittings- Water Closets, Flushing Cisterns, Urinals, Inspection Chambers, Traps, Anti-syphonage. Inspection, Testing and Maintenance of sanitary fittings.	6
6	**AIR AND NOISE POLLUTION: Air Pollution** –Definition, Causes and Classification of Air Pollutants. Effects of Pollution on Human Beings. Acid rain, Green house effect & Global warming, Ozone depletion. Prevention and control of Air Pollution, Cyclone Separator and ESP) **Noise**- Definition, Sources and measurement of noise, Effect of noise on human life and its control, Ambient air quality standards in respect of Noise, Legislations with respect to Air and Noise pollution. **Environmental impact assessment:** Aims &objectives of EIA Methodology of EIA, Environmental Impact statement (EIS).	8

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video

SUGGESTED STUDENT ACTIVITIES

The topic should be related to the course in order to enhance the student's knowledge, practical skill, lifelong learning, communication, and modern tool usage.

1. Estimate total quantities of sewage generated from a locality and design the sewage discharge.
2. Visit nearby New layout under construction and collect details of sewerage system.
3. Visit Sewage Treatment Plant and collect details each unit operations for treatment of sewage and prepare the charts.
4. Visit nearby Certified Waste Water testing laboratories and identify various tests conducted on waste water.

5. For a given building identify various components of sanitary fixtures used for sewerage system.
6. To visit a nearby industry to collect details of sources and control of air pollution.
7. Prepare a mini project report for Sewerage System for a locality.
8. To conduct market survey of sanitary ware.
9. Visit any Industry and collect & study EIA report.
10. Prepare a report on Eco-toilets.
11. Prepare a report on Modern septic tanks using biogas.
12. study of municipal sludge as a building material
13. A study on solid waste management in your city
14. Performance studies of oxidation ponds
15. Conservation by waste water reclamation
16. A study on performance of existing treatment plant of diary waste and improvement of treatment units
17. Treatment and reuse of automobile service station wastewater for vegetation
18. Laboratory study of migration of contaminants through soil column
19. Solid waste management for your town
20. A study on handling collection and utilization of city refuse
21. Characterizing analysis of textile mill effluent and its impact on receiving bodies
22. Solid waste management- a case study of a city
23. Impact of industrial solid wastes on soil and sub-surface water
24. Effects due to untreated disposal of municipal sewage
25. Quality study of sewage in your district
26. Treatability studies of dairy effluent using anaerobic filter
27. Soil-industrial effluent interaction and their engineering behaviour
28. Study of heavy metals in river
29. Treatment of sugar waste using anaerobic filter
30. Analysis of performance of the existing sewage treatment plant at hospital
31. Medical waste management.
32. Solid waste management of city municipality
33. Evaluation of treatment plant efficiency using toxicity index-a case study of textile industries
34. Electronics waste management (computer & its accessories) for in city
35. Identification and investigation of solid waste dumping site

NOTE:
1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1,** Developing **2,** Satisfactory **3,** Good4**,** Exemplary**5**)
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**,Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relev ant info	Has included some relev ant info	Has included many relev ant info	Has included all relevant info needed
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1,CO2
					Test 2			CO3,CO4
					Test 3			CO5, CO6
				Student Activities		05	Written Report	CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3, 4 & 5, 6, 7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**47**
2	Applying the knowledge acquired from the course	**50**
3	Analysis	**2**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**0**

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels R	U	Ap	Ay	C	E	Marks weightage	weightage (%)	A*	B*
1	Introduction , quantity of sewage	6	35% **6**	65% **11**	0% **0**	0% **0**	0% **0**	0% **0**	17	12	1	1
2	Characteristics, analysis of sewage and sewerage system	8	0% **0**	23% **5**	65% **15**	12% **3**	0% **0**	0% **0**	23	16	2	1
3	Sanitation in buildings and sanitary fittings.	10	0% **0**	35% **10**	65% **18**	0% **0**	0% **0**	0% **0**	28	20	1	3
4	Sewage treatment ,and disposal	14	0% **0**	38% **15**	62% **25**	0% **0**	0% **0**	0% **0**	40	27	2	3
5	Surface and storm water drainage and sewerage appurtenances,	6	0% **0**	33% **7**	60% **10**	0% **0**	0% **0**	0% **0**	17	12	1	1
6	Air and noise pollution	7	25% **5**	25% **5**	50% **10**	0% **0**	0% **0**	0% **0**	20	14	2	1
Total		51	**10%** **11**	**37%** **53**	**50%** **78**	**2%** **3**	**0%** **0**	**0%** **0**	145	100	9	10

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E:Evaluvation

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A

B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books(20 marks)
2. Student suggested activities report for 5 marks and should be assessed on RUBRICS
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

TEXT BOOKS & REFERENCES

1. Water Supply & Sanitary Engineering- by Rangwala .
2. Sewage Disposal and Air pollution - by S.K.Garg.
3. Water Supply & Sanitary Engineering- by G.S.Birde .
4. Environmental Science and Engg Vol-I – by Aloka Debi. (Universities Press)
5. Sanitary Engineering Vol-II - by Gurucharan Singh.
6. Sewerage and Sewage Treatment Vol-II.– by Fair & Geir.
7. Text Book of Environmental studies – Erach Bharucha (Universities Press)
8. Water Supply, Waste Disposal and Environmental Pollution Engineering-(khanna publication) A.k.chatterjee
9. Waste water Engineering by Dr B.C. Punmia, Jain & Jain

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	IV SEM	WASTE WATER ENGINEERING	20
	Year: 2015-16	Course code:15EN42T	
Name of Course coordinator CO1,CO2 **Note: Answer all questions**			

	Question	M	CL	CO	PO
1	Explain the importance of sanitation.	3	R/ U	1	1,2,5,6, 8
2	Explain the aims and objectives of sewerage work.	7	U	1	1,2,5,6, 8
3	Write the significance of the following terms in sewage analysis and its limits (i) Solids (ii) Dissolved oxygen (iii) B.O.D. (iv) C.O.D. (v) pH value OR Explain three types of Sewerage system used to convey the sewage. .	10	U/ A	2	1,2,5,6, 10

MODEL QUESTION PAPER (SEE)

Code: 15CE42T

IV Semester Diploma Examination
CIVIL ENGINEERING BOARD
SANITARY ENGINEERING

Time: 3 Hours] **[Max Marks: 100**

***Note*:** i) Answer any SIX questions from PART - A. Each question caries 05 marks.
ii) Answer any SEVEN Questions from PART - B. Each question caries 10 marks.

PART – A

1. Define the terms (i) Sullage, (ii) sewage, (iii) sewerage, (iv) sewer, (v) garbage.
2. Explain the merits and demerits of Combined System.
3. Compare COD over BOD.
4. Explain the requirements of surface drains.
5. Explain the functions of sedimentation tanks.
6. Explain Oxidation ditch with neat sketch.
7. List any five principles of planning and design of house drainage.
8. Define Air Pollution and list classification of air pollutants
9. Illustrate the effects of noise on human life.

PART – B

1. Differentiate between Domestic sewage and Industrial Waste water.
2. Write the significance of the following terms in sewage analysis and its limits
   (i) Solids (ii) Dissolved oxygen . (iii) pH value (iv) Chlorides (v) Nitrates
3. Explain different shapes of surface drains and their functions
4. Explain the procedure of design the storm water sewers.
5. Compute the velocity and discharge of a Storm water sewer flowing full of 0.6m dia, laid in a gradient of 1 in 300. Take Manning Constant as 0.012.
6. (a) Write a short note on Rotary Biological Disc.
   (b) Explain the tertiary treatment of sewage
7. Illustrate with sketch the functioning of Trickling filter.
8. With the flow diagram explain the working of Activated Sludge Process (ASP).
9. Explain with a neat sketch the drainage section of Multi storied building.
   as per BIS Code of practice.
10. With a neat sketch explain Electrostatic Precipitator (ESP).

MODEL QUESTION BANK

CO 1: Understand the concept of waste, types of sewage, sewerage system and appurtenances. Estimate the quantity of sewage of a town/city.

REMEMBER LEVEL QUESTIONS

1. State the importance of sanitation.
2. Define the terms (i) Sullage, (ii) sewage, (iii) sewerage, (iv) sewer, (v) garbage.
3. List the sources of sewage

UNDERSTANDING LEVEL QUESTIONS

1. Explain the aims and objectives of sewerage work. .
2. Explain the factors affecting the quantity of sanitary sewage.
3. Describe Water Carriage System.
4. Differentiate between Domestic sewage and Industrial Waste water.

APPLICATION LEVEL QUESTIONS

1. Estimate the quantity of domestic sewage generated for a town.
2. Explain limiting velocities of sewer.
3. Determine the diameter of a circular sewer to carry sewage of 100 litres/sec when it flows half full with a slope of 1in 350 using Manning's formula.
4. Determine the size of a circular sewer for a discharge of 600 lps running full. Use Manning's formula. Assume i=0.0001 & N=0.015.
5. Calculate the velocity of flow and discharge through a sewer of diameter 0.8m laid at a gradient of 1 in 600. Assume the sewer running full. Use Manning's formula N=0.012.

CO 2: Analyse the Sewage samples using standard test procedures and ascertain the quality of sewage.

UNDERSTANDING LEVEL QUESTIONS

1. Write a short note on Strength of Sewage.
2. Explain various types of waste water sampling methods.
3. Explain the necessity of examination of sewage.
4. Write a note on physical tests of sewage.
5. Explain the three sewerage system used to convey the sewage.
6. Explain the merits and demerits of Combined System.
7. Explain the merits and demerits of Separate system.
8. Compare Separate and Combined sewerage system.
9. Explain the various types of sewers, stone ware, cast - iron, cement concrete, pre-cast sewers, pvc sewers.
10. Explain laying of sewers

APPLICATION LEVEL QUESTIONS

1. Write the significance of the following terms in sewage analysis and its limits
(i) Solids (ii) Dissolved oxygen (iii) B.O.D. (iv) C.O.D. (v) pH value (vi) Chlorides (vii) Nitrates.

2. Compare COD over BOD.

CO 3: Compute the quantity of storm water flow in different types of surface drains.

UNDERSTANDING LEVEL QUESTIONS

1. Explain the factors affecting storm sewage.
2. Write a note on RCC sewers.

3. Explain the factors affecting the storm sewage.
4. Explain the requirements of surface drains.
5. Explain different shapes of surface drains and their functions

APPLICATION LEVEL QUESTIONS

1. Calculate the storm water flow using empirical formula for run- off.
2. Explain the procedure of design the storm water sewers.
3. Compute the velocity and discharge of a Storm water sewer flowing full of 0.6m dia, laid in a gradient of 1 in 300. Take Manning Constant as 0.012.
4. Calculate the quantity of storm water in a catchment area for the following design

Area – 32000 hectares, Intensity of rainfall – 16mm/hour and Average permeability factor – 0.5.

5. A Combined sewer of circular section is to be laid to serve a particular area with the following details.

Area to be served = 300 hectares

Population = 1,00,000

Intensity of rainfall =10mm/hour

Rate of supply=135 lpcd

Permeability factor = 0.5

Calculate the size of the sewer when it has to run full at maximum flow with a velocity of 3m/sec.

6. Explain in brief the, location function and construction of various types of sewer appurtenances

(i)Manholes (ii) Drop manholes (iii) Inlets (iv) Catch basins(v) Traps

(vi) Flushing tanks (vii) Regulators.

7. Sketch Manhole and name the parts.

CO 4: Compare various methods of Sewage treatment and sewage/sludge disposal methods.

UNDERSTANDING LEVEL QUESTIONS

1. Write the functions of (i) Screens (ii) Skimming tanks (iii) Grit chamber
2. With a neat sketch construction of a Screen.
3. Explain the functions of sedimentation tanks.
4. Write a short note on Rotary Biological Disc.
5. Explain the tertiary treatment of sewage
6. Describe Self purification of streams.
7. Explain various methods of sewage disposal.
8. Explain various methods adopted for sludge disposal.
9. Explain Sludge digestion tank with a neat sketch.
10. Explain Sludge drying beds with a neat sketch.
11. Explain the Recycling of Wastewater.

APPLICATION LEVEL QUESTIONS

1. Illustrate with sketch the functioning of Trickling filter.
2. With the flow diagram explain the working of Activated Sludge Process (ASP).
3. Explain Oxidation ditch with neat sketch.
4. Explain Oxidation pond with neat sketch.

5. Explain Aerobic lagoon with neat sketch.
6. Explain anaerobic lagoon with neat sketch.

CO 5: Know the arrangement of sanitary fittings in a building.

UNDERSTANDING LEVEL QUESTIONS

1. Explain the importance and requirements of building drainage.
2. Illustrate the aims and objectives of building drainage.
3. List any five principles of planning and design of house drainage.

APPLICATION LEVEL QUESTIONS

1. Explain with neat sketch the layout of drainage system in Single storied building..
2. Explain with a neat sketch the drainage section of Multi storied building.
3. Explain Gully trap with a neat sketch.
4. Explain with sketch sanitary fittings - water closets , flushing cisterns, urinals, inspection chambers, traps, anti-siphonage
5. Write a short note on Dual pipe system in buildings.
6. Explain testing of house sewers.

CO 6: Identify the sources, effects and preventive measures of air and noise pollution.

REMEMBER LEVEL QUESTIONS

1. Define Air Pollution
2. List classification of air pollutants
3. Define noise
4. List Ambient Air Quality Standards in respect of Noise.

UNDERSTANDING LEVEL QUESTIONS

1. Explain the causes of air pollution.
2. Enumerate the effects of air pollution on human beings.
3. Describe (i)Ozone layer depletion (ii) Acid rain
4. Explain Green house effects and global warming.
5. Explain the effects of noise on human life and its control.
6. Describe about EIS

APPLICATION LEVEL QUESTIONS

1. With a neat sketch explain Electrostatic Precipitator (ESP).
2. Explain the prevention and control of air pollution by control equipment,
   (i) Settling chambers,
   (ii) Cyclone fitters,
   (iii) Scrubbers,
   (iv) Electrostatic precipitators.
3. Illustrate the aims and objectives of EIA.
4. With a neat flow diagram explain the methodology of EIA.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: **CONCRETE TECHNOLOGY**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE43T**
	Type of Course: **Lectures, Self Study & Student activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Pre-requisites: Student should have the knowledge of basics of civil engineering, fundamentals of chemistry and building materials.

Course Objectives:

The student should be able to

1. Adopt the basic knowledge of science and engineering to properties of concrete.
2. Imbibe the culture of professional and ethical responsibilities by following codal provisions in concrete mix design.
3. Identify and solve problems in concrete mix design.
4. Engage in lifelong learning with the advances in concrete technology.

At the end of the course the students should be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Define concrete; understand the functional role of ingredients in concrete and the application of concrete as a building material.	R/U/Ap	1,2,3,5	9
CO2	Explain the significance of water cement ratio, differentiate the behavior of concrete in fresh and hardened states, and know the fundamental characteristics of fresh and hardened concrete.	R/U/Ap	1,2,3,4,5	17
CO3	Design concrete mixes as per codal provisions.	R/U/Ap/Ay	1,2,3,4,5,6,7	7
CO4	Summarize the sequence and procedure of concreting operations and the importance of joints in concrete structures.	R/U	1,2,4,5	12
CO5	Discover the need for sustainability and study the usage of waste/ recycled materials in concrete	R/U/Ap/		7
CO6	Evaluate the effect of the environment on service life performance, properties and failure modes of structural concrete and present it as a case study.	R/U/Ap/ Ay/ C	1,2,3,4,5, 6,7,8,9,10	*
			Total sessions	**52**

Legend- R; Remember U:Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Concrete technology	3	3	3	3	3	2	2	1	1	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENTS	HOURS
1	**INTRODUCTION: -** Definition of concrete. Advantages of concrete. Uses of concrete in comparison to other building materials. **CONCRETE INGREDIENTS** **Cement** – Chemical composition, grades of cement, Tests on cement-(fineness, normal consistency, setting time, soundness, and compressive strength) **i) Storing Cement**:- (a) Storing of cement in the warehouse., (b) Storing of cement at site., (c) Effect of storage on strength of cement **Water** -Quality of mixing water, Limits on the impurities as per ISI. **Fine aggregate** – specific gravity, density, moisture content, bulking, sieve analysis, grading of aggregates, deleterious materials, emerging trends of fine aggregate-manufactured sand. **Coarse aggregate** – importance of size, shape and texture, grading of aggregates, sieve analysis, specific gravity, flakiness and elongation index, crushing, impact and abrasion tests. . Aggregate:- Storing of aggregate on site for maintaining uniformity of moisture and cleanliness. **Admixtures** **Chemical admixtures**– (uses and effect):- plasticizers, accelerator, retarders and air entraining gents, carboxyclic based admixtures. **Mineral admixtures** –fly ash, blast furnace slag, meta-kaolin, Silica fume, rice husk ash.	**9**
2	**Behavior of concrete** Hydration of cement, Bogue's compounds, gel/space ratio, Calcium silicate hydrate, calcium hydroxide, calcium aluminates hydrates, water requirement for hydration, Water Cement Ratio- water cement ratio law and conditions under which the law is valid, Effect of various W/C ratios on the physical structure of hydrated cement, internal moisture, temperature, age, and size of specimen. Definition of cube strength	**5**

UNIT	COURSE CONTENTS	HOURS
	of concrete. Relations between water cement ratio and strength of concrete, Structure of concrete, transition zone,	
3	**PROPERTIES OF CONCRETE**: **Properties of Fresh concrete**: Workability – definition, factors affecting workability, measurement of workability by slump, compaction factor, vee-bee, flow tests. Segregation and bleeding. **Properties of hardened concrete**:- (a) Strength. Characteristic strength, (b) Durability, (c) Permeability., Factors affecting strength, w/c ratio, maturity concept, effect of aggregate properties, compressive strength, tensile strength, bond strength, modulus of rupture, modulus of elasticity, poisson ratio, the relationship between these parameters., aggregate-cement bond strength. **Shrinkage** – plastic shrinkage and drying shrinkage, factors affecting shrinkage. **Creep** – measurement of creep, factors affecting creep, effect of creep. **Durability** – definition, significance, permeability, Factors contributing to cracks in concrete – plastic shrinkage, settlement cracks, Thermal expansion, and structural design deficiencies. Concrete in Aggressive Environment: Alkali – Aggregate Reaction, Sulphate Attack, Chloride Attack, Acid Attack, Effect of Sea Water, Carbonation, special coating for Water Proofing, Freezing and thawing, Tests on hardened concrete – compressive strength, split tensile strength, flexural strength, non-destructive testing of concrete. (d) Dimensional changes. (iii) Quality Control at site:- Control tests on cement, aggregate water and concrete. Concept of quality control.	**12**
4	**CONCRETE MIX DESIGN**: Concept of mix design, Objectives of mix design, grades of concrete, different methods of mix design, factors affecting mix proportions variables in proportioning, exposure conditions, Design data for moisture, bulkage, absorption and suitable fine aggregate and coarse aggregate ratio, Procedure of mix design as per IS 10262-2009, numerical examples of mix design as per IS 10262- 2009 and IS 456 Adjustment on site for Bulking, water content, Absorption, Workability	**07**
5	**CONCRETE OPERATIONS**:- **(ii)Batching**:- (a) Batching of cement, (b) Batching of aggregate: Batching by volume, using gauge box, selection of proper gauge box, Batching by weight-spring balances and by batching machines., (c) Measurement of water. **(iii)Mixing** (a) Hand mixing (b) Machine mixing-types of mixer, capacities of mixers, choosing appropriate size of mixers, operation of mixers, mixing of water.(c) Maintenance and care of machines. precautions before, during and after concreting **(iv)Transportation of Concrete**:- Transportation with and situations of use of the following- pans, wheel barrows, transit mixers, chutes, belt conveyors, pumps, tower cranes. Ready-mix concrete-manufacturing of ready mix concrete **(v) Placement of Concrete** :(a) Prior preparation before placement; when put on natural soil, rocky base, specially prepared sub-base (brick soling and water bound macadam base), hardened concrete base, checking of form work, checking provision for joints. (b) Placement of concrete-precautions to be taken. **(vi) Compaction** :(a) Hand compaction-pavement, narrow and deep members. (b) Machine compaction-types of vibrators-internal and external-Method of handling-suitability for various situations. **(vii)Finishing concrete slabs**-screeding, floating, and trowelling.	**14**

UNIT	COURSE CONTENTS	HOURS
	Hot Weather Concreting- Cold Weather Concreting-under water concreting **(viii)Curing**:- Object of curing, Method of curing,- conventional and advanced Recommended duration for curing. **(ix)Jointing**:- Importance, types, Location	
6	**Special types of concrete**:- sustainability- application of waste/ recycled materials in concrete. Comparison of the following special concrete with conventional concrete- High strength concrete, fiber reinforced concrete, polymer concrete, ferrocement concrete. Foamed concrete, pervious concrete, high density concrete, self-compacting concrete, high performance concrete, Reinforced Cement concrete pavement quality concrete (Composition advantages and specific applications only) Suggested activity (Case study)	**05**

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Prepare a Spread sheet of concrete mix design template which helps to design the concrete mix and prepare practical test report consulting industry.
2. Prepare a detailed search report of Non-destructive test on concrete and present it.
3. Prepare a literature survey on Repairs and rehabilitation of structures.
4. Design a concrete mix as per ACI.
5. Visit your Institute's Library / internet centre and enlist the books available on the topic given by your teacher. Prepare a bibliography consisting name of the author, title of the book, publication and place of publication. Enlist the magazines, periodicals and journals being available in your library.(any one)
    a) Sustainable concrete buildings / Concrete green building
    b) Present scope of Epoxy and Polyurethane in construction industry.
    c) Strength and durability relationship, volume change in concrete
    d) permeability of concrete
    e) Alkali aggregate reaction,
    f) Chloride attack, sulphate attack etc.
    g) Corrosion of steel - causes of corrosion, remedial measure to control
    h) Ultrasonic Pulse Velocity - techniques of measuring and factors affecting measurement of Ultrasonic Pulse Velocity
    i) Cover meter and Corrosion meter
    j) Polymer concrete
    k) Fiber reinforced concrete
    l) No fines concrete
    m) Ferrocement
6. Writing report on (any one)
    a) Latest standards, specification, Test methods of ASTM /AASHTO/NRMCA.
    b) Case study of Concrete and grunting conducted in any project

c) Study on determine physical properties of ingredients of concrete in laboratory
d) Minimum & Maximum cement content on durability of Concrete
e) Schmidt's rebound hammer test concrete with their limitation
f) Vacuum concrete
g) Shortcreting
h) Vacuum Dewatered Concrete
i) Pavement quality concrete
j) RMC

7. Self-Compacting Concrete (SCC) – Mix Design and methods of testing.
8. Concrete Mix Design by DOE Method.
9. Mix design of fly ash concrete by IS 10262 – 2009.
10. Water permeability test on concrete.

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary**5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	**Students score (Group of five students)**				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	5				
2.Fulfill team's roles & duties	2				
3.Conclusion	3				
4.Convensions	4				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be					

given to a group of FIVE students

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
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2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Rare Error	No Error

Course Delivery: The course will be delivered through lectures, demonstration, site visits, expert lectures**.**

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	1,2
					Test 2			2,3
					Test3			4,5
				Mini project		05	Report	1,2,3,4,5
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1, 2, Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels R	U	Ap	Ay	Marks weightage	weightage (%)	A*	B*
1	Introduction to Concrete and Concrete Ingredients	9	40% **10**	20% **5**	40% **10**	0% **0**	25	17	1	2
2	Behavior of concrete	5	70% **10**	30% **5**	0% **0**	0% **0**	15	10	1	1
3	Properties of Concrete	12	50% **15**	50% **15**	0% **0**	0% **0**	30	23	2	2
4	Concrete Mix Design	7	21% **5**	20% **5**	20% **5**	40% **10**	25	13	1	2
5	Concrete Operations	12	50% **15**	33% **10**	17% **5**	0% **0**	30	23	2	2
6	Special types of concrete	7	25% **5**	75% **15**	0% **0**	0% **0**	20	13	2	1
	Total	52	**43%** **60**	**38%** **55**	**13%** **20**	**7%** **10**	145	100	9	10

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A
B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B (mix design problem compulsory)

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**81**
2	Applying the knowledge acquired from the course	**13**
3	Analysis	**7**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**0**

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Model Question Paper for CIE (Tests)

Test/Date and Time	Semester/year		Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	**IV SEM**		Concrete technology	**20**
	Year: 2015-16		**Course code:15CE43T**	

Name of Course coordinator :
Course outcome :CO1, CO2
Note: Answer all questions

	Question	**M**	**CL**	**CO**	**PO**
1	Mention the Chemical composition of cement OR Mention the different test conducted on cement	**5**	**R**	**1**	**1,2,3 ,5**
2	Differentiate between chemical admixtures and mineral admixtures?	**3**	**U**	**1**	**1,2,5**
3	Which test should be conducted to determine the expansion of cement? And how?	**6**	**Ap**	**1**	**1,2,3 4,5**
4	Write the difference between Gel/space ratio and water cement ratio OR Differentiate between hydration of cement and heat of hydration	**6**	**R/ U**	**2**	**1,2,5**

Textbooks:

1. Neville A.M., Concrete Technology, Standard Publishers Distributors, Delhi.
2. IS: 10262 – 2009 recommended guidelines for Concrete Mix design – BIS Publications
3. Shetty MS, Concrete technology, Chand S and Co.
4. Gambhir B L, Concrete Technology, Tata McGraw Hill, New Delhi
5. Concrete Technology - Theory & Practice - R.S. Varshney
6. Concrete Technology - A.R.Santhakumar
7. Concrete Technology R. S. Varshnay New Chand & Brothers,

.

Reference I.S. Codes

1. I.S.4031- (Part 1 to Part 6) Indian standard method of physical tests for hydraulic cement, BIS, New Delhi.

I.S.4031 (Part 1) - 1996 Part 1 – Determination of fineness by dry sieving. I.S.4031(Part 2) -1999 Part 2 – Determination of fineness by air permeabilitymethod.

I.S.4031(part 3) -1988 (reaffirmed 2000) Part 3– Determination of soundness
I.S.4031(part 4) - 1988 (reaffirmed 1995)

Part 4 - Determination of consistency of standard cement paste. I.S.4031 (part 5) – 1988, (reaffirmed 2000) Part 5 - Determination of initial and final setting times

I.S : 4031 (part 6) – 1988, (reaffirmed 2000) Part 6 - Determination of compressive strength of hydraulic cement other than masonry cement

2. I.S : 2386 (part i to part vi) – 1963 Indian standard methods of test for aggregate for concrete. BIS, New Delhi.

Part i - Particle size and shape. (reaffirmed 1997) Part ii - Estimation of deleterious materials and organic impurities. (reaffirmed 2002)

Part iii - Specific gravity, density, voids, absorption & bulking. (reaffirmed 1997) Part iv - Mechanical properties (reaffirmed 1997)

part v - Soundness. (reaffirmed 1997) part vi - Measuring mortar making properties of fine aggregate. (reaffirmed 2002)

3. I.S. : 383 – 1970 Indian standard specification for coarse & fine aggregates from natural sources for concrete. B.I.S.., New Delhi.

4. I.S. : 1911 - 1959 (reaffirmed) Indian Standard methods of sampling and analysis of concrete), B.I.S.., New Delhi.

5 I.S. : 456 - 2000 Indian standard , plain and reinforced concrete – code of practice. (fourth revision), B.I.S.., New Delhi.

6. I.S. : 516 – 1959 Indian standard methods of tests for strength of concrete (xii reprint December 1987), B.I.S.., New Delhi.

7. I.S. : 8112- 1989 Indian standard - 43 grade ordinary portland cement Specification

8. I.S. : 12269 – 1987 (reaffirmed 1999) Indian standard specification for 53 grade O.P.C..

9. I.S. : 9103 – 1999 Indian standard –concrete admixtures specification 10. I.S. : 455- - 1989 (reaffirmed 1995) –Indian standard – Portland slag cementspecification 11. I.S. : 1489 (part 1) 1991 – Portland – Pozzolana Cement – specification

part 1 fly ash based 12. I.S. : 7861 (part 1) 1975 (reaffirmed 1997) – Indian standard of practice forextreme weather concreting part 1 recommended practice for hot weather concreting

13. I.S.: 7861 (part 2) – 1981 (reaffirmed 1997) – Indian standard of practice For extreme weather concreting part 2 – recommended practice for cold weather concreting

13. I.S. : 8041 – 1990 – Indian standard – rapid hardening Portland Cement specification BIS-New Delhi

14. I.S. : 12330 – 1988 (reaffirmed 1995) – Indian standard specification for sulphate resisting Portland cement

15. I.S : 12600 - 1989 (reaffirmed 1995) - Portland cement, low heat Specification

16. I.S : 10262 – 1982 Indian standard recommended guidelines for concrete mix

design

Sp 23 handbook on concrete mixes (based on Indian standards) 18. I.S. 13311 (part-1 & 2)-1992 methods of non-destructive testing of concrete.

part-1 ultrasonic pulse velocity, part-2 rebound hammer.

E-Links

http://ict.concrete.org.uk/links.asp

http://elearning.vtu.ac.in/16/ENotes/ConcreteTechnology/Unit8-MCN.pdf

http://elearning.vtu.ac.in/10CV42.html

http://www.theconcreteinstitute.org.za/

http://www.aboutcivil.org/concrete-technology.html

http://nptel.ac.in/syllabus/syllabus.php?subjectId=105102012

http://nptel.ac.in/courses/105102012/1

www.btechguru.com/courses

http://www.faadooengineers.com/register.php

Model Question Paper

Diploma in Civil Engineering

4th semester

Course title: **CONCRETE TECHNOLOGY**

Time; 3Hrs. Max.marks: 100

Students can carry IS10262-2009

Assume any missing data suitably

Part –A

Answer any six each question carries 5 marks

1.Differentiate between Chemical admixtures and Mineral admixtures ?
2.Write the difference between Gel/space ratio and water cement ratio ?
3. Define workability? What are the factors affecting workability?
4.Explain Sulphate Attack & Chloride Attack ?
5.What are the factors affecting design of concrete mix?
6.Write the situation of use the following equipments wheel barrows, transit mixers, chutes, pumps, tower cranes
7.List the various methods of curing of concrete each with examples?
8.Explain Reinforced Cement concrete?
9. List some of the waste/ recycled materials can be used in concrete?

Part –B

Answer seven (Question No. 10 compulsory and any six) each question carries 10 marks

1. Explain Quality of mixing water in concrete? What are the permissible limits of impurities in water as per ISI?
2. Which test should be conducted to determine the expansion of cement ? And how?
3. Write short note on Calcium silicate hydrate and Calcium aluminates hydrates?
4. What is creep and shrinkage of concrete? List the factors affecting creep and shrinkage of concrete?
5. Differentiate between bleeding and segregation. Explain their effects on Concrete
6. Why is concrete mix design necessary? List the design data required for concrete mix design
7. Explain in details a) Hot weather concreting b) Light weight concrete
8. Why is vibrator required in concreting? Discuss the various types of vibrators used in concreting
9. Difference between High strength concrete and high performance concrete?
10. Design Concrete Mix Proportion for M30 grade by IS 10262 - 2009.

DESIGN STIPULATIONS FOR PROPORTIONING	TEST DATA FOR MATERIALS
Grade designation : M30 Type of cement : OPC 43 grade confirming to IS 8112 Maximum nominal size of aggregates:20mm Minimum cement content : 320 kg/m3 Maximum water cement ratio : 0.4 Workability : 100 mm (slump) Exposure condition: Severe Method of concrete placing : Pumping Degree of supervision : Good Aggregate type: Crushed angular aggregate Maximum cement content : 400 kg/m3 Chemical admixture type : Superplasticizer	Cement: OPC 43 grade confirming to IS 8112 Specific gravity of cement : 3.15 Chemical admixture : Super plasticiser conforming to IS 9103 Specific gravity of coarse aggregate : 2.74 Fine aggregate : 2.74 Water absorption coarse aggregate : 0.5% Fine aggregate : 1.0 % Free (surface) moisture Coarse aggregate : Nil (absorbed moisture also nil) Fine aggregate : Nil Sieve analysis coarse aggregate : Conforming to Table 2 of IS: 383 Fine aggregate Conforming to Zone I of IS383

Model Questions Bank

Unit 1- Introduction to Concrete and Concrete Ingredients
Cognitive level -Remember
1. Define concrete. 2. Mention the Chemical composition, 3. What are the grades of cement? 4. Mention the different test conducted on cement 5. Define fineness, 6. Define normal consistency, 7. What are the impurities limits in water as per ISI? 8. Mention the various test conducted on Fine aggregate 9. List the various test conducted on Coarse aggregate 10. What is manufactured sand or robo sand 11. What are method of storing of aggregate on site for maintaining uniformity of moisture and cleanliness ? 12. Define Admixtures ? 13. Mention the different types of admixtures? 14. Write a note on fly ash

15. Write a note on blast furnace slag
16. Write a note on meta-kaolin
17. Write a note on Silica fume
18. Write a note on rice husk ash
19. Write a note plasticizers
20. Write a note accelerator,
21. Write a note retarders
22. Write a note air entraining gents,
23. Write a note carboxyclic based admixtures.
24. What are different types of admixture used in concrete?
25. What are different types of admixture used in concrete?

Cognitive level -Understand

1. What are the advantages of concrete?
2. What are the uses of concrete in comparison to other building materials?
3. Explain the setting time of cement,
4. Explain the test conducted on normal consistency of cement?
5. Explain the test conducted on fineness of cement?
6. Explain the test conducted on setting time of cement?
7. Explain the test conducted on soundness of cement?
8. Explain the Storing of cement in the warehouse?
9. Explain the test conducted on specific gravity of fine aggregate?
10. Explain the test conducted on density of fine aggregate?
11. Explain the test conducted on moisture content of fine aggregate?
12. Explain the test conducted on bulking of fine aggregate?
13. Explain the test conducted on sieve analysis of fine aggregate?
14. Explain the test conducted on sieve analysis of Coarse aggregate?
15. Explain the test conducted on specific gravity of Coarse aggregate?
16. Explain the test conducted determine flakiness and elongation index of Coarse aggregate?
17. Explain the crushing tests on Coarse aggregate?
18. Explain the impact test conducted on Coarse aggregate?
19. Explain the abrasion tests on Coarse aggregate?
20. Explain the test conducted on specific gravity of coarse aggregate?
21. What do you mean by grading of aggregates
22. Differentiate between Chemical admixtures and Mineral admixtures ?
23. Mention any one uses and effect of each different types of Chemical admixtures
24. Mention any one uses and effect of each different types of Mineral admixtures
25. How does the carboxyclic based admixtures works?
26. Enlist the physical properties of cement. Explain setting time of cement with neat sketch.
27. Define fineness modulus of sand. Explain test procedure to calculate the Also state value as per IS standard.
28. Enlist mechanical properties of coarse aggregate. Explain any two in detail.
29. What is significance of fineness modulus of sand? Explain test procedure to calculate the F. M.
30. Explain detailed procedure to determine Aggregate Crushing Value?
31. Explain in detail effect of air entraining agents on concrete?
32. Explain the effects of different chemical admixture on fresh concrete.
33. Explain the advantages in using Pozzuoli admixture in concrete.
34. Explain in detaileffect of super-plasticizer on concrete?
35. What do you mean by Pozzuoli admixture? Explain in detail Fly Ash?
36. Explain Air-entraining Admixture and the effect of Air Entrainment on the Properties of

Concrete.

Cognitive level –Application

1. How do you arrive at compressive strength of cement?
2. How do you store cement at site?
3. What are the effects of long storage of cement and suggest how to overcome it?
4. What are the features/properties/quality of fine aggregate should look for while preparing concrete?
5. What are the features/properties/quality of coarse aggregate should look for while preparing concrete?
6. How size, shape and texture of Coarse aggregate is important in concrete
7. What are admixtures that can be added to minimize the heat of hydration of cement?
8. How do you use rice husk ash as a building material?
9. How do you ensure grading of aggregates at site
10. Which test should be conducted to determine the expansion of cement ? And how?
11. List the permissible Limits of impurities in water as per IS code
12. why use of fly ash and met kaolin in fresh concrete

Unit 2- Behavior of concrete

Cognitive level -Remember

1. What are the Bogue's compounds,
2. Define Gel/space ratio,
3. Briefly note on Calcium silicate hydrate?
4. Write a short note on Calcium aluminates hydrates,
5. What is the minimum water requirement for hydration of cement?
6. Define Water Cement Ratio
7. Define water cement ratio law?
8. What are the effect of various W/C ratios on the physical structure of hydrated cement?
9. Definition of cube strength of concrete?
10. Write the Relations between water cement ratio and strength of concrete?
11. Brief about structure of hydrated cement paste?
12. Explain transition zone in concrete?
13. Explain the effect of w/c ratio and gel space ratio on strength of concrete

Cognitive level -Understand

1. Explain Hydration of cement and heat of hydration
2. What is the role of Calcium hydroxide in cement ?
3. Write the difference between Gel/space ratio and water cement ratio
4. Differentiate between hydration of cement and heat of hydration
5. Differentiate between Calcium silicate hydrate, Calcium hydroxide & Calcium aluminates hydrates,
6. How are Calcium silicate hydrate, Calcium hydroxide &Calcium aluminates hydrates formed in concrete?
7. Write a note on water requirement for hydration of cement?
8. State the conditions under which the water cement ratio law is valid?
9. What are the effect of internal moisture on the physical structure of hydrated cement?
10. What are the effect of various temperature on the physical structure of hydrated cement?
11. What are the effect of age, and size of specimen on the physical structure of hydrated cement?

12. Explain the phenomenon of hydration of cement and its effect on Strength of cement.
13. Explain Heat of Hydration and Water Requirements for Hydration?
14. Explain how shape and texture of aggregate affected strength of concrete?
15. Write detail procedure of measuring slump of fresh concrete? Explain different types of slump failure.
16. Explain how gel/space ratio affecting strength of concrete?

Unit 3- Properties of Concrete
Cognitive level -Remember
1. What are the properties of Fresh concrete 2. Define Workability 3. What are the factors affecting workability 4. What are the Properties of hardened concrete 5. What are the factors affecting shrinkage. 6. Define Creep Explain measurement of creep? 7. Define Durability ? 8. Define permeability, 9. Write a short note on Carbonation, 10. Mention some of the special coating for Water Proofing of concrete 11. Mention the different tests conducted on hardened concrete 12. Define Segregation 13. Define bleeding 14. What are the different non-destructive test conducted on concrete. 15. Define compressive strength of concrete 16. Define tensile strength of concrete 17. Define bond strength of concrete 18. Define modulus of rupture of concrete 19. What are the values of modulus of elasticity, poisson ratio of concrete 20. Write the relation between compressive strength and modulus of elasticity 21. Write a note on aggregate-cement bond strength. 22. Write the relation between compressive & tensile strength of concrete 23. Define Shrinkage 24. What is modulus of elasticity and explain its relation with strength. 25. Enlist different tests on Hardened Concrete? Explain any one in detail? 26. Explain characteristic strength, compressive strength and flexural strength on concrete. 27. Explain creep of concrete and how determine the creep of concrete in laboratory. 28. What is modulus of elasticity and explain its relation with strength. 29. Explain Freezing and thawingphenomena of concrete. 30. Explain in details factors contributing to Cracks in Concrete. 31. Explain in details the methods for controlling the sulphate attack on Concrete 32. What you mean by NDT? Explain any one method in detailed
Cognitive level -Understand
1. Explain the properties of Fresh concrete: 2. Explain the factors depending upon workability 3. Explain the test conducted on measurement of workability by slump test 4. Explain the test conducted on measurement of workability by compaction factor test 5. Explain the test conducted on measurement of workability by vee-bee test 6. Explain the test conducted on measurement of workability by flow test 7. Differentiate between Segregation and bleeding?

8. Explain the Properties of hardened concrete
9. Differentiate between plastic shrinkage and drying shrinkage,
10. What are the factors affecting creep? Explain effect of creep.
11. What are the factors contributing to cracks in concrete
12. Write a short note on Alkali – Aggregate Reaction,
13. Write a short note on Sulphate Attack,
14. Write a short note on Chloride Attack,
15. Write a short note on Acid Attack,
16. What are the effect of Sea Water on concrete,
17. Explain how to determine compressive strength of concrete
18. Explain how to determine split tensile strength of concrete
19. Explain how to determine flexural strength,
20. Write short note on rebound hammer test
21. Write short note on Ultrasonic pulse velocity test
22. What are the factors affecting strength of concrete?
23. Explain maturity concept?
24. Explain effect of aggregate properties strength of concrete?
25. How do you ensure concrete quality Control at site
26. Differentiate between bleeding and segregation. Explain their effects on Concrete
27. Explain in detail factors affecting strength of concrete?
28. Explain in details types of concrete shrinkage?
29. Explain how to determine dynamic modulus of elasticity and its relation with static modulus of elasticity
30. Explain effect of w/c ratio on durability and permeability of concrete.
31. Explain the importance on minimum & maximum cement content on durability?
32. Explain the techniques of measuring and factors affecting measurement of Ultrasonic Pulse Velocity.
33. Explain in detail Schmidt's rebound hammer to test concrete with their limitation (with figure)
34. Explain the techniques of measuring and factors affecting measurement of Ultrasonic Pulse Velocity.
35. Explain in detail Schmidt's rebound hammer to test concrete with their limitation (with figure)

Unit 4- Concrete Mix Design
Cognitive level -Remember
1. Define Grades of concrete, 2. Mention the different methods of mix design, 3. List the design data required for concrete mix design 4. What are the factors affecting mix proportions 5. Provide the details of exposure conditions provided in the code 6. Explain the procedure of mix design as per IS 10262-2009, 7. What are the factors affecting design of concrete mix? 8. Enlist varies method of mix design? Write data to be collected for a mix design?
Cognitive level -Understand
1. Why concrete mix design necessary? 2. Explain the concept of mix design? 3. What are the objectives of mix design? 4. Write a note on adjustment on site for Bulking while preparing concrete?

5. Explain adjustment on site for water absorption of materials while preparing concrete during rainy season?
6. Write a note on adjustment on site for Workability while preparing concrete ?
7. What are methods of compaction of concrete used for making good quality concrete? Explain in brief
8. Explain different exposure condition as per IS 456 – 2000 provision.
9. Explain the importance on minimum & maximum cement content on durability?
10. Explain detail procedure of concrete mix design by IS 10262 - 2009
11. Explain method of expressing proportions and also what do you mean by acceptances criteria?

Cognitive level : application & analysis

1. Design concrete mix design for proportioning

m) Grade designation: M40
n) Type of cement: OPC 43 grade confirming to IS 8112
o) Type of mineral admixture: Fly ash confirming to IS 3812 (Part-1)
p) Maximum nominal size of aggregates: 20 mm
q) Minimum cement content: 320 kg/m3
r) Maximum water cement ratio: 0.45
s) Workability: 100 mm (slump)
t) Exposure condition: Severe (for reinforced concrete)
u) Method of concrete placing: Pumping
v) Degree of supervision: Good
w) Type of aggregate: Crushed angular aggregate
x) Maximum cement content: 450 kg/m3
y) Chemical admixture type:Superplsticizer

A-2 TEST DATA FOR MATERIALS

h) Cement used: OPC 43 grade confirming to IS 8112
i) Specific gravity of cement: 3.15
z) Fly ash used: Fly ash confirming to IS 3812 (Part-1)
j) Specific gravity of fly ash: 2.2
k) Chemical admixture: Super plasticiser conforming to IS 9103
l) Specific gravity of Coarse aggregate: 2.74 Fine aggregate: 2.74
m) Water absorption Coarse aggregate: 0.5 percent Fine aggregate: 1.0 percent
n) Free (surface) moisture coarse aggregate: Nil (absorbed moisture also nil) Fine aggregate: Nil
o) Sieve analysis coarse aggregate: Conforming to Table 2 of IS: 383 Fine aggregate: Conforming to Zone I of IS: 383

Unit 5- Concrete Operations

Cognitive level -Remember

1. Explain in details a) Hot weather concreting b) Light weight concrete c)Cold weather concreting d) High Density Concrete
2. What do you know about Batching ?
3. Explain different types of Transportation of Concrete
4. What is Ready-mix concrete-
5. Explain different Methods of curing?
6. Mention different types of joints and its location?

Cognitive level -Understand

1. Describe the various methods of mixing of concrete

2. Why is vibrator required in concreting? Discuss the various types of vibrators used in concreting
3. What are precautions is to be taken during hot and cold weather concreting?
4. Differentiate between Hand mixing & Machine mixing ?
5. What are the precautions taken before, during and after concreting in concrete mixing machines?
6. Write the situation of use the following equipments pans, wheel barrows, transit mixers, chutes, belt conveyors, pumps, tower cranes.
7. Explain manufacturing of ready mix concrete
8. Explain Finishing concrete slabs-screeding, floating, and trowelling.
9. Why curing is necessary?
10. Why water is used in curing the concrete?
11. what is the recommended duration for curing of concrete?

Unit 5- Special types of concrete
Cognitive level -Remember
1. Explain in details a) Polymer concrete b) Fiber reinforced concrete c) Nofines concrete d) Ferrocement 2. Explain in details a) Self Compacting Concrete (SCC) b) High performance concrete 3. Explain different types of fiber used in concrete? 4. What is fiber reinforced concrete, mention any two advantages and its specific application ? 5. What is polymer concrete mention any two advantages and its specific application ? 6. What is ferrocement concrete mention any two advantages and its specific application ? 7. What is Foamed concrete mention any two advantages and its specific application ? 8. What is pervious concrete mention any two advantages and its specific application ? 9. What is high density concrete mention any two advantages and its specific application ? 10. What is self-compacting concrete mention any two advantages and its specific application ? 11. What is high performance concrete mention any two advantages and its specific application ? 12. What is pavement quality concrete mention any two advantages and its specific application ? 13. List some of the waste/ recycled materials can be used in concrete?
Cognitive level -Understand
1. Compare conventional concrete and self-compacting concrete 2. Compare conventional conventional concrete & High strength concrete, 3. Mention advantages of application of waste/ recycled materials in concrete? 4. Difference between High strength concrete and high performance concrete?

Some of the suggested activities

1. Flyash – building blocks for the future
2. Flyash -cement stabilized soil blocks
3. Pollution studies in silk industry experimental investigations on replacement of sand by quarry dust in concrete

4. Experimental investigation on recycled aggregate concrete
5. To find the influence of the size of the aggregate of the compressive strength of concrete
6. Ferro cement composite with no-fines concrete
7. Lime -fly ash - soil blocks
8. A study on effects of light weight aggregates on compressive and flexural strength of concrete
9. Studies on partial replacement of cement by red mud in motor
10. A study on low cost housing material bricks made up of building waste
11. Experimental investigations on replacement of sand by graded quarry dust in concrete
12. Development of traditional water proofing agents (using natural resins) for economy in construction
13. Compressive strength of stabilised blocks and masonary prisms
14. Preliminary investigations on red soil cement stabilised coconut shell blocks
15. Laboratory study on cement- stabilised iron-ore rejections
16. Variations in strength of concrete and masonary units
17. Crushed stone dust cement blocks
18. Stabilized manganese-ore tailings blocks
19. Mangalore tile waste as coarse aggregate in concrete
20. Effect of blast furnace sl*g on soil-cement stabilization
21. Stabilized haalu mannu blocks
22. Portable low cost ferrocement water tank
23. Flyash concrete door shutters
24. Development of masonry mortar using limestone polished slurry and cement
25. Utilization of man made waste in man-made structures
26. Flyash laterite bricks
27. Properties and suitability of fine quarry dut for the final coat plastering and impervious layer
28. Suitability of beach sand as fine aggregate for concrete
29. Characteristics properties of concrete with mixed fibres using waste plastic and waste coiled steel fibres
30. Waste plastic fibre reinforced concrete with polymers-turning pollution to solution
31. Investigation on coiled fibre reinforced concrete with tile waste as coarse aggregate
32. Effect of microsilica-600 on the properties of waste plastic fibre reinforced concrete
33. Concreting practices in belgaum - a case study
34. Comparative study of strength of welded mesh and expanded metal in ferrocement
35. Behaviour of filler slab in low cost housing
36. Study of geo-technical and strength parameters of laterite blocks in and around karkal talaq
37. Design and construction of folded ferrocement boat
38. Experimental study on utilization of silica fume in concrete
39. The strengths of recron 3s fibrous concrete with and without super plasticizers
40. Experimental study on utilization of blast furnace sl*g in concrete
41. Determination of aggregate shape factors using universal thickness-length guage
42. An experimental study on enhancement of strength of concrete embers using wrapping technology
43. A study on the use of rice husk ash in concrete from sustainability consideration
44. Mix design for self compacting concrete
45. Utilization of pozzolanic wastes in the production of wastes coiled fibre reinforced concrete
46. Use of recycled aggregates,waste plastic fibres and flyash in the production of bituminous mix for flexible pavements
47. Effective utilization of bauxite residue(red mud) in brick making
48. Fibre reinforced concrete and cocktail fibre reinforced concrete as repair materials

49. Experimental studies on mix proportioning and strength properties of pavement quality and lean concrete with high volume flyash
50. Study on blending of quarry dust in large volume for structural component available in udupi and d k
51. Study on utilisation of building materials from demolished structures
52. An experimental study on effect of ratio of different sized coarse aggregates on compressive strength of self compacting concrete
53. Sustanable and cost effective building material technology through partial replacement of cement by granite cutting slurry waste powder and partial replacement of coarse aggregates by mangalore tile bats for arch lintels
54. Design and evaluation of high volume flyash concrete for rigid pavement overlays
55. Geopolymer mortar
56. Geopolymer concrete
57. Study on strength behaviour of concerte using foundry dust in fine aggregate
58. Enhancing the strength properties of recycled aggregate concrete through the use of supplimentary cementing materials
59. Experimental studies on air entrained ferrocement panels with high volume fly ash and compatibility of its connection
60. Rice husk ash concrete blocks
61. Mix design and strength characteristics of reactive powder concrete
62. Experimental study on resistance of self compacting concrete to elevated temperature and verification of ratio of compressive strengths of cube to that of cylinder for scces
63. Waste of material in the construction industry

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30. Nataraja, M.C and Ramalinga Reddy, B.M, Bavanishankar, S and Barathraj Etigi., "Mix design and some properties of concrete containing Ground granulated Blast Furnace Slag", pp. 491-500, II CANMET-ACI International conference on Concrete Technology for Sustainable Development, Hyderabad, March 2005.
31. Nataraja, M. C, Lelin Das and N. Richard Sandeep "Comparison of Indian Standard Draft Method and ACI Method of Concrete Mix Proportioning", Second National seminar on Advances in Materials and Structure, IIT, Chennai, India.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

Course Title: **PROFESSIONAL ETHICS & INDIAN CONSTITUTION**		
Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE44T**
Type of Course: **Lectures, Self Study& Quiz**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Prerequisites: Enthusiasm to learn the subject

Course Objectives:

1. To create an awareness on Engineering Ethics and Human Values.
2. To instill Moral and Social Values and Loyalty.
3. Create awareness among engineers about their social responsibilities
4. Appreciate the Ethical issues
5. To Know the Human rights and concept of women empowerment
6. To know features of our constitution.

Course Outcomes:

7. *On successful completion of the course, the students will be able to attain CO:*
8:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Practice the moral values that ought to guide the Engineering profession.	***R/U***	5,6,7,8,10	**10**
CO2	Discover of the set of justified moral principles of obligation, ideals that ought to be endorsed by the engineers and apply them to concrete situations	***U/A***	5,7,8,10	**09**
CO3	Know the definitions of risk and safety also discover different factors that affect the perception of risk	***R/U***	5,6,7,10	**05**
CO4	Appreciate the Ethical issues and Know the code of ethics adopted in various professional body's and industries	***R/U***	5,6,7,10	**06**
CO5	Justify the need for protection of human rights and to know about concept of women empowerment	***R/U***	5,6,7,8,10	**8**
CO6	Know the successful functioning of democracy in India	***R/U***	5,6,7,9,10	**14**
		Total sessions		**52**

Legend: R; Remember, U: Understand A: Application

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
PROFESSIONAL ETHICS & INDIAN CONSTITUTION	-	-	-	-	**3**	**3**	**3**	**3**	**2**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks weightage	weightage (%)
			R	U	A		
1	HUMAN VALUES	10	15	15	-	30	21
2	ENGINEERING ETHICS	09	10	15	-	25	17
3	SAFETY, RESPONSIBILITIES OF ENGINEERS	05	05	-	10	15	11
4	ETHICAL ISSUES IN ENGINEERING PRACTICE	06	05	05	5	15	11
5	HUMAN RIGHTS	8		15	5	20	13
6	INDIAN CONSTITUTION	14		25	15	40	27
	Total	52	35	75	35	145	100

Legend: R; Remember, U: Understand A: Application

UNITI: HUMAN VALUES 10Hrs

Professional Ethics-Objectives of study of professional ethics-Human values- Definition of Morals and Ethics-Difference between Morality and Ethics-Values-Definition-Types of values- Definition of Integrity- Concept of Work Ethic- Service Learning- Definition Virtues-Definition-Civic Virtue-Duties and Rights - Respect for Others – Attitude and values, opinions-changing attitude-beliefs-Reliability-Living Peacefully-Means to be adopted for leaving peacefully-Caring-Sharing-Honesty-ValuingTime-Co-operation-Commitment-Empathy-Self-Confidence-Spirituality.

UNTII: ENGINEERING ETHICS 09Hrs

Engineering ethics-Definition-Approach-Senses of Engineering Ethics-variety of moral issues– Inquiry-Types-Moral dilemmas-Steps to solve dilemma-Moral autonomy –Definition-consensus & controversy –Profession-Definition–Ethical theories-Theories about right action Personality–Self control- Self-interest –Self respect.

UNITIII: SAFETY, RESPONSIBILITIES OF ENGINEERS 05Hrs

Safety and risk-definition- - assessment of safety and risk - risk benefit analysis and reducing risk –Personal risk-Public risk-Reducing risk-Voluntary Risk-Collegiality and loyalty–Authority-Types- collective bargaining -occupational crime –Responsibility of engineers–Types-Social responsibility-Professional responsibility-confidentiality-conflicts of interest-liability

UNIT IV:ETHICAL ISSUES IN ENGINEERING PRACTICE 06Hrs

Ethical issues–Industrial standards-Environmental ethics –Plastic waste disposal-E-Waste Disposal-Semi conductor waste Disposal-Industrial waste disposal-Human centred environmental ethics- computer ethics –Types of issues-Computer as the Instrument and Object of Unethical Acts -Engineers as managers-Codes of ethics-Sample code of Ethics like -Institution of Engineers(India)-Institute of Electrical & Electronics engineers- Institute of Electronics & Telecommunication Engineers - Indian Institute of Materials Management.

UNIT V: HUMAN RIGHTS 8 Hrs

Human Rights-Definition-constitutional provisions-right to life and liberty-Human Rights of Women-Discrimination against women- steps that are to be taken to eliminate discrimination against women in Education, employment, health care, Economic and social life, Women in rural areas- Status of Women in India - Constitutional Safeguards - Dowry Prohibition act 1961- Domestic violence act 2005- Sexual harassment at work place bill 2006-Human Rights of Children- Who is a child- list the Rights of the Child- Right to education--Protection of Children from Sexual Offences Act(POCSO)-2012- National Human Rights Commission-Constitution- Powers and function of the Commission-Employee rights- Provisions made-Contractual-Non contractual employee rights-Whistle blowing-definition-Aspects-Intellectual Property Rights (IPR)–Meaning-Need for protection- Briefly description of concept of patents, Copy right, Trade mark.

UNIT VI: INDIAN CONSTITUTION 14Hrs

Introduction to constitution of India-Formation and Composition of the Constituent Assembly-Salient features of the Constitution-Preamble to the Indian Constitution Fundamental Rights- Fundamental Duties-Directive principles of state policy.
Parliamentary system of governance- Structure of Parliament- Lokhasabha and Rajyasabha - Functions of parliament- Legislative ,Executive, Financial Function, Powers of Loksabha and Rajya Sabha- Procedure followed in parliament in making law-Structure of union executive-Power and position of President, Vice President, Prime minister and council of ministers. Structure of the judiciary: Jurisdiction and functions of Supreme Court, high court, and subordinate courts
Federalism in the Indian constitution, Division of Powers- Union list, State list and concurrent list, Structure of state legislation, Legislative assembly and Legislative council, Functions of state legislature, Structure of state executive-Powers and positions of Governor, ,Speaker, Deputy Speaker, Chief Minister and council of minister.
Local self government- meaning-Threetiersystem-Villagepanchayath-Talukpanchayath-Zillapanchayath-Local bodies-Municipalities and Corporations, Bruhath mahanagara Palike.
Functions of Election commission, UPSC, KPSC.

TEXT BOOKS

1. Naagarazan, R.S. , "Professional Ethics and Human Values " New age International http://www.imd.inder.cu/adjuntos/article/524/Professional%20Ethics%20and%20Human%20Values.pdf
2.Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall,

3.NCERT_Indian_Constitution_at_Work_Political_Science_Class_11_www.upscportal.com (1)

REFERENCES

1.Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice HallofIndia,NewDelhi,2004.
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics - Concepts and Cases", Wadsworth Thompson Learning, United States, 2000
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi,2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001
5.Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York, 1996.
6. Introduction to the Constitution of India- Dr.Durga Das Basu
7. Empowerment of rural women in India-Hemalatha H.M and RameshwariVarma,HemaPrakashana.

LIST OF LEARNING WEBSITES:

1. http://www.imd.inder.cu/adjuntos/article/524/Professional%20Ethics%20and%20Human%20Values.pdf
2. http://www.course.sdu.edu.cn/G2S/eWebEditor/uploadfile/20131017113401956.pdf

SUGGESTED LIST OF STUDENT CASE STUDY

Note: The following or similar Case study related for assessing CIE (IA) for 10 marks

1	Teacher form the group of 5- 6 students, Ask to think by each student, about an important value acquired from their child hood and the value still retained with them and value they rejected. Ask to share the values retained and explore what has made to reject some values. Make report
2	The construction company wants to make a feasibility study of a proposed ring road near your city. It hires Civil engineer for this purpose. The engineer learns that the project would have a very negative impact in term of pollution, economy, and lives of low income rural population. The Engineer had no intention of divulge the information during public hearings. What should the Engineer as Adviser to do? Make report
3	The computer engineer develops a computer program used as a tool in developing other programs assigned to him. He uses the facilities of the company to develop the program. He changes jobs and takes the only copy of the first program with him for use in his new job. Will it be a violation of the employer's right? Does he require previous employer's permission before using it on the new job? Make report
4	A manufacturing enterprise pays their Technicians Trainees overtime salary and a handsome bonus to work during a strike period. The strike was organized by the union against the unsafe working conditions of the plant. You, considered as a Technician trainee, believe that the conditions may be unsafe even though no government regulations apply. What will you do? Make report Options: 1. Refuse to work, because thinking that the allegations of the union have merit 2. Refuse to work because believing that breaking the strike is unethical. 3. Continue to work, because he feels this is an obligation to the employees 4. Continue to work because it will help clear some of his pending commitments 5. Work, because otherwise Management is likely to be fired and cannot get alternate job.
5	A woman who was driving a car was involved in an accident. The vehicle dashed against the divider. She had fallen unconscious. You are passing by your vehicle. She is known to you, alive and stable. You are going to appear for an interview for Air Force recruitment. Is it (or) is it not your duty to save her from suffering? You are likely to fulfill a duty of protecting the country. What you will do .Apply Ethical theory on this situation. Make report
6	Teacher form the group of 5- 6 students, Ask to Visit local general hospital/leading Nursing homes. Ask them to observe how their hospital wastes being disposed. Will they follow the safe disposable measures? Assess how it will violate their environmental ethics. Make report

MORE SUGGESTED CASE STUDY FOR UNDERSTANDING THE COURSE

Case Studies: Study the cases given in text book *Vide page number 120 to page number 138*: *Naagarazan, R.S "Professional Ethics and Human Values* "New age International (E-link :http://www.imd.inder.cu/adjuntos/article/524/Professional%20Ethics%20and%20Human%20Values.pdf) and analyzes the ethical issues and comment on what one should do. State ethical principles, codes of ethics of professional societies, to support your comments.

Course Delivery:

- The course will be delivered through lectures and Power point presentations/ Video
- Teachers can encourage the students to take case study and make the report of the same.

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three tests (Average of three tests to be computed)	20	Blue books	1,2,3,4,5,6
				One Case study	05	Report	1,2,3,4,5,6
				Total	25		
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. After taking average of three tests marks, any decimals shall be rounded off to the next higher digit.

Example only: RUBRICS/CRITERIA FOR ASSESSING STUDENT's CASE STUDY (5 Students in a group).

Dimension	Scale					Students Score				
	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	1	2	3	4	5
1. Research and gather data information	Does not collect information relate to topic	Collects very limited information, some relate to topic	Collects basic information, most refer to the topic	Collects more information, most refer to the topic	Collects a great deals of information, all refer to the topic	3				
2.Full fills teams roles and data interpretation	Does notable to interpret data perform any duties assigned to the team role	slightly able to interpret data and Performs very little duties	Not precisely able to interpret data and Performs nearly all duties	Precisely Able to interpret Data and Performs almost all duties	Excellent in interpreting data and Performs all duties of assigned team roles	4				
3.Shares work equally	Always relies on others to do the work	Rarely does the assigned work, often needs reminding	Usually does the assigned work, rarely needs reminding	Always does the assigned work, rarely needs reminding.	Always does the assigned work, without needing reminding	5				
4. Listen to other team mates and able to conclude	Is always talking, never allows anyone to else to speak not able to infer	Usually does most of the talking, rarely allows and the others to speak and slightly able to infer	Listens, but sometimes talk too much and able to infer	Listens and talks a little more than needed and able to precisely conclude	Listens and talks a fare amount and excellently conclude this opinion	2				
					Grand Average/Total	14/4=3.5 ~ 4				

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	**Bloom's Category**	**% in Weightage**
1	**Remembering**	**35**
2	**Understanding**	**50**
3	**Application**	**10**
4	**Analysis (activities)**	**05**

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	**Semester/year**	**Course/Course Code**	**Max Marks**
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	**PROFESSIONAL ETHICS & INDIAN CONSTITUTION**	20
	Year:	**15CE44T**	
Name of Course coordinator : CO's:____			Units:__

Question no	**Question**	MARKS	**CL**	**CO**	**PO**
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	**Semester/year**	**Course/Course Code**	**Max Marks**
Ex: I test/6 th weak of sem 10-11 Am	IV SEM	**PROFESSIONAL ETHICS& INDIAN CONSTITUTION**	20
	Year: 2015-16	Course code: **15CE44T**	
Name of Course coordinator :			Units:1,2 and CO: 1,2

Note: Answer all questions and carry equal marks

Question no	**Question**	**CL**	**CO**	**PO**
1	List the factors for one to work peacefully.	R	1	5,6,7
2	Illustrate the ethical aspect principle of caring or sharing, with an example? OR Explain various actions of an engineer leading to dishonesty?	A	1	5,6,7
3	State the specific virtues relating to honesty? OR List the situations when moral dilemmas arise?	R	2	5,7,8
4	Explain the relation between autonomy and authority?	A	2	5,7,8

MODEL QUESTION PAPER

4- Semester Diploma Examination

PROFESSIONAL ETHICS & INDIAN CONSTITUTION

Time: **3 Hours**] [Max Marks**: 100**

Note: *Answer any SIX from Part A and any SEVEN from Part B*

PART-A 6x5=30 marks

1. Distinguish between 'morality' and 'ethics'
2. Explain the terms, 'Profession', 'Professional', and 'Professionalism'?
3. Name a few techniques (steps) to reduce risks?
4. List the ill effects of E waste disposal on environment?
5. Explain the role of computers as object of Unethical Acts?
6. State various provisions under 'human rights?
7. Differentiate between 'Patent' and 'Trade secret'?
8. State the function of Governor?
9. Write Note on gram panchayaths?

PART-B 7x10=70 marks

10. Illustrate the ethical aspect principle of caring or sharing, with an example?
11. Explain various actions of an engineer leading to dishonesty?
12. List the situations when moral dilemmas arise?
13. Distinguish between 'corporate responsibility' and 'corporate accountability?
14. Explain Occupational crime?
15. Explain code of Ethics followed in Institution of Engineers?
16. Explain Sexual harassment at work place bill 2006?
17. Explain the basic structure of Parliament?
18. Explain the formation and functions of state high Court?
19. State the role of following members in Rajyasabha?:
    a) Chairman
    b) Leader of the house
    c) Opposition leader

MODEL QUESTION BANK

4th Semester

Course title: PROFESSIONAL ETHICS & INDIAN CONSTITUTION

CO1: PRACTICE THE MORAL VALUES THAT OUGHT TO GUIDE THE ENGINEERING PROFESSION.

Level-1: Remember

1. Define Engineering Ethics?
2. State the two approaches to Engineering ethics?
3. List different meanings of 'ethics'.
4. List the key trends in engineering ethics?
5. Distinguish between 'morality' and 'ethics'?
6. List different types of values and give a few examples in each?
7. List the civic virtues one should develop?
8. List the types of virtues, with an example for each
9. List the factors for one to work peacefully?
10. List different ways the honesty reflects?
11. List the benefits of empathy?
12. Define 'character'. and 'spirituality'?

Level-2: Understand

13. How do the human values evolve?
14. Explain the term 'respect for others' with suitable example?
15. Explain what should one do or not to do live peacefully?
16. Distinguish between 'caring' and 'sharing'?
17. What are the impediments to proper co-operation?
18. Explain the factors that shape self-confidence in a person?
19. Explain two methods of developing self-confidence?
20. Illustrate the ethical aspect principle of caring or sharing, with an example?
21. Explain various actions of an engineer leading to dishonesty?
22. Explain Service Learning and discuss on its components?
23. Explain any two Human values in detail?

CO2: DISCOVER OF THE SET OF JUSTIFIED MORAL PRINCIPLES OF OBLIGATION, IDEALS THAT OUGHT TO BE ENDORSED BY THE ENGINEERS AND APPLY THEM TO CONCRETE SITUATIONS

Level-1: Remember

1. List the objectives of this course 'professional ethics'?
2. Define the term, 'moral dilemma'?
3. List the situations when moral dilemmas arise?
4. List the steps in confronting moral dilemma?
5. State the five characteristics of professionals?
6. State the specific virtues relating to honesty?
7. Define 'corporate responsibility'
8. Define 'corporate accountability?
9. List the skills required to handle moral problems/issues in engineering ethics?

Level-2: Understand

10. Why do people behave unethically?
11. Why and how do moral problems arise in a profession?
12. Explain the moral dilemma
13. Explain the difficulties in solving moral problems?

14. Explain the relation between autonomy and authority?
15. Highlight the principle of 'pre-conventional level' of moral development?
16. Explain the terms, 'Profession', 'Professional', and 'Professionalism'?
17. Describe the virtues fulfilled under professional responsibility?
18. Distinguish between 'corporate responsibility' and 'corporate accountability?
19. What is moral integrity? Write on its significance?
20. Differentiate between self-respect and self-esteem.?
21. Distinguish between causal responsibility, moral responsibility and Legal responsibility?
22. What is meant by Professional Responsibility?
23. Where and how do moral problems arise in engineering practice? Justify the safety and other obligations of professional engineers?

CO3: KNOW THE DEFINITIONS OF RISK AND SAFETY ALSO DISCOVER DIFFERENT FACTORS THAT AFFECT THE PERCEPTION OF RISK

Level-1: Remember

1. Name the factors that influence the perception of risk?
2. List the factors that affect the risk acceptability?
3. Name a few techniques (steps) to reduce risks?
4. List various aspects of collegiality?
5. List factors/principles to justify 'confidentiality'?
6. State the difference between 'bribe' and 'gift'?

Level-2: Understand

7. What is meant by 'safe exit', in the study of safety?
8. Describe 'institutional authority' with an example?

Level-3: Application

9. Explain 'collective bargaining with example?
10. Explain briefly ''institutional authority?
11. Explain Occupational crime?

CO4: APPRECIATE THE ETHICAL ISSUES AND KNOW THE CODE OF ETHICS ADOPTED IN VARIOUS PROFESSIONAL BODY'S AND INDUSTRIES

Level-1: Remember

1. List the ill effects of E waste disposal on environment?
2. Define 'computer ethics'? List the issues in 'computer ethics'?
3. Name different types of problems in 'computer ethics'?
4. List the ethical problems by computers in workplace?
5. List the ethical features involved in computer crime?

Level-2: Understand

6. Describe briefly on code of ethics?
7. Write note on Industrial standards?
8. What are the duties of an engineer as an experimenter, in environmental ethics?
9. How the plastic waste disposals create havocs?
10. Discuss on Industrial waste disposal creating disasters on environment?

Level-3: Application

11. Explain 'environmental ethics'?

12. Explain human centred environmental ethics?
13. Explain the role of computers as instruments?
14. Explain the role of computers as object of Unethical Acts?
15. Explain the role of engineers as managers?
16. Explain code of Ethics followed in Institution of Engineers?
17. Explain code of Ethics followed in engineering council of India?
18. Explain code of Ethics followed in TATA group?
19. Explain code of Indian Institute of Materials Management?

CO 5: JUSTIFY THE NEED FOR PROTECTION OF HUMAN RIGHTS AND TO KNOW ABOUT CONCEPT OF WOMEN EMPOWERMENT

Level-1: Remember

1. State various provisions under 'human rights?
2. List the features of 'international human rights?
3. State the provisions under professional rights?
4. State the features of the employee rights?
5. List the principles of *conflict resolution?*
6. List the ethical responsibilities of consulting engineers?
7. List the various Special Programs for Women's Development from government?

Level-2: Understand

8. Describe briefly 'trademark'?
9. Differentiate between 'Patent' and 'Trade secret'?
10. Describe briefly 'right of conscientious refusal'?
11. Describe 'right to due processes?
12. Describe 'intellectual property rights?

Level-3: Application

13. Explain briefly the 'copyright'?
14. Explain briefly about patents?
15. Explain on the participation in professional societies? `
16. Explain the concept of women empowerment?
17. Explain woman and Development?
18. Explain Dowry Prohibition act 1961?
19. Explain POCSO act 2012?
20. Explain domestic violence act 2005?
21. Explain Sexual harassment at work place bill 2006?

CO6: KNOW THE SUCCESSFUL FUNCTIONING OF DEMOCRACY IN INDIA

Level-1: Remember

1. List the function and powers of parliament?
2. State the positions and powers of the Governor?
3. State the powers and Functions of the Chief Minister?
4. State the functions of Taluk panchayaths?
5. State the functions of Zilla panchayaths?
6. List the functions of urban local bodies?
7. State the powers of the president?
8. State the functions of the president?

9. State the powers and Functions of the prime minister?

Level-2: Understand

10. Describe briefly about Indian constitution?
11. Write about structure of Parliament?
12. What are the Procedure followed in parliament in making law?
13. Describe the role of gram panchayaths in community upliftment?
14. Describe the role of: a) Chairman b) Leader of the house c) Opposition leader in Rajyasabha?
15. Describe importance of Judiciary?
16. Describe the Structure of state legislation
17. Describe the Jurisdiction of Supreme court,
18. Describe the Jurisdiction high court?

Level-3: Application

19. Explain theFormation & Composition of constituent assembly?
20. Explain preamble and its main objectives of Indian constitution?
21. Explain the fundamental Rights of Every citizen?
22. Explain the fundamental Duties of Every citizen?
23. Explain salient features of Indian constitution?
24. Explain the basic structure of Parliament?
25. Explain the composition of Lokasabha?
26. Explain the composition of Rajyasabha?
27. Explain the Directive principles of state policy?
28. Explain the Structure Of The Judiciary?
29. Explain the Powers of Rajya Sabha and Loksabha ?
30. Describe briefly about, Division of Powers- Union list, State list and concurrent list,
31. Explain the federalism in the Indian constitution ?
32. Explain the role of vice president?
33. Explain the role of State council of ministers?
34. Explain the functions of Zilla panchayaths?
35. Explain the formation and functions of Supreme Court?
36. Explain the formation and functions of state high Court?
37. Explain the formation and functions of subordinate courts?
38. Explain the formation of three tier system for local self government?

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **SOIL & MATERIAL TESTING LAB**		
	Credits (L:T:P) **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE45P**
	Type of Course: **Practical's, Task work**	**Credit :03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre-requisite: Knowledge of strength of materials, Materials of construction.

Course objectives

1. To provide the basic knowledge of science and engineering with respect to properties of construction materials and to *identify* problems in choosing the suitable materials in any construction site.
2. Ability to apply knowledge of Mathematics and Engineering in calculating the mechanical properties like tensile strength, compressive strength etc.
3. Ability to *communicate* effectively about mechanical properties of materials, and apply the knowledge in design of concrete structures, soil subgrade and pavements.
4. Understands use of modern *instruments* and engage in life-long learning with the advances in material testing without inhibiting *professional and ethical responsibility*.

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Reproduce the basic knowledge of mathematics, science and engineering in assessing the quality and suitability of construction materials, structural element, & preparation of test reports as per the IS specification, by inculcating professional and ethical responsibility in the areas of material testing & modern instrument usage	R/U/Ap/ Ay/C	1,2,3,4,5 ,7,8,9	72
CO2	Formulate and solve in teams in order to improve future problem solving ability in material engineering and able to present it.	R/U/Ap/Ay	1,2,3,4,5 ,6,7,8,9, 10	6
			Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Soil & Material Testing Lab	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

Tests on Cement as per IS code **9**

1. Determination of Fineness by Surface area (Blaine air Permeability apparatus / 90 micron sieve)
2. Determination of Specific gravity
3. Normal Consistency & Setting time
4. Test on Grade of Cement (Mortar Cube)

Tests on Aggregate as per IS code **9**

1. Specific gravity of Fine Aggregate and Coarse Aggregate
2. Water absorption test of Fine Aggregate and Coarse Aggregate
3. Grading analysis of Fine and Coarse Aggregates
4. Bulking of sand.
5. Bulk Density of Coarse Aggregate

Tests on cement concrete as per IS code **15**

1. Slump test
2. Compaction factor test
3. Compressive strength of Concrete cubes and Split Tensile test for cylinders.
4. Non destructive testing (Rebound hammer or Ultra sonic pulse velocity)

Tests on Road Materials as per MORTH Specifications **9**

1. Abrasion test on road aggregates by Los Angeles (Abrasion Testing Machine)
2. Impact test on road aggregates.

Tests on other Building Materials as per IS Code **6**

1. Water absorption test & Compression test on bricks or building blocks
2. Tensile test on steel

Tests on Soils as per IS code **18**

1. Grain Size analysis of soils
2. Atterberg limits a) Liquid limit b) Plastic limit c) Shrinkage limit

3. Tests on Moisture content of soil (Oven drying method)
4. Field Density of Soil By Core cutter
5. Standard Proctor Compaction Test on soil

*Test reports should be done for all experiments. Formats should be followed as per industries or IS codes, this should be integrated in the Graded exercise for each experiment.

Suggested activities

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Collect the information with proper justification for the fine aggregates used for different constructional activities such as foundation, plastering, concreting etc mentioning zonal classification.
2. Extraction of disturbed and undisturbed soil samples and finds field density.
3. Presentation on Strain gauges, strain indicators, extensometer.
4. Prepare and compare Soil classification chart as per IS and ASTM or 3 Phase system.
5. Writing and Collecting test report formats by consulting industry on various construction materials other than given experiments.
6. Collecting Specifications of various materials and correlate with standards.
7. Collecting and study of various IS codes regarding testing of materials.
8. Spread sheet of concrete mix design template
9. Collection of minimum compression strength values and water cement ratio of concrete used for different structural components from IS codes
10. Tests on grouting and its applications
11. Comparative study of M-sand with Natural sand
12. Tools and equipment with pictorial presentation chart
13. Finding unit weight of various diameters of HYSD and TMT steel and compare with theoretical calculations.
14. Model of plate load test.
15. Water absorption test on Fine and coarse aggregate.
16. Field tests on various building materials such as cement, sand, brick etc as per codes.
17. A study of local soils for rammed earth construction
18. Study of strenght and properties of eucalyptus as a truss material
19. Rammed earth wall
20. Role of geo synthetic in the improvement of strength of soil
21. Compressive strength characteristics of stacked stabilised soil cement blocks
22. Strength properties of bhalki soil
23. Stabilization of soft soils using industrial wastes
24. Study of strength parameters of silica fume concrete
25. Study on infiltration rate on different soils of your city/town/locality
26. Effect of ph on physical properties of fine-grained soils
27. A study of laterite particles in adsorption of oil and grease

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily

submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary**5**				
1.Organisation	3				
2.Fulfill team's roles & duties	4				
3.Conclusion	5				
4.Convensions	2				
Total	14				
Average=(Total /4)	14/4=3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video/ demonstration / Practices/ Site visits / Expert lectures.

Course Assessment and Evaluation Scheme

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Twice test (Average of twice tests)	10	Blue books	CO1,CO2
				Record	10	Graded exercise	CO1,CO2
				Task work	05	Task work reports	CO1,CO2
	SEE	End Exam		End of the course	50	Answer scripts at BTE	CO1,CO2
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	CO1 Delivery of course
	End of Course Survey			End of the course		Questionnaires	CO1,CO2 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student task work activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**25**
2	Applying the knowledge acquired from the course	**40**
3	Analysis	**20**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**5**

TEXT BOOKS

1. Timoshenko and Young, Strength of Materials - Vol II, Von Nastrand Company, New York
2. Laboratory Manual prepared by the Department
3. Shetty M.S, 'Concrete Technology S. Chand & Co. Ltd, New Delhi.
4. Mehta P.K, 'Properties of Concrete Tata McGraw Hill Publications, New Delhi
5. Reference Books:
6. Neville AM, 'Properties of Concrete ELBS Publications, London.
7. Relevant BIS codes.

REFERENCES

1. Concrete Technology By MS Shetty (S. Chand Publication 16 Edition)
2. IS Codes
   a) IS 8112:1989 -43 Grade OPC Specification
   b) IS-4031-PART-2
   c) IS 12269:1987 -53 Grade OPC Specification
   d) IS 1489(PART -I) :1991- Portland Pozzolona Cement Specification
   e) IS 383:1970 – Specification for Coarse & fine Aggregate for Concrete
   f) IS 456 :2000 – Pain & RCC Code of Practice
   g) IS 1786:1985 – Specification for HYSD Steel bars & wires for RCC
   h) IS 2185 PART-I:1979–Specification for Concrete masonry units Hollow & Solid Concrete Blocks
   i) IS 1077 :1992 – Common Burnt Clay Building Bricks Specifications
   j) IS 2720 Part III – Determination of water contents of Soil
   k) IS 2720 Part IV – Grain size analysis of Soil
   l) IS 2720 Part V– Determination of Liquid limits & Plastic Limits of Soil
3. Material Testing Lab Manual – Gambir.
4. Soil Testing Manual – HD Charan & KS Grover.
5. MORTH (Ministry Of Road Transport and Highways) Specifications

E-links

1. http://site.iugaza.edu.ps/mymousa/files/Material_-Testing-lab-manual.pdf
2. http://www.technicalsymposium.com/CIVIL_SEM5_CE2307LM.pdf
3. http://docslide.us/documents/som-bmt-lab-manual-final.html

SCHEME OF EXAMINATION

Material & Soil Testing Laboratory		
1	Writing Procedure for a Question	10
2	Conduction of a Experiment	10
3	Tabulation/Calculation	10
4	Result / Conclusion	5
5	Viva	5
6	Task work	5
7	Record	5
	Total	**50**

LIST OF EQUIPEMENTS AND APPARATUS

Sl.No	Name of Equipments and Apparatus	No
1	Blaine's permeability Apparatus	6
2	Density/specific Gravity Bottle	6
3	Vicat Apparatus with Accessories	6
4	Mortar cube Moulds 50mm2 (7.06x7.06)	6
5	Pycnometer	6
6	Sieve10, 4.75, 2.36, 1.18mm, 600,300,150micron with lid & Pan(Concrete Fine agg.)	2 sets
7	Measuring Jars of 1000, 500, 100, 10ml	3
8	Mechanical sieve Shaker for the above set of sieves	1
9	Sieve 80, 40, 20, 4.75 mm with Lid & Pan(Coarse Agg.)	2sets
10	Measuring Cylinder(metal) 15 l, 250mm dia and 300mm height	3
11	Mechanical sieve Shaker for the above set of sieves	1
12	Slump Cone with accessories	3
13	Compaction factor testing machine	3
14	Concrete cube moulds150x150x150mm	6
15	Concrete cylindrical moulds150mm dia, 300mm height	3
16	Compression Testing Machine of 200 tonne capacity	1
17	Universal Testing Machine of 40 tonne capacity	1
18	Sieve 125, 90, 63, 45, 22.4, 13.2, 11.2 mm with Lid & Pan(Road aggregate)	2sets
19	Mechanical sieve Shaker for the above set of sieves	1
20	Los angels abrasion testing machine with charges	1
21	Impact testing machine with 12.5mm & 10mm Sieve with lid & pan	1

Sl.No	Name of Equipments and Apparatus	No
22	Digital weighing Balance 12 kg capacity with minimum 1 gm accuracy	3
23	Hot air Oven	1
24	Steel containers	10
25	Core cutter with dolly	3
26	Standard proctor compaction apparatus	2
27	Atterberg limits apparatus	2
28	Sieve100,63,40,20,,10,4.75,2 ,1 mm &600,425,212,150,75 micron with lid & pan (Soil test)	2
29	Rebound hammer	1
30	Ultra sonic pulse velocity kit	1
31	Strain gauage with stand	2
32	Strain indicator	1

Model Question bank (Viva voce aid)

OBJECTIVE QUESTIONS ON COMPACTION FACTOR TEST ON CONCRETE

Q.1. Compaction factor test is used to measure

(a) water cement ratio

(b) workability

(c) compressive strength

(d) tensile strength

Q.2. Compaction factor test is used for

(a) dry mixes where slump test generally fails

(b) wet mixes where slump test generally fails

(c) both dry and wet mixes

(d) none of these

Q.3. In compaction factor(C.F.) test, the two top and middle hoppers are

(a) cylindrical

(b) hexagonal

(c) rectangular

(d) conical

Q.4. In compaction factor test, the bottom container is

(a) conical

(b) rectangular

(c) hexagonal

(d) cylindrical

Q.5. In compaction factor test, if the weight of concrete in bottom cylinder(without compaction) is w and that of after filling a similar concrete and compaction, is W, then

(a) C.F. = W/w

(b) C.F. = w/W

(c) C.F. = loge(W/w)

(d) C.F. = loge(w/W)

Q.6. C.F. for concreting of small sections with vibration should be

(a) 0.75 to 0.80

(b) 0.80 to 0.85

(c) 0.85 to 0.92

(d) greater than 0.92

Q.7. C.F. for concreting of lightly reinforced sections with vibration should be

(a) 0.75 to 0.80

(b) 0.80 to 0.85

(c) 0.85 to 0.92

(d) greater than 0.92

Q.8. C.F. for concreting of lightly reinforced sections without vibration should be

(a) 0.75 to 0.80

(b) 0.80 to 0.85

(c) 0.85 to 0.92

(d) greater than 0.92

Q.9. C.F for concreting of heavily reinforced sections without vibration should be

(a) 0.75 to 0.80

(b) 0.80 to 0.85

(c) 0.85 to 0.92

(d) greater than 0.92

Q.10. Slump for concreting of lightly reinforced sections without vibration should be

(a) 10 to 15 mm

(b) 15 to 25 mm

(c) 25 to 75 mm

(d) 75 to 125 mm

1. Define hardness
2. Which hardness tests and scales would you use for very thin strips of materials, such as aluminum foil?
3. Which one of the following materials has the highest hardness?
   (a) Aluminum, (b) diamond, (c) steel, (d) titanium
4. Hardness is the ability of a material to

   A. Return to the original shape after being bent.

   B. Resist penetration.

   C. Stand deformation (bending) without breakage.

   D. Stretch before breakage.

1. The ultimate strength of steel in tension in comparison to shear is in the ratio of
   a) 1:1
   b) 2:1
   c) 3:2
   d) 2:3
2. The formula to find double shear strength is_____
   a) Load/Area
   b) Load/2XArea
   c) Load X Area
   d) Load X (2*Area)
3. The machine in which the double shear test conducted is _____
4. The number of pieces in double shear test of a steel rod after failure is_____
   a) 1
   b) 2
   c) 3
   d) 4

5. The number of pieces in single shear test of a steel rod after failure is_____
   a) 1
   b) 2
   c) 3
   d) 4
6. Unit of shear strength is_____

Key Answers:
1) C
2) B
3) UTM/ Compression Testing Machine
4) C
5) B
6) N/mm^2

COMPRESSIVE STRENGTH OF CONCRETE

1) Define compressive strength?
2) Define compressive strength of concrete?
3) What is the meaning of "M" in Grade M20

1. A first class brick when immersed in cold water for 24 hours should not absorb water more than
a) 15%
b) 20%
c) 22%
d) 25%
Ans: b

2. Crushing strength of a first class brick should not be less than
a) 3.5 N/mm2
b) 7.0 N/mm2
c) 10.5 N/mm2
d) 14.0 N/mm2
Ans: c

3. The main function of alumina in brick earth is
a) To impart plasticity
b) To make the brick durable
c) To prevent shrinkage
d) To make the brick impermeable
Ans: a

4. The percentage of alumina in a good brick earth lies between
a) 5 to 10%
b) 20 to 30%
c) 50 to 60%
d) 70 to 80%
Ans: b

5. Excess of alumina in brick earth makes the brick
a) Impermeable
b) Brittle and weak
c) To lose cohesion
d) To crack and warp on drying
Ans: d

6. The nominal size of the modular brick is
a) 190 mm x 90mmx 80 mm
b) 190 mm x 190 mm x 90 mm
c) 200 mm x 100 mm x 100 mm
d) 200 mm x 200 mm x 100 mm
Ans: c

7. Percentage of silica in a good brick earth lies between
a) 5 to 10%
b) 20 to 30%
c) 50 to 60%
d) 70 to 80%
Ans: c

8. Excess of silica in brick earth results in
a) Cracking and warping of bricks
b) Loss of cohesion
c) Enhancing the impermeability of bricks
d) None of the above
Ans: b

9. Which of the following ingredients of the brick earth enables the brick to retain its shape ?
a) Alumina
b) Silica
c) Iron
d) Magnesia
Ans: b

10. Which of the following pairs gives a correct combination of the useful and harmful constituents respectively of a good brick earth ?
a) Lime stone and alumina
b) Silica and alkalies
c) Alumina and iron
d) alkalies and magnesium
Ans: b

11. The process of mixing clay, water and other ingredients to make brick is Known as
a) Kneading
b) moulding
c) pugging
d) Drying
Ans: a

12. Advantage of a clamp compared to a kiln for burning bricks is that
a) It takes less time for burning
b) It gives more output of first class bricks
c) It has less initial cost
d) It is suitable when bricks are required in large numbers
Ans: c

13. The internal size of mould used in brick preparation is
a) Equal to the size of a fully burnt brick
b) Smaller than the size of a fully burnt brick
c) greater than the size of a fully burnt brick
d) None of the above
Ans: c

14. Pug mill is used for
a) Preparation of clay
b) moulding of clay
c) Drying of bricks
d) Burning of bricks
Ans: a

15. Which of the following bricks are used for lining of furnaces?
a) overburnt bricks
b) unburnt bricks
c) Refractory bricks
d) First class bricks
Ans: c

16. The frog of the brick in brick masonry is generally kept on
a) Bottom face
b) Top face
c) Shorter side
d) Longer side
Ans: b

17. Number of bricks required for one cubic metre of brick masonry is
a) 400
b) 450
c) 500
d) 550
Ans: c

1. In the cement test Vicat needle is used to the determination of
   a) Initial & final setting time
   b) fineness
   c) normal consistency
   d) specific gravity

2. In Vicat test, the final setting is assumed when the attachment of the needle fails to make any impression on the mould but the needle
   a) Penetrates the sample by 5 mm
   b) makes just an impression on the sample
   c) does not penetrate the sample
   d) pierce the sample by 10 mm

3. Initial setting time of cement should not be less than
   a) 15 minutes
   b) 30 minutes
   c) 28 minutes
   d) 1 hour (IES 1992)

4. Final setting time of cement should not be more than
   a) 1 hour
   b) 2 hours

c) 5 hours
d) 10 hours

5. Which of the following pairs in respect of ordinary Portland cement are correctly matched?
   1.Initial setting time……30 min. 2. Final setting time…….10 hours 3. Normal consistency…..10% 4.Soundness of cement is tested by Vicat apparatus
   Select the correct answer using the codes given below
   a) 1 and 4
   b) 2 and 3
   c) 1 and 2
   d) 1 and 3

6. The ability of cement to maintain a constant volume is called
   a) flashing
   b) honeycombing
   c) soundness
   d) creep
7. Soundness test of cement is done to determine its
   a) durability in sea water
   b) free lime content
   c) iron oxide content
   d) alumina content

8. Soundness of cement is tested by
   a) Vicat apparatus
   b) Le Chatalier apparatus
   c) soundness meter
   d) Duff Abrams apparatus

9. In the soundness test, the whole assembly is immersed in water at a temperature of
   a) 19 ± 1^0C
   b) 27 ± 1^0C
   c) 37 ± 1^0C
   d) 47 ± 1^0C

10. In the soundness test, the whole assembly is immersed in water for
    a) 30 minutes
    b) 1 hour
    c) 24 hours
    d) 48 hours

11. In the cement the compound quickest to react with water, is
    a) Tri caicium aluminate
    b) Tetra- calcim alumino-ferrite
    c) Tricalcium silicate
    d) Di- calcim silicate

12. Ultimate strength to cement is provided by
    a) Tri caiciumsilicate
    b) Di- calcim silicate
    c) Tricalcium aluminate
    d) Tetra calcium alumino ferrite

13. In a motor, the building material is
    a) Cement
    b) Sand
    c) Surkhi
    d) Cinders

14. The difference between 53 grade cement and 43 grade cement is
    a) Fineness & Compressive strength
    b) Soundness
    c) Tensile strength
    d) Color

15. For normal consistency test of OPC the attachment kept of movable rod is
    a) **Plunger(10mm dia 50mm long)**
    b) Needle ($1mm^2$)
    c) Needle with annular ring
    d) Needle ($2mm^2$)
16. The component added to increase the initial setting time in OPC is
    a) Gypsum
    b) Alumina
    c) Calcium
    d) Manganese

1. The resistance of the material to failure by impact is termed as ……..
   A) Strength
   B) Toughness
   C) Hardness
   D) None of these
2. In case of impact test, the aggregate kept in the mould is subjected to ……. Blows
3. The height of fall in case of impact test is ……mm
   A) 380mm
   B) 420mm
   C) 308mm
   D) 300mm
4. What is the test sample used in case of impact test?
5. What is the difference between impact load and crushing load
6. Los Angeles test is used to test aggregates for its abrasion resistance. (**True/False**)
7. List the test conducted to find the aggregate abrasion value
8. In case of aggregate crushing value the compression load is applied at the rate of ……. Tones/min.
   A) 40T/min
   B) 4T/min
   C) 400T/min
   D) 0.4T/min
9. Match the following
   A) 10% fineness test — shock
   B) Aggregate impact test — crushing
   C) Los Angeles test — abrasion

FINE AGGREGATE

1. The ability of aggregate to resist excessive changes in volume is referred as ……..
2. Define specific gravity
3. Differentiate between coarse aggregate and fine aggregate
4. Match the following
   A) Specific gravity — Oven drying method
   B) Moisture content — Sieve analysis
   C) Fineness modulus — Pyconometer
5. What is necessity of conducting Sieve Analysis in case of fine aggregate?
6. The aggregate fraction from 80mm to 4.75mm are termed as ……..
   A) Coarse aggregate
   B) Fine aggregate
   C) All-in aggregate
   D) Graded aggregate
7. For testing specific gravity, the sample should be dried to a constant mass at ……. ^{o}C
8. Differentiate between absolute specific gravity and apparent specific gravity.
9. Strength of quality of concrete depends on
   A) Aggregate shape
   B) Aggregate grading
   C) Surface area of the aggregate
   D) All of these
10. Maximum size of fine aggregate should not exceed 4.75mm (**True/False**)
11. Bulking of aggregate is due to …….
    A) Moisture content
    B) Absorbed water
    C) Voids
    D) Less compaction
12. If angularity number of a aggregate is increased when workability of concrete will ……
    A) Increase
    B) Decrease
    C) No change
    D) None of these

13. In concrete the fine Aggregate is used to fill up the voids in ……..
    A) Cement
    B) Coarse aggregate
    C) Sand
    D) None of these
14. According to IS 460-1962 sieve size varies from ……..
    A) 160mm to 25 µ
    B) 120mm to 50 µ
    C) 80mm to 75 µ
    D) None of these
15. Match the following
    A) Coarse aggregate

       passes through 4.75mm
    B) Fine aggregate

       retained on 4.75mm
    C) Dividing line between FA and CA

       4.75mm
16. Combination of Fine aggregate and Coarse aggregate is called …….
    A) Single sized aggregate
    B) Graded aggregate
    C) All-in aggregate
    D) All the above
17. Fineness modulus of fine aggregate is in the range of ……..
    A) 2-3.5
    B) 3.5-5
    C) 5-7
    D) 5-8.5
18. What is meant by fineness modulus?
19. If fineness modulus is 6.2, what does it indicate?
20. The nature of graph in fineness modulus is …… cuve.

1. The Minimum size of coarse aggregate is --------
2. The sieve analysis graph consists of % of ------- on Y axis and sieve size in log value x axis

a)passing b) retained c) cumulative passing d) cumulative retained

3. The size of coarse and fine aggregate is differentiated by
   a) >4.75 b)<4.75 c)=4.75 d) none of the above

4. The unit of fineness modulus is ------

5. The fineness modulus of fine aggregsate is 2.51, it can be graded as
   a) fine sand b) Medium sand c) Very fine sand d) coarse sand

6. The inert ingredient of a concrete mix is --------

7. Workability of concrete can be increased by
   a) increase in maximum size of aggregate b) decrease in temperature c) use of round aggregate which has smooth surface texture d) all of the above

8. The maximum nominal size of the coarse aggreagate is determined by sieve analysis and is designated by the sieve size hiher than the largest size on the the material retained is more than
   a) 5% b) 15% c) 25% d) 50%

9. Sieve analysis of coarse aggregate is done as per IS code-------

10. 150micron sieve size is equal to ----------mm

Answers:

1. 4.75 2. c) 3.c) 4.no unit 5.a) 6. Aggregate 7. d) 8. d)

9. 2386 (Part I) – 1963 10. 0.150

Objective type questions:

1. Increase volume of sand due to the pressure of surface moisture is called ----------

2. Bulking of sand is expressed in ----------
3. The bulking will be greater when the sand is
   a) Finer b) coarser) c)medium
4. Whether the following statement is true or false:
   The maximum volume is reached when all sand particles have their surface completely covered and pore spaces filled with water
5. Whether the following statement is true or false:
   The texure, surface tension and capillarity will affect the bulking of sand
6. Specify the Is code which gives the bulking characteristics of sand -------
7. When the sand is completely saturated with water , the volume in terms of dry sand can be taken
   a) Equal b) more c) less d) none of these
8. Differentiate fine and coarse sand by sieve size
   a) 4.25 b) 4.5 c) 4.75 d) 2.36
9. Bulking of sand is due to
   a) Viscosity b) air voids c) surface moisture d)porosity

10. The preferable measurement of sand is ---------batching

Answers:

1. Bulking of sand
2. 2. Percentage
3. 3. a)
4. 4. True
5. 5. True
6. 2386 (part III)-1963
7. a)
8. b)
9. c)
10. Weigh

1. Strength and quality of concrete depends on
   a. Aggregate shape
   b. aggregate grading
   c. Surface area of aggregate
   d. all of these
2. What is the normal range of absorption capacity of the coarse aggregate by weight of aggregate
   a) 0.2 to 0.5%
   b) b) 0.5 to 1%
   c) c) 1 t0 2%
   d) d) 2 to 3%
3. Say true or false for the following statement
   The absorption value not varies with aggregate derived from the sand, stone and other soft sand
4. In mix design calculation , the relative weight of the aggregates are based on the condition that the aggregate are
   a) Saturated and surface dry
   b) b) Saturated and surface moisture

   c) surface dry

   d) surface moisture
5. The coarse aggregate sample is immersed in water for------ hrs
6. Whether the following statement is true or false:

The sample for water absorption test on coarse aggregate is washed to remove the fine particles and dust

7. The unit of water absorption of coarse aggregate is expressed in-------

8. The water absorption test is conducted as per I.S code------

9. Say true or false for the following statement

Indian Road congress has specified the maximum water absorption value as

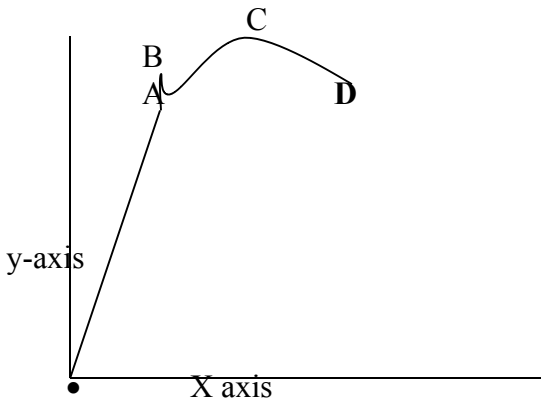
1.0 percent for aggregates used in bituminous surface dressing

10. Separation of ingredients from concrete during transportation is called
    a) Bleeding b) creep c) Segregation d) Shrinkage

Answers:

1. d)
2. 2. b)
3. 3. False
4. 4. a)
5. 5. 24
6. 6. True
7. 7. %
8. IS: 2386 (Part III) – 1963
9. True
10. c)

1. Define stress?
2. Define strain?
3. Define hooks law?
4. Ratio of stress and strain within elastic limits is called_____?
5. Expand UTM & CTM?
6. Difference between mild steel and HYSD bars ?
7. Define Elasticity, Plasticity, Mealibilty, Ductility, Brittle?
8. Mode of failure for Mild steel?
9. What is necking?
10. IS code for tension test?
11. What is the units of stress?
12. What is the unit of young's modulus?
13. What is the unit of strain?
14. Young's modulus of mild steel is - _____?
15. Define modulus of elasticity?
16. Define yield stress, proof stress, ultimate stress, breaking stress,?
17. Define percentage elongation, percentage reduction of area?
18. Draw the Typical stress-strain curve for mild steel?
19. Identify the Important parameter located in the graph



20. What is extensometer?
21. Difference between lateral strain and linear strain?

BULK DENSITY OF COARSE AGGREGATE

1. Define Bulk Density?
2. Bulk density of aggregate depends on _____
   a) Specific gravity b) water content c) compressive strength d) voids
3. Unit of Bulk density _____
4. Define percentage of voids
5. IS code specified for the test of bulking of aggregate is_____

6. Where and Why Bulk density of aggregate is required in field application.
7. Define grading of aggregate
8. Define well graded aggregate
9. Define uniform graded aggregate
10. What is the significance of bulk density on concrete
11. Difference between bulk density and Density
12. Difference between bulk density and relative density
13.

SPECIFIC GRAVITY OF CEMENT

1. Specific gravity of the cement is tested with_____ a)water b)kerosene c) acid d) base
2. Specific gravity of OPC ranges from_____
3. Ratio of weight of the material to its weight of equal volume of water is called _____
4. Relationship between specific gravity and density?
5. Specificgravity of water is _____?
6. If specific gravity of cement is 3.15 then what is the specific gravity of cement taken on the moon _____?
7. Relation between specific gravity and specific weight?
8. Match the following

a.	Cement	2.1 to 2.35
b.	CA	1.91 to 2.41
c.	FA	2.5 to 2.85
d.	Fly ash	3.15to 3.36
		4.5 to 5

9. Specific gravity of cement is is found as per code _____
10. Important parameter for designing heterogeneous material is _____
11. Unit of specifc gravity is_____ a)Gram b)Kg/cm c)meter d) no unit
12. Why water is not used in finding specific gravity of cement?
13. Which constituent of cement react first with addition of water?
14. How do you determine specific gravity of cement?

Specific gravity of coarse aggregates

1. Average specific gravity of the rocks vary from,
   a) <u>2.6 to 2.8</u>
   b) 2.8 to 3.0
   c) 3.0 to 3.2
   d) 3.2 to 3.4
2. Specific gravity of Coarse Aggregate is made use of in design calculation of _____
   a) Concrete Mix Design
   b) Volume Determination
   c) Weight Determination
   d) <u>All of the above</u>
3. Apparatus used find out Specific Gravity of Coarse Aggregate
   a) Pycnometer
   c) Specific Gravity Bottle
   b) Density Bottle
   d)**<u>Wire Basket</u>**
4. Specific Gravity is an indicator of
   a) <u>How heavy a material is.</u>
   b) How lighter a material is
   c) How porous a material is
   d) How stronger material is
5. Specific gravity is the ratio of _____
6. Specific Gravity of aggregates ranges from
   a) 3.0 to 3.5 b) **<u>2.5 to 3.0</u>**
   b) 3.15 to 3.65 d) 2.0 to 2.5
7. Water Absorption of aggregates ranges from
   a) 0.5% to 1.6%
   b) 0.8% to 1.8%
   c) <u>0.1% to 2.0%</u>
   d) 1.0% to 3.0%
8. To what temperature the aggregates are kept in oven in case of Sp. Gravity test.
   a) 120^0C
   b) <u>110^0C</u>
   c) 95^0C
   d) 100^0C

9. For how much time the aggregates are kept in oven in case of Sp. Gravity test.
   e) 12hrs
   f) <u>24hrs</u>
   g) 18hrs
   h) 3hrs
10. Size of Wire Basket mesh should not exceed.
    a) 4.75mm c) 10mm
    b) **6.3mm** d) 2.36mm

Flakiness and Elongation Index

1. Apparatus used to perform flakiness test is?
   a) Length Gauge
   b) Thickness Gauge
   c) Meter Gauge
   d) Screw Gauge
2. Apparatus used to perform elongation test is?
   a) Meter Gauge
   b) Length Gauge
   c) Thickness Gauge
   d) Screw Gauge
3. Flakiness and Elongation test is not applicable to sizes,
   a) Smaller than 6.3mm
   b) Smaller than 10mm
   c) Smaller than 12.5mm
   d) Smaller than 4.75mm
4. Flaky and Elongated Particles are considered undesirable in pavement construction.
   a) True
   b) False
5. The flakiness index of the aggregates is the percentage by weight of particle whose least dimension is less than _____
   a) $2/5^{th}$ of their mean dimension
   b) $1/5^{th}$ of their mean dimension
   c) $4/5^{th}$ of their mean dimension
   d) $3/5^{th}$ of their mean dimension
6. The Elongation index of the aggregates is the percentage by weight of particle whose greatest dimension is greater than _____
   a) $1\frac{2}{5}$ of their mean dimension
   b) $2\frac{2}{5}$ of their mean dimension
   c) $1\frac{4}{5}$ of their mean dimension
   d) $2\frac{4}{5}$ of their mean dimension
7. The percentage by weight of particle whose least dimension is less than $3/5^{th}$ of their mean dimension is called as_____
   a) Angularity Number c)elongation index
   b) **flakiness index** d)none of the above
8. The percentage by weight of particle whose greatest dimension is greater than $1\frac{4}{5}^{th}$ of their mean dimension is called as_____
   a) Angularity Number
   b) **elongation index**
   c) flakiness index
   d) none of the above
9. Flakiness index is the percentage by weight of particles _____
   a) **Passed** c)Retained
   b) Neither a nor b d)none of the above
10. Elongation index is the percentage by weight of particles _____
    a) Passed **c)Retained**
    b) Neither a nor b d)none of the above
11. Flakiness and Elongation tests are categorized under_____
    a) Size Test c) Strength test
    b) **Shape Test** d) Durability test
12. Flakiness and Elongation is described under which IS Code:
    a) IS 2386 part-I
    b) IS 2386 part-II
    c) IS 2386 part-III
    d) IS 2386 part-IV

13 Aperture size of the smallest sieve used in Flakiness and Elongation test
   a) 6.3mm IS Sieve
   b) 4.75mm IS Sieve
   c) 2.36mm IS Sieve
   d) 1.18mm IS sieve
14 Aperture size of the Largest sieve used in Flakiness and Elongation test
   a) 80mm IS Sieve
   b) 70mm IS Sieve
   c) 63mm IS Sieve
   d) 50mm IS sieve
15 The particle shapes are determined by_____
   a) Sieve Analysis
   b) Flakiness and Angularity
   c) Elongation and Angularity
   d) Both b and c

1. In what way the values of impact energy will be influenced if the impact tests are conducted on two specimens, one having smooth surface and the other having scratches on the surface?
2. What is the effect of temp? On the values of rupture energy and notch impact strength?
3. What is resilience? How is it different from proof resilience and toughness?
4. What is the necessity of making a notch in impact test specimen?
5. If the sharpness of V-notch is more in one specimen than the other, what will be its effect on the test result?

1. The slump test is used to measure_____
2. What is the slump value of concrete for road work
   a) 20 to 30
   b)50 to 100
   c) 75 to 150
   d)12 to 25

3. What is the slump value of ordinary RCC work for beams and slabs

   a) 20 to 30
   b) 50 to 100
   c) 75 to 150 d) 12 to 25

4. Increase in slump may indicate

   a) Increase in moisture content of aggregate
   b) Change in grading of aggregate
   c) Both a and b

   d) None of the above

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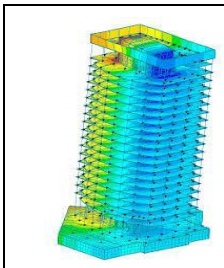

Course Title: **COMPUTER AIDED BUILDING PLANNING AND DRAWING**		
Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE46P**
Type of Course: **Practical**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 50 Marks

Pre-requisites: Knowledge of drafting software and Building Planning and Drawing.

Course Objective: Students are expected to prepare building plans, 3D drawings of buildings and to know the latest techniques in drafting software.

At the end of the course, the students will be able to

Course Outcome		Experiments linked	CL	Linked PO	Teaching Hrs
CO1	Develop any type of building drawing using CADD software.	1,2,3 ,4,5,6,7	R/Ap/C	1,2,3,4, 5,8,9	40
CO2	Create layout plan, sanction drawings, working drawings using concept of layers.	8,9,10, 11,12,13	R/Ap/C	1,2,3,4, 5,6,8,9	20
CO3	Develop 3D model of building.	14,15	R/Ap/C	1,3,4, 8,9,10	15
CO4	Explore modern drafting tools in teams and prepare a report and able to present it	16	R/ Ap/Ay/C/E	1,2,3,4,6, 8,9,10	**03**
				Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

Course	Programme Outcome									
	PO1	**PO2**	**PO3**	**PO4**	**PO 5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
	Basic knowledge	Discipline knowledge	Experiments and	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Computer Aided Building Planning And Drawing	3	3	3	3	3	2	-	3	3	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT:

UNIT	EXERCISES		HOURS
1	**Preparation of Building Drawings**		40
	Given the line diagram, draw the plan, Section and elevation of the following types of buildings.		
	Experiment 1	Residential Building with Dog Legged Stairs	
	Experiment 2	Two storied residential building.	
	Experiment 3	Primary School	
	Experiment 4	Hostel Building.	
	Experiment 5	Primary Health Centre	
	Experiment 6	Small work shop building / Canteen Building / Bus station	
	Experiment 7	Post office Building/Bank Building.	
2	**Preparation of working / Service Drawings**		20
	Preparation of service drawing for a same given residential building as layers.		
	Experiment 8	Introduction to layers Prepare Water supply layout & Sanitary Layout	
	Experiment 9	Shallow well rain water harvesting &Solar water heater for terrace	
	Experiment 10	Fire fighting layout for college building/commercial building	
	Experiment 11	Preparation of a foundation Plan for residential building & framed structures.	
	Experiment 12	Preparation of detailed plan and section of a Dog legged Stair case.	
	Experiment 13	Preparation of Plan and Section of a Manhole and Septic tank with soak pit	
3	**Develop 3D Modelling of Buildings**		15
	Experiment 14	Develop 3D model of a stair case.	
	Experiment 15	Develop 3D model of a Residential Building / Public building from the given line diagram.	

UNIT	EXERCISES		HOURS
4	Experiment 16	**Suggested activities**	3
Total			**78**

Course Delivery: The course will be delivered through lectures and Demonstration and CAD practices**.**

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill, lifelong learning, communication and modern tool usage.

1. Visit any nearby public building and Draw a Layout Plan (Key plan) with building plan.
    a. PWD office
    b. Forest office
    c. Bank
    d. Post Office
    e. Hospital
    f. Police station
    g. Bus Stand
2. Prepare a foundation plan (Excavation Plan) for a multistoried building.
3. Search for ongoing layout plan collect the information of area distribution, building plans, Service drawings (water supply, sanitary, electrical and landscaping).
4. Space design of a Primary health centre using Circulation Diagram (Bubble diagram).
5. Space design of an Educational Building using Circulation Diagram (Bubble diagram).
6. Create an awareness program on rain water harvesting among your locality.
7. Choose a multistoried building and prepare a fire fighting layout.
8. Create a 3D building model by using any two software mentioned below and compare the utilities and limitations.
    a. Revit
    b. Google sketch up
    c. ArchiCAD
    d. 3DSMAX
    e. Blender
    f. QCAD
    g. Pythoncad
    h. CADEMIA

i. ZWCAD
j. SKETCHBOARD
k. Sweethome 3D
l. ProgeCAD Smart!
m. Sculptris

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	1				
2.Fulfill team's roles	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Twice test (average of two tests)	Test 1	10	Blue books	CO1
					Test 2			CO2,CO3
				Record		10	CADD exercises	CO1,CO2,CO3
				Suggested Activity		05	Reports/Drawings	CO1,CO2,CO3,CO4
	SEE	End Exam		End of the course		50	Answer scripts at BTE	CO1,CO2,CO3,CO4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		---	Feedback forms	CO1,CO2 Delivery of course
	End of Course Survey			End of the course		---	Questionnaires	CO1,CO2,CO3,CO4 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**15**
2	Applying the knowledge acquired from the course	**35**
3	Analysis	**5**
4	Synthesis (Creating new knowledge)	**40**
5	Evaluation	**5**

Sl No	Scheme of End Examination	Marks
1	Record & report on suggested activities	10
2	Preparation of Building drawings/3D drawings/ Preparation of Service or Working Drawings	30
3	Print out	5
4	Viva-voce	5
	Total	50

TEXT BOOKS

1. CAD in Civil Engineering a Laboratory Referrel- Dr M.A.Jayaram, D.S.Rajendra Prasad, Sapna Book House
2. Building Drawing – Shah M G, Tata McGraw – Hill, 1992.
3. Building Planning & Drawing – Kumaraswamy N., Kameswara Rao A., Charotar Publishing
4. Shah, Kale and Patki, Building Drawing with integrated approach to environment, Tata McGraw – Hill, 1992
5. Civil Engg. Drawing and House Planning – Verma B. P., Khanna Publishers, Delhi
6. Building Drawing & Detailing – Balagopal & T.S. Prabhu, Spades Publishers, Calicut
7. Building Planning and Drawing – S.S .Bhavikatti & M.V Chitawadagi, I.K International Publishing House Pvt.Ltd
8. National Building Code, BIS, New Delhi.

E-links

1. www.sketchup.com
2. www.autodesk.in/products/3ds-max/overview

Equipment List:

1. Computers with Latest Configuration. (One Computer per student in practical session.)
2. Any latest licensed Computer Aided Drafting Software.
3. Plotter of size A0
4. LCD Projector
5. UPS 5KVA
6. Furniture

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

COURSE TITLE: HYDRAULICS AND ENVIRONMENTAL LAB		
Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code :15CE47P
Type of Course Delivery: **Tutorial and Practice**	**Credit :03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 50 Marks

Prerequisites: Basic knowledge of science and water supply engineering**.**

Course Objectives:

1. Exposure to the principles of Hydraulics in flow measurements.
2. Ability to critically observe/ examine and Measure the discharges through flow measuring devices.
3. Ability to critically examine the quality of water as per IS code of Practice.

Course Outcomes: (CO's)

On successful completion of this course, the student will be able to:

Course Outcome		CL	Linked experiments	Linked PO	Teaching Hrs
CO1	Apply Bernoulli's equations in flow experiments to determine the coefficient of discharge.	***U/A***	1,2,3,4,5	1,2,3,4,5,6 ,8,10	**03**
CO1	Determine hydraulic coefficients of notches and orifices	***U/A***	1,2,3,4,5	1,2,3,4,5,6 ,8,10	**06**
CO3	Determine flow rates, pressure changes, and major head losses for viscous flows through pipes.	***U/A***	5,6	1,2,3,4,5,6 ,8,10	**06**
CO4	Assess physical characteristics of water as per BIS code of practice.	***U/A***	7,8,9,10	1,2,3,4,5,6 ,8,9,10	**03**
C05	Assess chemical characteristics of water as per BIS code of practice.	***U/A***	10,11,12,13, 14,15,16	1,2,3,4,5,6 ,8,9,10	**48**
CO6	Apply techniques, skills developed for sustainable engineering solutions in environmental and societal context.	***U/A***	18	1,2,3,4,5,6 ,8,9,10	**12**
				Total sessions	**78**

COURSE-PO ATTAINMENT MATRIX

Mapping of COs with POs	PROGRAMME OUTCOME (PO)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic Knowledge	Discipline Knowledge	Experiments & practic	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Lifelong learning
Hydraulics and environmental lab	3	3	3	3	3	3	-	3	2	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNITS		HOURS
	Hydraulics Lab	
1	Determination of Coefficient of discharge for Rectangular Notch	3
2	Determination of Coefficient of discharge for Triangular Notch	3
3	Determination of Co-efficient of discharge for Trapezoidal Notch	3
4	Determination of Coefficient of discharge for Venturimeter.	3
5	Determination of Coefficient of discharge, Coefficient of contraction, and Coefficient of velocity for Circular Orifice.	3
6	Determination of Loss of Head due to Friction in Pipe line of different diameters.	3
	Water Analysis Lab	
7	Collection of Water Samples- Surface, Running and Ground water samples.	6
8	Determination of Turbidity of Water by Jackson turbidity meter / Nephelo Turbidity meter	6
9	Determination of Color of Water.	3
10	Determination of Total solids, Suspended Solids and Dissolved solids of water.	6
11	Determination of hardness- total hardness, Calcium and Magnesium Hardness, Permanent Hardness.	6
12	Determination of pH Value (pH meter method & pH paper) of water sample.	3
13	Determination of Alkalinity & acidity of water sample.	6
14	Determination of Chlorides of water sample.	3
15	Determination of Nitrates of water sample.	3
16	Determination of Calcium of water sample.	3
17	Tests	6
18	Field Visits to water treatment plant and sewerage treatment plant and preparation of Report and Presentation.	9
Total		**78**

TEXT BOOKS & REFERENCES:

1. Hydraulic Lab Manual Compiled – T.T.T.I. – Chennai – 113.
2. Ghosh and Talapohia– Experimental Hydraulic –Khanna Publishers –New Delhi
3. Central Public Health EnggOrganisation(CPHEO) water supply Manual
4. National environmental engineering Institute (NEERI) water supply manual
5. Water supply engineering by-Birdie
6. Water supply and sewage disposal by – S.K.Garg.
7. Water supply and sanitary engg. By –Rangawala.

SUGGESTED LIST OF STUDENT ACTIVITIES

Note: Following is the list of proposed student activities such as (5 marks for CIE)
Each student should submit Field visit report on any one of the following visits.

Sl No.	*Student Activity*
1	Visit to Water Treatment Plant
2	Visit to Sewerage Treatment Plant
3	Visit to a HOUSING Colony and Study of Water Supply and Sewerage System
4	Prepare/Download a dynamic animation to illustrate the following: • Working principle of hydraulic pumps. • Working of different types of hydraulic devices (applications). • Download the catalogue of Hydraulic devices. • Arrange visit to nearby Hydraulic equipment based industries.
5	Prepare reagents for conducting graded exercises.

Course Delivery:

The course will be delivered through lectures, Demonstration and practices.

Course Assessment and Evaluation Scheme:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	**CIE (Continuous Internal Evaluation)**	I A Tests	Students	Two IA tests for Theory: (Average marks of Two Tests to be computed).	10	Blue Books	ALL CO's
		Graded Exercise Practice			10	Records	ALL CO's
		Field Visit/Student Activity		Field Visit/Student Activity	05	Log of Activity/Report on field visit	ALL CO's
				TOTAL	**25**		

	SEE (Semester End Examination	End Exam	Students	End Of the Course	50	Answer Scripts at BTE	ALL CO's
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feed Back Forms		All Cos Delivery of course
	End Of Course Survey			End Of The Course	Questionnaires		All Cos Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's Category	% in Weightage
1	Remembering and Understanding	**30**
2	Applying the knowledge acquired from the course	**55**
3	Analysis	**07**
4	Evaluation	**55**
5	Creating new knowledge	**03**

Scheme of Valuation:

Sl no	Particulars	Marks
Hydraulics lab		
1	Writing Procedure /Formulae and Tabular column	05
2	Conduction of Experiment	15
Water Analysis Lab		
3	Writing Procedure /Formulae and Tabular column	05
4	Conduction of Experiment	15
5	Calculation and Result	05
6	Graded exercise + Suggested activity report	05
	Total Marks	50

List of equipments for Hydraulics lab:

1. Venturimeter with accessories.
2. Flow through notches apparatus with all accessories.
3. Flow through pipes (friction) apparatus with all accessories.

4. Piezometer with scale and tube.
5. Differential manometer set.
6. Orifice apparatus.

List of equipments for Water Analysis lab:

1. Spectrophotometer/colorimeter
2. Hot air Oven
3. Hot plate
4. Digital TDS meter for suspended solids
5. Electronic digital balance (1mg accuracy)
7. Digital turbidity meter
8. Digital PH meter
9. Water bath double walled
10. Porcelain dish
11. Dessiciator with accessories-2 lts capacity
12.Jackson turbidimeter
13.Nephelometer
14. Crucible, Burettes.
15. BOD bottles -250 ml
16. COD-Reflux apparatus
17. Volumetric flask 100ml.250ml,500ml
18. Reagent bottle-250 ml
19. Distillation kit
20. Beaker 100ml,250ml,500ml,1000ml
21. Funnel, Pipettes 5ml & 10ml(graduated)
22. Imhoff cone.

KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.													
TEACHING AND EXAMINATION SCHEME FOR KANNADA COURSE IN DIPLOMA PROGRAME													
SEMESTER: III			COMMON TO ALL DIPLOMA PROGRAMMES										C-15 Curriculum
SL.N0	COURSE NAME	Teaching Department	COURSE /QP CODE	Teaching scheme Contact hours					Examination scheme				
				TH	TU	PR	TOTAL	Credit	Exam paper duration in Hrs	End exam Max marks	End exam Min marks	Maximum CIE Marks (IA+SA)	Minimum Marks for passing. (IA + SA)
	THEORY												
1	KANNADA KALI-1	KA	15KA3NT	2	-	-	2	2	-	-	-	50	20
2	TANTRIKA KANNADA -1	KA	15KA3KT	2	-	-	2	2	-	-	-	50	20

CIE- Continuous Internal Examination: SEE-Semester End Examination: IA-Internal Assessment Tests: SA- Student Activity.

Note: 1. Candidates studied Kannada as one subject in 10th standard shall take Tantrika Kannada 1 &2. Others may take "Kannada Kali-1&2".

2. In 3rd Semester- Assessment is only by CIE and no SEE. Average marks of three I A tests shall be rounded off to the next higher digit. Rubrics to be devised appropriately to assess student activity.

KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.													
TEACHING AND EXAMINATION SCHEME FOR KANNADA COURSE IN DIPLOMA PROGRAME													
SEMESTER: IV			COMMON TO ALL DIPLOMA PROGRAMMES										C-15 Curriculum
SL.N0	COURSE NAME	Teaching Department	COURSE /QP CODE	Teaching scheme Contact hours					Examination scheme				
				TH	TU	PR	TOTAL	Credit	Exam paper duration in Hrs	Sem End Exam Max Exam Marks	Sem End Exam Min Passing Marks	Maximum CIE Marks (IA+SA)	Minimum Marks for passing. (IA + SA)
	THEORY												
1	KANNADA KALI-2	KA	15KA4NT	2	-	-	2	2	2	50	20	-	-
2	TANTRIKA KANNADA -2	KA	15KA4KT	2	-	-	2	2	2	50	20	-	-

CIE- Continuous Internal Examination: SEE-Semester End Examination: IA-Internal Assessment Tests: SA- Student Activity.

Note: In 4th Semester- Assessment is only by SEE and no CIE. To award diploma certificate, passing in Kannada course is mandatory. However Kannada course is not included in the eligibility criteria for promotion to the higher semester.

4ನೇ ಸೆಮಿಸ್ಟರ್–ಕನ್ನಡ ಕಲಿ–2 (ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಪರಿಚಯ)

4th Semester	**Course: Kannada Kali-2**	**Course Code:15KA4NT** (2016-17)
	No. of Credits:02	**No. of teaching hours/week:02** No. of teaching hours/Semester:26
	Mode of Assessment and Evaluation: Semester End Examination (SEE)only. No CIE.	**Maximum Marks: 50 (SEE only) Minimum Passing marks:20**

ಉದ್ದೇಶ:

1. ಕೇಳುವುದು, ಗ್ರಹಿಸುವುದು, ನಿರರ್ಗಳವಾಗಿ ಮತ್ತು ಸ್ಪಷ್ಟವಾಗಿ ಓದುವ ಮತ್ತು ಮಾತನಾಡುವ (ಅಭಿವ್ಯಕ್ತಿಸುವ) ಸಾಮರ್ಥ್ಯವನ್ನು ಬೆಳೆಸುವುದು.
2. ಜ್ಞಾನಾರ್ಜನೆ, ಸಾಹಿತ್ಯಾಭಿರುಚಿ, ಚಿಂತನೆ ಮತ್ತು ಆನಂದಕ್ಕಾಗಿ ಸ್ವತಂತ್ರವಾಗಿ ಓದಲು, ಬರೆಯಲು ಮತ್ತು ಮಾತನಾಡಲು ಸಮರ್ಥರಾಗುವಂತೆ ಮಾಡುವುದು.
3. ಪದ ಸಂಪತ್ತನ್ನು ಹೆಚ್ಚಿಸಿಕೊಂಡು ಸ್ಪಷ್ಟ ಉಚ್ಚಾರಣೆಯೊಡನೆ ಲಿಖಿತ ಮತ್ತು ಮೌಖಿಕ ಚಟುವಟಿಕೆಗಳನ್ನು ಮಾಡಿಸಿ, ಸ್ವತಂತ್ರವಾಗಿ ಭಾಷೆಯ ಬಳಕೆ ಮಾಡುವುದು.
4. ನಾಡು–ನುಡಿ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ಸಾಹಿತ್ಯಗಳ ಪರಿಚಯ ಮತ್ತು ಆತ್ಮೀಯ ಭಾವಾಭಿಮಾನವನ್ನು ಬೆಳೆಸುವುದು.
5. ಕ್ರಿಯಾತ್ಮಕ ಚಟುವಟಿಕೆಗಳಿಂದ ಭಾಷಾ ಕೌಶಲ್ಯದ ಸರಳ ಪ್ರಯೋಗ ಮಾಡಿಸುವುದು./ಕಲಿಸುವುದು.
   (ಕ್ರಿಯಾತ್ಮಕ ಚಟುವಟಿಕೆ ಎಂದರೆ, ವರ್ಣಮಾಲೆ ಪರಿಚಯ, ವ್ಯಾಕರಣದ ಸರಳ ಪರಿಚಯ, ಗುಣಿತಾಕ್ಷರ, ಸಂಯುಕ್ತಾಕ್ಷರಗಳು, ನಾಮಪದ, ಲಿಂಗ, ವಚನ, ಪ್ರತ್ಯಯಗಳು, ವಾಕ್ಯರಚನೆ (ಕರ್ತೃ, ಕರ್ಮ, ಕ್ರಿಯಾಪದ) ಇತ್ಯಾದಿ).

Course outcome:

1. Developing listening and speaking skills.
2. Easy Interaction with peers.
3. Students can use the language at ease in daily life situations

ಪಠ್ಯಕ್ರಮ ಮತ್ತು ಸರಳ ಭಾಷಾ ಕೌಶಲ್ಯ

(ಕನ್ನಡ ಕಲಿ–ಪಠ್ಯಪುಸ್ತಕ –ಶ್ರೀ ಲಿಂಗದೇವರು ಹಳೇಮನೆ – ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ ಪ್ರಕಾಶನ)

ಭಾಗ–2

ಪಾಠಗಳ ಕ್ರಮಾಂಕ Lesson No	ಪಠ್ಯವಸ್ತುವಿನ ವಿವರ – Curriculum Content	ಸೆಮಿಸ್ಟರ್ ಬೋಧನ ಅವಧಿ Total no.of Classes /Sem
Part-I		
11	Plan to go for a movie. Comparative, non-past tense, instrumental and ablative case	02
12	Conversation between Doctor & Patient. Potential forms, accusative case.	02
13	Enquiring about friend's family	02

	Past tense –d, and –t- and –id-, negation.	
14	Conversation between friends – Past tense –k – T – D and –id-v negation verbal noun	02
15	Routine activities of a Student.	01
16	About children's education. Continuous, Perfect tenses and negations.	02
17	Halebidu - Belur Relative participle, negation and Participle nouns.	02
18	Discussing about Examination and future plan-conditional and negative conditions.	03
19	Karnataka (Lesson for reading)(reading skill)	03
20	bEku bEDagaLu (Lesson for reading (Reading skill)	03
Part-II	Kannada Scripts	03
	ECA-word/sentence formation/letter/small essay writing	01
	ಒಟ್ಟು ಗಂಟೆಗಳು	**26**

ಸೂಚನೆಗಳು:

- ಮೇಲಿನ ಪಾಠಗಳ ಪುನರಾವರ್ತಿತ ಭಾಗಗಳಿಗೆ ಬದಲಾಗಿ **"ಕ್ರಿಯಾತ್ಮಕ ಚಟುವಟಿಕೆ"**ಯಿಂದ ಗಳಿಸುವ ಅಕ್ಷರ ಜ್ಞಾನ ದಿಂದ ಪದ ಸಂಪತ್ತು ಹೆಚ್ಚಿಸಿ, ಪದಗಳಿಂದ ಸ್ವಂತ ವಾಕ್ಯಗಳ ರಚನೆ ಮಾಡಿಸುವುದು. (ಅಮ್ಮ, ಮೊಬೈಲ್, ಕನ್ನಡ ಭಾಷೆ, ಕವಿಗಳು, ನಾಟಕ, ಜನಪದ ಕಲೆ, ನಾಡಿನ ಪ್ರಸಿದ್ಧ ವ್ಯಕ್ತಿಗಳು, ಸಹೋದರ, ಸ್ನೇಹಿತ, ತರಕಾರಿ, ದೋಸೆ, ತಿಂಡಿ, ನಿದ್ದೆ, ಬಿಸಿ, ಚಳಿ, ಆಕಾಶ, ಓದು, ಇತ್ಯಾದಿ ನಿತ್ಯ ಬಳಕೆಯ ಸರಳ ಪದಗಳಿಂದ ವಾಕ್ಯರಚನೆ ಮತ್ತು 25–50 ಪದಗಳ ಕಿರು ಪ್ರಬಂದ ರೂಪದ ಲೇಖನ ರಚನೆ).
- ಸಂಸ್ಥೆಯ ಪ್ರಾಚಾರ್ಯರಿಗೆ ವಿದ್ಯಾರ್ಥಿಯ ಮನವಿ ಪತ್ರ, ಕುಂದುಕೊರತೆಗಳ ಬಗ್ಗೆ ಸಂಬಂಧಿಸಿದವರಿಗೆ ಪತ್ರ, ಸ್ನೇಹಿತರಿಗೆ ಪತ್ರಗಳು, ಸರಳವಾಗಿ ಯಾವುದೇ ಸಾಮಾನ್ಯ ವಿಷಯಗಳ ಬಗ್ಗೆ ಪತ್ರಲೇಖನ. (6–10 ವಾಕ್ಯಗಳು).

ಆಕರ ಗ್ರಂಥಗಳು:

1. **ಕನ್ನಡ ಕಲಿ–ಶ್ರೀ ಲಿಂಗದೇವರು ಹಳೇಮನೆ – ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.**
2. ಪ್ರಾಥಮಿಕ ಶಾಲೆಯ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕಗಳು
3. ಸರಳ ಕನ್ನಡ ವ್ಯಾಕರಣ ಪುಸ್ತಕಗಳು– ಎಂ.ವಿ ನಾಗರಾಜರಾವ್/ಇತರೆ ಲೇಖಕರು.
4. ಪ್ರಯೋಗ ಪ್ರಣತಿ–ಪ್ರಥಮ ಪಿಯುಸಿ ಪೂರಕ ಪಠ್ಯ.
5. ಸರಳ ಪತ್ರವ್ಯವಹಾರದ ಪುಸ್ತಕಗಳು

ಡಿಪ್ಲೋಮಾ 4ನೇ ಸೆಮಿಸ್ಟರ್–*ಕನ್ನಡ ಕಲಿ–2 (ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಪರಿಚಯ)*

ಸೆಮಿಸ್ಟರ್ ಅಂತಿಮ ಲಿಖಿತ ಪರೀಕ್ಷೆ

ಸಮಯ: 2 ಗಂಟೆಗಳು ಗರಿಷ್ಠ ಅಂಕಗಳು:50

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1. Fill in the blanks using the appropriate words.
2. Rewrite as directed.
3. Combine the following sentences.
4. Translate into Kannada.
5. Answer the following questions.
6. Fill in the blanks using the correct past tense forms of the verbs giving in the bracket.

7. Transform into negative.
8. Substitute and complete the sentence
9. Vocabulary (meanings of words) using formation of sentences (any five).
10. Questions from lessons 17 to 19. (Out of 6 questions, answer any 3 questions).
11. Scripts- consonants form- +vowel (10 types)
12. Conversation & other questions. (KK-Exercises)

ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ:

ಡಿಪ್ಲೋಮಾ 4ನೇ ಸೆಮಿಸ್ಟರ್–*ಕನ್ನಡ ಕಲಿ–2 (ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಪರಿಚಯ)*

ಸೆಮಿಸ್ಟರ್ ಅಂತಿಮ ಲಿಖಿತ ಪರೀಕ್ಷೆ

ಸಮಯ: 2 ಗಂಟೆಗಳು ಗರಿಷ್ಠ ಅಂಕಗಳು:50

I. (a) Fill in the blank using the correct past tense forms of the verbs given in the bracket. 3+2 =05

1.ಅವರು ನಿನ್ನೆ ಊರಿನಿಂದ ..... (ಬಾ)
2. ಅವಳು ಒಂದು ಹೆಣ್ಣು ಮಗು ..... (ಹೆರು)
3.ನಾನು ನಿನಗಾಗಿ ತುಂಬಾ ಹೊತ್ತು..... (ಕಾಯು)

(b) Fill in the blank using the correct verbal participle forms of the verbs given in the bracket.

1.ಆ ಹುಡುಗಿ ಮನೆ ..... ಹೋದಳು. (ಬಿಡು)
2. ಅವನು ಇವತ್ತ ಊರಿನಿಂದ.....ನಾಳೆ ಬರುತ್ತಾನೆ. (ಹೊರಡು)

II. Give the negative forms of the following sentence. (Any Five) 1X5=05

ಅ) ನೀವು ಪುಸ್ತಕ ಕೊಡಿ.

ಆ) ನೀವು ಸಿಗರೇಟ್ ಸೇದಬಹುದು.

ಇ) ಅವರು ನನಗೆ ಚೆನ್ನಾಗಿ ಗೊತ್ತು.

ಈ) ಅವರು ಕನ್ನಡ ಚೆನ್ನಾಗಿ ಕಲಿತರು.

ಉ) ಅವಳು ತಲೆ ಬಾಚಿಕೊಂಡು ಬಂದಳು.

ಊ) ಅವನಿಗೆ ಫೋನ್ ಬಂದಿದೆ.

ಎ) ರವಿ ಮನೆಯಲ್ಲಿ ಮಲಗಿರ್ತಾನೆ.

III. Translate into KANNADA. (Any Five) 2X5=10

1) Who will come with you?
2) Today Ms. Kamala will go to her native place.
3) You must drink butter milk daily.
4) Please, don't talk to me.

5) How much advance money did you pay for the hostel?
6) How many of you are learning Kannada seriously?
7) If I get good marks in diploma, I will get admission for BE program.
8) At what time today you will be available in the hostel?.

IV. Vocabulary.

(a) Write English equivalents of the Kannada words. (Any five) 1X5=05

1. ಆಗಸ 2. ಶೈಲಿ 3. ಅನುಮಾನ 4.ಪರೀಕ್ಷೆ 5.ಜಾತಿ 6.ನೈಸರ್ಗಿಕ 7.ಮತ 8. ವಾಣಿಜ್ಯ

(b) Write Kannada equivalents of the English words. (Any five) 1X5=05

1. Wealth 2. Religion 3. Memory 4.fear 5.Environment 6. Primary 7. Mistakes 8. Tall

VI. Conversation:

ಈ ಕೆಳಗಿನ ಅಪೂರ್ಣ ಸಂಭಾಷಣೆಯನ್ನು ಆವರಣದಲ್ಲಿ (bracket) ನೀಡಿರುವ ಪದಗಳನ್ನು ಅರ್ಥಮಾಡಿಕೊಂಡು ಪೂರ್ತಿ ಮಾಡಿ. –05

ರಾಜು: ನಿನಗೆ ನಿನ್ನೆ ಮೋಹನ್ ಸಿಕ್ಕನಾ?
ರಾಮು: ..... negative) ನಿನಗೆ ಸಿಕ್ಕನಾ?
ರಾಜು ..... (Positive) ಹೌದು, ನಿಮ್ಮನ್ನು ನೋಡುವುದಕ್ಕೆ ಹೋಗುತ್ತೀನಿ ಅಂತ ಹೇಳಿದ.
ರಾಮು: ..... (Enquiring about meeting him)
ರಾಜು: ಅವನು ಕೆಲಸ ಬಿಟ್ಟನಂತೆ.
ರಾಮು: ..... (Questioning)
ರಾಜು: .....(Answer).

VII.Transform the following sentences as per direction. (Any Five) 1X5=05

1. ಮಕ್ಕಳು ರಸ್ತೆಯಲ್ಲಿ ಆಟ ಆಡ್ತಾ (into present continuous) ಇದ್ದವು.
2. ಹುಡುಗರು ತರಗತಿಯಲ್ಲಿ ಸುಮ್ಮನೆ (into present continuous) ನಗ್ತಾ ಇದ್ದರು.
3. ಆ ಹೆಂಗಸರು ಜಗಳ ಆಡ್ತಾ ಇದ್ದಾರೆ. (into past continuous)
4. ತರಕಾರಿ ಕಡಿಮೆ ಬೆಲೆಗೆ ಸಿಗ್ತಾ ಇದೆ. (into past continuous)
5. ಅವನು ದಿನಾ ಇಲ್ಲಿಗೆ ಬರ್ತಾನೆ. (into habitual)
6. ಇಲ್ಲಿ ಬಸ್ಸುಗಳು ತುಂಬಾ ಓಡಾಡ್ತ (into habitual) ಇವೆ.
7. ಆಂಧ್ರಪ್ರದೇಶದಿಂದ ಬಂದಿದ್ದ ವಿದ್ಯಾರ್ಥಿಗಳು ಎಲ್ಲಿದ್ದಾರೆ?(into present perfect)

VIII.Write the Kannada alphabet in the traditional order. 05

OR

ಹಳೇಬೀಡು ಬೇಲೂರಿನಿಂದ ಎಷ್ಟು ದೂರದಲ್ಲಿದೆ ಮತ್ತು ಯಾವ ಜಿಲ್ಲೆಯಲ್ಲಿದೆ? ಇಲ್ಲಿನ ದೇವಸ್ಥಾನಗಳ ಹೆಸರುಗಳು ಏನು ಮತ್ತು ಅವುಗಳನ್ನು ಕಟ್ಟಿಸಿದವರು ಯಾರು?

IX. Combine the following: (Any One) 1X1=01

(A) 1) ಮನೆ + ಇಂದ =
2) ಮ್ + ಔ =

(B) Combine the following sentence using verbal participle form. (Any One) 1X1=01

ಅ) ಹುಡುಗರು ದುಡ್ಡು ಕೊಟ್ಟರು.
ಹುಡುಗರು ಸರ್ಕಸ್ ನೋಡಿದರು.
ಆ) ನಾನು ಕೆಲಸ ಮಾಡ್ತಾ ಇದ್ದೆ.
ನಾನು ಎಂ.ಎ. ಓದಿದೆ.

(B) Frame meaningful small sentences with using words given given below:(Any Three) -1X3=03.
ಅ) ಮರ ಆ) ಫಲ ಇ) ಊರು ಈ) ಪೇಪರ್ ಉ) ಇವರು ಊ) ಮನೆ ಎ) ಶಾಲೆ

ಕನ್ನಡ ಪಠ್ಯಕ್ರಮ ರಚನಾ ಸಮಿತಿ

- **ಸಂಪಾದಕೀಯ ಸಮಿತಿ:**

1. ಶ್ರೀ ಟಿ ಎಲ್ ರವೀಂದ್ರ, ಉಪನ್ಯಾಸಕರು, ಸರ್ಕಾರಿ ಜಿ.ಆರ್.ಐ.ಸಿ.ಪಿ ಬೆಂಗಳೂರು.
2. ಶ್ರೀ ಟಿ. ತಿಮ್ಮಪ್ಪ, ಉಪನ್ಯಾಸಕರು(ಆಯ್ಕೆ ಶ್ರೇಣಿ), ಯಾಂತ್ರಿಕ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಪಾಲಿಟೆಕ್ನಿಕ್, ತುಮಕೂರು.

- **ಸಲಹಾ ಸಮಿತಿಯ ಬಾಹ್ಯ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು.**

1. ಪ್ರೊ. (ಡಾ.) ಡಿ. ಪಾಂಡುರಂಗ ಬಾಬು, ಕುಲಸಚಿವರು, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
2. ಪ್ರೊ. (ಡಾ.) ಅಶೋಕ್ ಕುಮಾರ್ ರಂಜರೆ, ಪ್ರಾಧ್ಯಾಪಕರು, ಪ್ರಸಾರಾಂಗ ವಿಭಾಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
3. ಪ್ರೊ. (ಡಾ.) ಕೆ ವೈ ನಾರಾಯಣ ಸ್ವಾಮಿ, ಸಹ ಪ್ರಾಧ್ಯಾಪಕರು, ಸ್ನಾತಕೋತ್ತರ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಕಲಾ ಕಾಲೇಜು, ಬೆಂಗಳೂರು.
4. ಪ್ರೊ. (ಡಾ.) ಜೆ ಬಾಲಕೃಷ್ಣ, ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗು ಮುಖ್ಯಸ್ಥರು, ಕನ್ನಡ ಭಾಷಾ ಅಧ್ಯಯನ ವಿಭಾಗ, ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾಲಯ, (ಜಿಕೆವಿಕೆ) ಹೆಬ್ಬಾಳ, ಬೆಂಗಳೂರು.

4ನೇ ಸೆಮಿಸ್ಟರ್ – ತಾಂತ್ರಿಕ ಕನ್ನಡ –2 (ಸಾಹಿತ್ಯ ಮತ್ತು ಭಾಷಾ ಕೌಶಲ್ಯ ಪ್ರಯೋಗ)
ಪತ್ಯಕ್ರಮ

4th Semester	**Course:** **ತಾಂತ್ರಿಕ ಕನ್ನಡ –2**	**Course Code:15KA4KT** (2016-17)
	No. of Credits:02	**No. of teaching hours/week:02** No. of teaching hours/Semester:26
	Mode of Assessment and Evaluation: Semester End Examination (SEE)only. No CIE.	**Maximum Marks: 50** **(SEE only)** **Minimum Passing marks:20**

ಪತ್ಯ ಪ್ರಕಾರ	ಪಾಠ	ಪತ್ಯದ ಹೆಸರು/ಲೇಖಕರು/ಪ್ರಕಟಣೆ	ಸೆಮಿಸ್ಟರ್ ಬೋಧನಾವಧಿ ಗಂಟೆಗಳು
ಕಾವ್ಯ ಮಂಜರಿ–(ಬದುಕು ಮತ್ತು ಮಾನವತೆ)	1	(ಕಾವ್ಯ ಗುಚ್ಛಗಳು) (1) ನನ್ನ ಹಣತೆ–ಡಾ:ಜಿ.ಎಸ್.ಎಸ್. (2) ಮಂಕು ತಿಮ್ಮನ ಕಗ್ಗ–ಡಿ.ವಿ.ಜಿ	02
ಸಂಸ್ಕೃತಿ	2	ಅಲೆಕ್ಸಾಂಡರ್‌ನ ಗುರುದಕ್ಷಿಣೆ–ಮಾಸ್ತಿ ವೆಂಕಟೇಶ ಅಯ್ಯಂಗಾರ್	02
ಪರಿಸರ/ಸಾಹಸ	3	ವೈನಾಡಿನ ನರಭಕ್ಷಕರು – ಪೂರ್ಣಚಂದ್ರ ತೇಜಸ್ವಿ	02
ಕ್ರೀಡೆ/ಕಲೆ	4	ಜೆ.ಆರ್.ವಿಶ್ವನಾಥ್–ಡಾ: ಕೆ.ಪುಟ್ಟಸ್ವಾಮಿ	02
ತಂತ್ರಜ್ಞಾನ	5	ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನ–ಒಂದು ಸ್ಥೂಲ ನೋಟ–ಜಿ.ಎನ್.ನರಸಿಂಹಮೂರ್ತಿ	02
ಯಶೋಗಾಥೆ/ವ್ಯಕ್ತಿಚಿತ್ರಣ	6	ಡಾ:ವಿಶ್ವೇಶ್ವರಯ್ಯ–ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್	02
ಭಾಷಾ ಕೌಶಲ್ಯ–ಚಟುವಟಿಕೆಗಳು	7	<u>ಲಿಖಿತ ಅಭಿವ್ಯಕ್ತಿ</u>: ಪತ್ರಗಳ ರಚನೆ–ವ್ಯಾಖ್ಯೆ: ಪತ್ರದ ಭಾಷೆ, ಶೈಲಿ, ನಮೂನೆಗಳು (1) ವೈಯಕ್ತಿಕ ಪತ್ರ (ಪ್ರವಾಸ/ಕೋರಿಕೆ.(ಮನವಿ/ಆತ್ಮೀಯರಿಗೆ ಬರೆಯುವ ಪತ್ರಗಳು)..) (2) <u>ಪತ್ರ ವ್ಯವಹಾರ</u> (ವಾಣಿಜ್ಯ ಸಂಸ್ಥೆಗಳಿಗೆ ಬರೆಯುವ/ಪ್ರತ್ಯುತ್ತರ ಪಡೆಯುವ, ಬ್ಯಾಂಕ್‌ಗಳಿಗೆ/ಸರ್ಕಾರಿ ಕಚೇರಿಗಳಿಗೆ ಬರೆಯುವ ಪತ್ರಗಳು....)–ಮಾದರಿಗಳು (3) ಅಭ್ಯರ್ಥನ ಪತ್ರ (ಹುದ್ದೆಗೆ ಅರ್ಜಿ) –1–2 ನಮೂನೆಗಳು–4–5 ಪ್ರಶ್ನೆಗಳು (4) ಓದುಗರ ವಿಭಾಗಕ್ಕೆ ಪತ್ರಿಕಾ ಸಂಪಾದಕರಿಗೆ ಬರೆಯುವ ಪತ್ರಗಳು 1 ನಮೂನೆ–3–4 ವಿಷಯಗಳ ಮೇಲೆ ಪತ್ರ ಬರೆಸುವುದು.	06
	8	<u>ಸಂಕ್ಷಿಪ್ತ ಲೇಖನ</u> (ಸಾರಾಂಶ ಲೇಖನ)	02
	9	<u>ಮೌಖಿಕ ಅಭಿವ್ಯಕ್ತಿ</u>> ಚರ್ಚಾ ಸ್ಪರ್ಧೆ/ಕೂಟ–ಭಾಷಣ–ಆಶುಭಾಷಣ –ಕಾರ್ಯಕ್ರಮ ನಿರೂಪಣೆ ಮಾಡುವುದು.	06
		ಒಟ್ಟು ಅವಧಿ	26 ಗಂಟೆಗಳು

ಡಿಪ್ಲೋಮಾ 4ನೇ ಸೆಮಿಸ್ಟರ್ (ಕನ್ನಡಬಲ್ಲ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ)
ತಾಂತ್ರಿಕ ಕನ್ನಡ–2

ಪರಿವಿಡಿ

ಭಾಗ–1

ಕಾವ್ಯ ಗುಚ್ಛ

1. ನನ್ನ ಹಣತೆ–ಡಾ:ಜಿ.ಎಸ್.ಶಿವರುದ್ರಪ್ಪ
2. ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ–ಡಿವಿಜಿ

ಗದ್ಯ ಸಾಹಿತ್ಯ

3. ಅಲೆಕ್ಸಾಂಡರನ ಗುರುದಕ್ಷಿಣೆ (ಸಂಸ್ಕೃತಿ–ಕತೆ)–ಶ್ರೀನಿವಾಸ (ಮಾಸ್ತಿ)
4. ವೈನಾಡಿನ ನರಭಕ್ಷಕರು (ಪರಿಸರ–ಸಾಹಸ)–ಕೆ.ಪಿ.ಪೂ.ತೇಜಸ್ವಿ
5. ಲಿಟ್ಲಲ್ ಮಾಸ್ಟರ್ (ಕ್ರೀಡೆ/ಕಲೆ)–ಡಾ.ಕೆ.ಪುಟ್ಟಸ್ವಾಮಿ
6. ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನ–ಜಿ.ಎನ್.ನರಸಿಂಹಮೂರ್ತಿ
7. ಡಾ:ವಿಶ್ವೇಶ್ವರಯ್ಯ–ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ–ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್

ಭಾಗ–2 –ಭಾಷಾ ಕೌಶಲ್ಯ ಚಟುವಟಿಕೆಗಳು

(1)ಬರಹ ರೂಪದ ಸಂವಹನ ಕನ್ನಡ–ಅಭಿವ್ಯಕ್ತಿಯ ಸ್ವರೂಪ
ಔಪಚಾರಿಕ ಮತ್ತು ಅನೌಪಚಾರಿಕ ಪತ್ರಗಳು
(ಅ) ಪತ್ರವ್ಯವಹಾರ–ವ್ಯಾಖ್ಯೆ–ವಿವರಣೆ
(ಆ) ಪತ್ರಗಳ ಮಾದರಿಗಳು
1. ವಾಣಿಜ್ಯ ಪತ್ರಗಳು–ವ್ಯಾಖ್ಯೆ, ಕೆಲವು ವಿಧಗಗಳು
2. ಖಾಸಗಿ/ವೈಯಕ್ತಿಕ ಪತ್ರಗಳು
3. ಪತ್ರಿಕೆಗಳಿಗೆ ಬರೆಯುವ (ಓದುಗರ)ಪತ್ರಗಳು
4. ಅಭ್ಯರ್ಥನ ಪತ್ರಗಳು

(2) ಸಾರಾಂಶ ಲೇಖನ: ವ್ಯಾಖ್ಯೆ, ಉದ್ದೇಶ, ವಿಧಾನಗಳು.

3 . ಮೌಖಿಕ ಅಭಿವ್ಯಕ್ತಿ ಚಟುವಟಿಕೆಗಳು(ತರಗತಿ ಚಟುವಟಿಕೆಗಳು)

1. ವಿಷಯಾತ್ಮಕ ಭಾಷಣಗಳು
2. ಆಶುಭಾಷಣ (ರಚನಾತ್ಮಕ ವಿಷಯಗಳು)
3. ಚರ್ಚೆ (ವಿಚಾರ ವಿನಿಮಯ/ಪರ–ವಿರುದ್ಧ ವಾದ ಮಂಡನೆ)
4. ನಿರೂಪಣೆ

Course outcome:

1. Developing listening and speaking skills.
2. Easy Interaction with peers.
3. Students can use the language at ease in daily life situations

ಡಿಪ್ಲೋಮಾ ನಾಲ್ಕನೇ ಸೆಮಿಸ್ಟರ್ (ಕನ್ನಡ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ)

ತಾಂತ್ರಿಕ ಕನ್ನಡ–2

ಸಮಯ: **2.00** ಗಂಟೆ ಅಂಕಗಳು: 50

I. ಕೆಳಗಿನ ಯಾವುದೇ **ಐದು** ಪ್ರಶ್ನೆಗಳಿಗೆ 1–2 **ಪೂರ್ಣ** ವಾಕ್ಯಗಳಲ್ಲಿ ಉತ್ತರಿಸಿ. 1X5=05

(1) ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನದ ಮಾಹಿತಿಯನ್ನು ನಷ್ಟಗೊಳಿಸುವ ಅನಿಷ್ಟ ಯಾವುದು?
(2) ದಿವಾನ್ ಪದವಿ ಬಂದಾಗ ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯನವರು ತಮ್ಮ ತಾಯಿಗೆ ಹೇಳಿದ ಮಾತೇನು?
(3) ಅರಿಸ್ಟಾಟಲ್ ಯಾರು ಮತ್ತು ಅವರು ಅಲೆಕ್ಸಾಂಡರನಿಗೆ ಏನಾಗಬೇಕು?
(4) ಸುತ್ತೋಲೆ ಅಥವ ಪರಿಪತ್ರ ಎಂದರೇನು?
(5) ಫಿನಿಕ್ಸ್ ಎಂದರೇನು?
(6) 'ಖೆಡ್ಡಾ' ಎಂದರೇನು?
(7) ನಿರೂಪಕರೆಂದರೆ ಯಾರು?

II. ಕೆಳಗಿನ ಯಾವುದೇ **ಮೂರು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಸಂಕ್ಷಿಪ್ತವಾಗಿ ಉತ್ತರಿಸಿ. 5X3=15

(1) ಕವಿ "ಹಣತೆ ಹಚ್ಚುತ್ತೇನೆ ನಾನು' ಎಂದು ಏಕೆ ಹೇಳುತ್ತಾರೆ?
(2) ಕ್ಲಿಯಾಂತಸನ ಸಾವು
(3) ಕಾಕನಕೋಟೆ ಕಾಡು ಹೇಗಿದೆ?
(4) ಅಂತರಜಾಲದ ಉಪಯೋಗಗಳು.
(5) ಅನೌಪಚಾರಿಕ ಅಭಿವ್ಯಕ್ತಿ ಎಂದರೇನು ತಿಳಿಸಿ.
(6) ಚರ್ಚೆ – ವ್ಯಾಖ್ಯೆ ಮತ್ತು ಉಪಯೋಗದ ಬಗ್ಗೆ ಬರೆಯಿರಿ.

III . ಈ ಕೆಳಗಿನ ಯಾವುದೇ **ಮೂರು** ಪ್ರಶ್ನೆಗಳಿಗೆ ವಿವರಣಾತ್ಮಕ ಉತ್ತರ ಬರೆಯಿರಿ. 10X3=30

(ಅ) ಹುಲ್ಲಾಗು ಬೆಟ್ಟದಡಿ..... ಕಗ್ಗದಲ್ಲಿ ಮನುಷ್ಯ ಏನಾಗಬೇಕೆಂದು ಮತ್ತು ಸಂಗೀತ ಕಲೆಯೊಂದು ಸಾಹಿತ್ಯ ಕಲೆಯೊಂದು...." ಕಗ್ಗದಲ್ಲಿ ಕವಿ ಇವೆಲ್ಲ ಮನುಷ್ಯನಿಗೆ ಏಕೆ ಬೇಕೆಂದು ಹೇಳುತ್ತಾರೆ?

(ಆ) ಅಣ್ಣನನ್ನು ಕಾಪಾಡಲು ಯೇಗ ಮಾಡಿದ ಸಾಹಸವನ್ನು ವಿವರಿಸಿ.

(ಅಥವ)

ಅತಿಯಾದ ನಗರೀಕರಣಕ್ಕಾಗಿ ಕಾಡುಗಳ ನಾಶದಿಂದ ಪರಿಸರದ ಮೇಲಾಗುವ ಪರಿಣಾಮಗಳ ಬಗ್ಗೆ ಬರೆಯಿರಿ.

(ಇ) ನೀವು ಕಾಲೇಜಿನಿಂದ ಹೋಗಿಬಂದ ಪ್ರವಾಸದ ಅನುಭವ ಕುರಿತು ನಿಮ್ಮ ಗೆಳೆಯರಿಗೆ ಪತ್ರ ಬರೆಯಿರಿ.

(ಈ) ಕೆಳಗಿನ ವಿಷಯವನ್ನು ಒಂದು ಸೂಕ್ತ ಶೀರ್ಷಿಕೆ ಸಹಿತ 30 ಪದಗಳ ಮಿತಿಯಲ್ಲಿ **ಸಂಕ್ಷೇಪಗೊಳಿಸಿ**.

ನೀಲಾಂಬರ ದ್ವೀಪ. ಇದೊಂದು ಸುಂದರ ದ್ವೀಪ. ಪ್ರವಾಸಿಗಳಿಗೆ ಸ್ವರ್ಗಸಮಾನ ದ್ವೀಪ. ಈ ದ್ವೀಪ ಹಿಂದೂ ಮಹಾಸಾಗರದ ದಕ್ಷಿಣಕ್ಕಿರುವ ಆರು ದ್ವೀಪ ಸಮೂಹದಲ್ಲಿ ಮಧ್ಯದಲ್ಲಿ ಹುಣ್ಣಿಮೆ ಚಂದ್ರನಂತೆ ಕಂಗೊಳಿಸುತ್ತಿರುವ ದೊಡ್ಡ ದ್ವೀಪ. ಈ ದ್ವೀಪ ಒಂದು ಭಾಗದಲ್ಲಿ ಹಸಿರು ಚಾದರ ಹಾಸಿದಂತೆ ಸಮತಟ್ಟಾದ ಹುಲ್ಲುಗಾವಲು. ಇನ್ನೊಂದು' ಪಕ್ಕ ಬಗೆಬಗೆಯ ಹಣ್ಣುಗಳ ಮತ್ತು ಹೂವುಗಳ ಗಿಡಗಳು ಮತ್ತು ಅಡಿಕೆ, ಮಾವು, ಮೆಣಸು, ಏಲಕ್ಕಿ, ಲವಂಗದಂತಹ ಗಿಡ–ಮರಗಳಿಂದ ಕೂಡಿದೆ.ಈ ದ್ವೀಪದ ಮಧ್ಯೆ ಕಿರೀಟದಂತೆ ನಮ್ಮ ಉದಕಮಂಡಲದಂತಿರುವ ಹಸಿರಿನ ಬೆಟ್ಟ. ನಿಸರ್ಗದತ್ತ ಹೂವುಗಳ ಗಿಡಗಳಿಂದ ಪುಷ್ಪೋದ್ಯಾನದಂತಿದೆ. ಪ್ರಕೃತಿಯೇ ನಿರ್ಮಿಸಿರುವ ತಿಳಿನೀರಿನ ಸುಂದರ ಕೊಳ ಈ ಬೆಟ್ಟದ

ಆಕರ್ಷಣೆಯಾಗಿದೆ. ಹೀಗಾಗಿ ಈ ದ್ವೀಪ ಪ್ರವಾಸಿಗರಿಗೆ ಅಪಾರ ಆಕರ್ಷಕ ತಾಣವಾಗಿದೆ. ಇಲ್ಲಿನ ಜನ ಸಹ ಸೌಜನ್ಯಶೀಲರು. ಸೃಷ್ಟಿಯ ಶೃಂಗಾರವನ್ನೆಲ್ಲ ಒಳಗೊಂಡ ಈ ದ್ವೀಪದ ಮುಖ್ಯ ಕಸುಬು ಕೃಷಿ, ತೋಟಗಾರಿಕೆ ಮತ್ತು ಪ್ರವಾಸೋದ್ಯವಾಗಿರುವುದರಿಂದ, ಇದೊಂದು ಶ್ರೀಮಂತ ದ್ವೀಪವಾಗಿದೆ.

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ಕನ್ನಡ ಪಠ್ಯಕ್ರಮ ರಚನಾ ಹಾಗು ಪಠ್ಯಪುಸ್ತಕ ಸಮಿತಿ

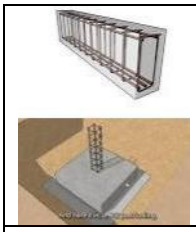
- **ಸಂಪಾದಕೀಯ ಸಮಿತಿ:**

1. ಶ್ರೀ ಟಿ ಎಲ್ ರವೀಂದ್ರ, ಉಪನ್ಯಾಸಕರು, ಸರ್ಕಾರಿ ಜಿ.ಆರ್.ಐ.ಸಿ.ಪಿ ಬೆಂಗಳೂರು.
2. ಶ್ರೀ ಟಿ. ತಿಮ್ಮಪ್ಪ, ಉಪನ್ಯಾಸಕರು(ಆಯ್ಕೆ ಶ್ರೇಣಿ), ಯಾಂತ್ರಿಕ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಪಾಲಿಟೆಕ್ನಿಕ್, ತುಮಕೂರು.

- **ಸಲಹಾ ಸಮಿತಿಯ ಬಾಹ್ಯ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು.**

1. ಪ್ರೊ. (ಡಾ.) ಡಿ. ಪಾಂಡುರಂಗ ಬಾಬು, ಕುಲಸಚಿವರು, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
2. ಪ್ರೊ. (ಡಾ.) ಅಶೋಕ್ ಕುಮಾರ್ ರಂಜರೆ, ಪ್ರಾಧ್ಯಾಪಕರು, ಪ್ರಸಾರಾಂಗ ವಿಭಾಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ.
3. ಪ್ರೊ. (ಡಾ.) ಕೆ ವೈ ನಾರಾಯಣ ಸ್ವಾಮಿ, ಸಹ ಪ್ರಾಧ್ಯಾಪಕರು, ಸ್ನಾತಕೋತ್ತರ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಕಲಾ ಕಾಲೇಜು, ಬೆಂಗಳೂರು.
4. ಪ್ರೊ. (ಡಾ.) ಜೆ ಬಾಲಕೃಷ್ಣ, ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗು ಮುಖ್ಯಸ್ಥರು, ಕನ್ನಡ ಭಾಷಾ ಅಧ್ಯಯನ ವಿಭಾಗ, ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾಲಯ, (ಜಿಕೆವಿಕೆ) ಹೆಬ್ಬಾಳ, ಬೆಂಗಳೂರು.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru



Course Title: **DESIGN OF REINFORCED CEMENT CONCRETE**		
Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE51T**
Type of Course: **Lectures, Case Study, Mini-Project**	Credit **: 04**	Core/ Elective: **Core**
CIE-25 MARKS		SEE-100MARKS

Prerequisite: Student should have knowledge of fundamentals of Materials of constructions, Strength of Materials and Concrete Technology.

COURSE OBJECTIVE

1. To realize the basic concept of reinforcement in Reinforced Cement Concrete and Pre-stressed concrete and methods of pre-stressing.
2. To analyse stress and load carrying capacity in different structural elements.
3. To design and detail the structural elements as per IS codes.
4. To identify the application of available software with respect to failures of structures and present it.

COUSE OUTCOMES

At the end of the course students should be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Illustrate the concepts of Reinforced Cement Concrete, compare various design methodologies, identify grades of concrete and steel, types of loads acting on structures, and analyse beams.	***R/U/Ay***	1,2,3,4,5,6,7, 10	12
CO2	Design singly and doubly reinforced beams.	***R/U/Ap/E***	1,2,4,5,6,7, 9,10	08
CO3	Differentiate between one way and two way slabs, Design one way, one way continuous and two way slabs.	***R/U/Ap/E***	1,2,4,5,6,7, 10	12
CO4	Design column and column footings economically and suitably recommend the appropriate type according to site conditions.	***R/U/Ap/E***	1,2,4,5,6,7, 10	10
CO5	Economically design Staircase and Lintel.	***R/U/Ap/E***	1,2,4,5,6,7, 10	06
CO6	Explain the concept of Pre-stressed concrete, methods of pre-stressing and losses in pre-stress.	***R/U***	1,2,4,5,6, 10	04
C07	Identify problems on structural elements in the building in order to improve future problem solving ability and able to present it.	**R/U/Ap/E/ Ay/C**	1,2,3,4,5,6, 7,8,9,10	*
			Total sessions	**52**

Legend- R; Remember, U: Understand, Ap: Application, Ay: Analysis C:Creation
****- Related to Student activity beyond classroom hours.***

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
RCC	3	3	1	3	3	3	3	1	1	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENTS	HOURS
1.0	**Introduction:** Concept of reinforced concrete structures, Different grades of concrete and steel used in RCC Load and loading standards as per IS:875. Differentiate between ultimate load method, working stress method and limit state method of design. **Design Based on Limit State Method:-**Fundamentals of Limit State Method, types of limit state, Introduction to stress block parameters**,** Assumptions in the theory of simple bending for RCC beams, Neutral Axis, Moment of resistance, critical neutral axis, actual neutral axis, concept of balanced, under reinforced and over-reinforced sections. Partial safety factors, characteristic strength of materials and loads, Flexural strength, Shear Strength, Development Length of bars, Concept of Deflection and cracking , Design requirements, Side face reinforcement, Nominal Cover to reinforcement. **Analysis of Beams:** Analysis of the following beam as per IS:456-2000(Simply supported and cantilever beams) (i) Singly reinforced Beams (ii) Doubly reinforced Beams and its necessity. (iii) T-beams: Structural behaviour of a beam and slab floor laid monolithically, Rules for the design of T-Beams, Economical depth of T-Beams, Strength of T-Beams, concept of L-beam.	12
2.0	**Design of singly reinforced concrete beams** as per IS: 456 from the given data such as span load and properties of materials used. (Design for shear Two legged vertical stirrups only and check for deflection) **Design of doubly reinforced concrete beams** as per IS: 456 from the given data such as span, load and properties of materials used. (Design only for shear), **Problems** on simply supported and cantilever beams.	08

3.0	**Design of RCC Slabs:** Structural behaviour of one way and two way slabs under uniformly distributed load (UDL), Types of end supports, Check for DEFLECTION is not necessary. (i) Design and reinforcement detailing of one way slab (simply supported) and Concept of design of balcony slab. (ii) One way continuous slab (Two span only) using moment co-efficient as per IS: 456 Table 12. (iii) Design and reinforcement detailing of Two-way slab : a) Corners are not held down b) Corners are held down : All the Four edges discontinuous case only.	12
4.0	**Design of Columns:** Concept of long and short columns, Specifications for main and lateral reinforcement, interaction diagram in column design, Behaviour of RCC column under axial load. (i) Design and detailing of Axially loaded short columns (circular, square and rectangular as per IS specifications), (ii) Design of column subjected to uniaxial bending for reinforcement distributed equally on TWO sides only using SP-16 chart (Square and Rectangular). **Design of Column Footings:** Concept of column footing, Design criteria, Design of square, rectangular isolated column footings, Detailing of reinforcement.	10
5.0	**Design of Staircase:** Introduction to stair cases, design and detailing of dog-legged stair, Single flight stairs. **Lintel :** Design and Detailing of a Lintel	06
6.0	**Pre-Stressed Concrete :** Concept of prestressing, Difference between RCC & PSC, Situations where prestressed concrete is used, and Materials used in prestressed concrete and their specifications as per IS. Pre-tensioning and Post-tensioning, Mention the systems of prestresses, Mention the Losses in Prestresses. (Excluding numerical problems)	04

Note:
(i) Students have to be taken to construction sites to give the demonstrative examples of structural elements such as columns, beams, slab, staircase, etc.
(ii) IS 456-2000 & SP16 is permitted in the examination only original copy or hard bound xerox copy attested by head of the institution.

COURSE DELIVERY: Lectures, Power point presentations, demonstrations etc.

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Prepare a case study of failure of structures due to wrong design, use of poor quality of materials and faulty construction methods.
2. Design the structural elements-Beams, slabs and columns for residential building (One and Two story building).
3. Visit to nearby multi-storeyed building/Apartment etc and collect the structural details.

4. Preparing a model of pre stressed concrete using locally available materials.
5. Understand the concept of formwork for different types of buildings and collect information about stripping times for forms for different conditions.
6. Visit to PSC manufacture site and prepare a report on methodology of different components.
7. Practical difference between RCC and PSC bridges and present it.
8. Use structural analysis software to analyse the various elements of structures
9. Prepare spreadsheet for design of RCC elements
10. Analyse the elements of structures using analysis software
11. Collect the information about Floating column and shear wall and present a seminar on it.
12. Collect the IS codes related to Design of RCC and PSC structures, make a report and present it

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**)

2. Reports should be made available along with bluebooks to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**,Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

COURSE ASSESSMENT AND EVALUATION SCHEME:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE (Continuous Internal Evaluation)	IA	Students	Three tests (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3, CO4
					Test 3			CO5, CO6
				Student activities		05	Report/ Handouts	All CO's
	SEE(Student End Examination)	End Exam		End of the course		100	Answer scripts at BTE	CO1 to CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3,4,5,6&7 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

WEIGHTAGE OF MARKS AND BLUE PRINT OF MARKS FOR SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE						Marks weightage	weightage (%)
			Cognitive Levels							
			R	U	Ap	Ay	C	E		
1	Introduction to RCC, Analysis of singly reinforced, doubly reinforced beams, T-beam	12	11.10% 5	22.22 % 10	0.00% 0	66.67 % 30	0.00 % 0	0.00% 0	45	23
2	Design of singly reinforced, doubly reinforced beams, Lintels	8	0.00% 0	13.33 % 2	66.67% 10	0.00% 0	0.00 % 0	20.00 % 3	15	15
3	Design of Slabs	12	0.00% 0	13.33 % 4	66.67% 20	0.00% 0	0.00 % 0	20.00 % 6	30	23
4	Design of Column and Footings	10	0.00% 0	13.33 % 4	66.67% 20	0.00% 0	0.00 % 0	20.00 % 6	30	19
5	Design of Dog-legged Staircase	6	0.00% 0	13.33 % 2	66.67% 10	0.00% 0	0.00 % 0	20.00 % 3	15	12
6	Pre-stressed Concrete	4	66.67% 10	33.33 % 5	0.00% 0	0.00% 0	0.00 % 0	0.00% 0	15	8
	Total	52	**13.0%** 15	**18.0 %** 27	**40.0%** 60	**20.0 %** 30	**0.0 %** 0	**12.0 %** 18	150	100

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**31**
2	Applying the knowledge acquired from the course	**35**
3	Analysis	**20**
4	Synthesis (Creating new knowledge)	**05**
5	Evaluation	**12**

Format of Model Question Paper for CIE(Tests)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I Test/6 th week of sem 10-11 Am	Sem : V SEM	Course : RCC and PSC	20
	Year : 2016-17	Course code:15CE51T	

Name of Course coordinator :
Course outcome :CO1, CO2 **Note: Answer all questions**

Q No	Question	M	CL	CO	PO
1	List the basic assumption of design for limit state of collapse in flexure.	3	R	1	1, 2
2	Differentiate between under reinforced section and balanced section(Limiting section)	4	U	1	1, 2
3	An RCC rectangular beam of size 230X600mm overall is to carry a super imposed load of 40KN/m over an effective span of 6m. Find the area of tension and compression reinforcement. Use M20 & Fe500 steel. Take effective cover 40mm on both sides. OR Find the ultimate moment of a T-beam from the following sectional properties. Use M15 & Fe415 steel. • Width of flange = 1500mm • Thickness of flange = 100mm • Overall depth of beam = 600mm • Width of rib or web = 300mm • Ast = 2455mm^2 • Effective cover = 40mm	6	U/ A y	1	1, 2, 4, 5, 7
4	Design a singly reinforced beam of clear span 6m to support a working live load of 15KN/m. Use M20 & Fe500 steel. Sketch the reinforcement details. OR Design a cantilever beam of clear span 3.5m to support a working live load of 15KN/m. Use M20 & Fe500 steel. Sketch the reinforcement details.	7	U/ A p	2	1, 2, 6, 7

TEXT BOOKS

1. Ashok K. Jain,*Reinforced Concrete* by Limit State Design by Nem Chand & Bros, Roorkee.
2. UNNIKRISHNAN PILLAI AND DEVADAS MENON, Design Of Reinforced Concrete Structures –Tata McGraw Hill Publications.
3. Design of reinforced concrete structures by Krishna raju
4. Limit state design of concrete structural elements –TTTI (NITTTR), Chennai
5. Minocha&Diwedi, *Design of R.C.C. Structures*, B. Bharat Prakshain, Merrut.
6. S.K. Mallick, *Reinforced Concrete*, Oxford & IBH Publshing Co., Delhi.
7. Design of reinforced concrete structures by P.C. Varghees
8. Design of Reinforced Concrete Structures by S Ramamrutham& R Narayan

9. Theory & design of RCC Structures by Gurucharan Singh
10. Reinforced Concrete Structures by B C Punmia
11. Treasure of RCC Designs by Sushil Kumar S
12. SP-16 Design aid for IS 456-2000, SP-23 Hand book on concrete mixes
13. IS 875-1987 Loading standards, SP-34 Detailing of RC Structures

REFERENCES

1. Punmia B.C., *Limit State Design of Reinforced Concrete*, Laxmi Publication (P), Delhi.
2. Raju N.K., *Reinforced Concrete Design IS 456 – 2000 Principles & Practice*, New Age International Publishers, New Delhi.
3. BIS, *IS 456 – 2000 Code of Practice for Plain & Reinforced Concrete*.
4. SINHA S N, *Reinforced Concrete Design*, Tata McGraw Hill Publications
5. KARVE S R AND SHAH V L, *Limit State Theory And Design Of Reinforced Concrete* – Vidyarthi Prakashan, Pune
6. PARK AND PAULAY, *Reinforced Concrete*, John Wiley and Sons

E-Learning

https://books.google.co.in/books?id=o_mKzwhbeHkC&pg=PR9&lpg=PR9&dq=introduction+to+limit+state+design+IS+456-2000
https://www.youtube.com/watch?v=Grv09rIAPQM
https://youtu.be/Grv09rIAPQM
http://freevideolectures.com/Course/2686/Design-of-Reinforced-Concrete-Structures#
https://youtu.be/hxakW1miEcM
https://www.google.co.in/url?-to-design-rcc-column-in-limit-state.
https://www.google.co.in/url? concrete&usg=AFQjCNFmUZeUdmDxV3VSLCsQsKFf5f5V-w

Guidelines to the paper setter

Part-A : Answer any 5 questions. Each question carries 5 marks.
Part-B : Answer any 5 questions, two questions from each section. Each question carries 15 marks.

Part-A :

Q1, Q2, Q3, Q4, Q5 are based on RCC theory.
Q6, Q7, Q8 are based on PSC.

Part-B :

Section-I :
Q9, Q10, Q11 based on analysis of SR, DR and T-beams.

Section-II :
Q12 based on design of SR beam or DR beam
Q13 based on design of Lintel or One way slab or Staircase.
Q14 based on design of One way continuous slab or Two way unrestrained or Two way restrained.
Q15 based on design of Columns or design of column by using SP 16 charts or design of column Footing.

Note :

- **In analysis problems, A_{st} is calculated by using codal formula by solving quadratic equation.**
- **In design problems A_{st} is calculated by using tables.**
- **IS 456-2000 & SP16 is permitted in the examination only original copy or hard bound xerox copy attested by head of the institution.**

MODEL QUESTION PAPER

Diploma in Civil Engineering

5TH Semester

REINFORCED CEMENT CONCRETE

Time: 3Hrs. **Max Marks: 100**

Note: IS 456-2000 & SP16 is permitted in the examination only original copy or hard bound xerox copy attested by head of the institution.

Part –A

Answer any 5 questions **5X5=25 Marks**

1) Explain interaction diagram in the design of column.
2) Explain characteristic strength of material, characteristic load and partial safety factor.
3) Define Neutral axis, Limiting neutral axis, moment of resistance, Lever arm, Effective depth.
4) Distinguish between singly reinforced and doubly reinforced sections.
5) Differentiate between short column and long column.
6) Explain the principle of prestressing.
7) Difference between pre-tensioned and post-tensioned members.
8) Mention the systems of pre-stress and its losses.

Part –B

Answer any 5 questions, atleast TWO questions from each section **5X15=75 Marks**

Section –I

1) An RCC rectangular beam of 200X500mm overall is used as a SS beam of an effective span of 6m. It is reinforced with a tensile steel of 4000mm^2. What maximum UDL can be allowed on the beam. Take effective cover 35mm. Use M20 & Fe415 steel.

2) An RCC rectangular beam of size 230X600mm overall is to carry a super imposed load of 40KN/m over an effective span of 6m. Find the area of tension and compression reinforcement. Use M20 & Fe500 steel. Take effective cover 40mm on both sides.

3) A T-beam of depth 450mm has a flange width of 1000mm and depth of 120mm. It is reinforced with 6 of 20mmϕ as tension steel with a clear cover of 30mm. Use M20 & Fe415 steel. Find M_u and super imposed UDL. Take b_w= 300mm.

Section –II

1) Design a singly reinforced beam of clear span 6m to support a working live load of 15KN/m. Use M20 & Fe500 steel. Sketch the reinforcement details.

2) The main stair of an office building has to be located in a hall measuring 3.3mX5.5m. The vertical distance between the floor is 3.6m. Design the stairs. The LL on the stair is 4KN/m^2. Use M20 grade concrete and Fe415 steel.

3) Design a slab over a room of internal dimensions 4mX5m supported on 230mm thick brick wall all the edges are simply supported (the corners of the slab is held down). Live load on slab 3KN/m^2, floor finish 1KN/m^2. Take M20 concrete and Fe415 steel. Sketch the reinforcement details.

4) Design a rectangular footing for a column of size 300X500mm supporting an axial factored load of 1500KN. SBC of soil 200KN/m^2. Use M20 & Fe415 steel.

Model Questions Bank

Unit 1-Introduction:
Cognitive level –Remember
➢ Explain briefly limit state method of designing RC structures. ➢ List the basic assumption of design for limit state of collapse in flexure. ➢ Explain characteristic strength, characteristic load and partial safety factor. ➢ What are serviceability requirements satisfied by designing an RC structures? ➢ Explain the concept of shear in beams and mention its types. ➢ What is meant by development length and mention the codal provisions ? ➢ What is meant by curtailment of tension reinforcement ? ➢ Write a short note on cracking in structural concrete members. ➢ Write the effective flange width of an intermediate T-beam and an isolated T-beam. ➢ Explain yield line theory concept in slabs. ➢ Define the terms: One way slab, Restrained two way slab, Unrestrained two way slab, Cantilever slab, Continuous slab, Flat slab. ➢ Define the terms: Axially loaded, Eccentrically loaded column. ➢ Define the terms: Positive reinforcement, negative reinforcement, shear reinforcement, torsional reinforcement, lateral reinforcement, side face reinforcement.
Cognitive level –Understand
➢ Define Neutral axis, Limiting neutral axis, moment of resistance, Lever arm, Effective depth. ➢ Differentiate between under reinforced section and balanced section(Limiting section). ➢ Differentiate between analysis and design of an RC structure. ➢ List the different types of shear failure and how it is prevented. ➢ What are the factors which affects short term and long term deflection ? ➢ Distinguish between singly reinforced and doubly reinforced sections. ➢ List the conditions under which doubly reinforced beams are preferred. ➢ What are the advantages of a T-beam over a rectangular beam. ➢ Distinguish between T-beam and L-beam. ➢ Distinguish between a beam and a Lintel. ➢ Differentiate between one way slab and two way slab. ➢ Mention the section at which Max span moment, support moment, shear force occurs in case of a continuous slab or a beam. ➢ Under what conditions a slab is designed as two way. ➢ Differentiate between short column and long column. ➢ What are the points to be considered while designing long columns? ➢ Differentiate between uniaxial bending and bi-axial bending.
Cognitive level –Analysis

Singly reinforced Sections

Type 1 :

Given - Size of beam, A_{st}, effective span, grade of materials and exposure condition.
To find – Ultimate moment & super imposed UDL for SS beam & cantilever beam.
(Point load at mid span of SS beam, Point load at free end of a cantilever)

Typical Problem:

- An RCC rectangular beam of 200X500mm overall is used as a SS beam of an effective span of 6m. It is reinforced with a tensile steel of 4000mm^2. What maximum UDL can be allowed on the beam. Take effective cover 35mm. Use M20 & Fe415 steel.

- An RCC cantilever beam of 230X380mm overall of effective span 2m. It is reinforced with 2 of 16ϕ on tension side. Determine the super imposed load on the beam. Use M20 & Fe500 steel.

Type 2 :

Given – Breadth of beam, factored or working moment, grade of concrete & steel
To find – Minimum effective depth &A_{st}.

Typical Problem:

- Find the minimum effective depth and area of reinforcement required for a rectangular beam of 300mm width to resist a working moment of 150KN-m. Use M20 & Fe500 steel.

Type 3 :

Given – Size of beam, factored or working moment, grade of concrete & steel
To find – Ast.

Typical Problem:

- Find the area of reinforcement required for a SS beam of 230mm wide and 450mm effective depth to resist an ultimate moment of 80KN-m. Use M20 & Fe500 steel.

Type 4 :

Given – Thickness of slab, effective span, Dia of bar, spacing of bar, grade of concrete & steel
To find – Super imposed load UDL on slab.

Typical Problem:

- Find the safe super imposed UDL for one way slab of 125mm thick which is simply supported over an effective span of 3.2m. The slab is reinforced with 12mmϕ bars at 100mm c/c. Use M20 & Fe500 steel. Take clear cover 15mm.

Doubly reinforced Sections

Type 1 :

Given - Size of beam, Effective cover on both zones, A_{st} , A_{sc}, Effective span, grade of concrete & steel .
To find – Ultimate moment & super imposed UDL on beam.

Typical Problem:

- A doubly reinforced beam of size 230X600mm overall. The beam is reinforced with 4 of 16mmϕ as compression steel and 6 of 20mmϕ as tension steel at an effective cover of 40mm on both sides. Find the super imposed load over an effective span of 6m. Use M20 & Fe500 steel.

Type 2 :

Given – Size of beam, Effective cover on both sides, super imposed load, effective span, grade of concrete & steel .
To find – A_{st} and A_{sc}

Typical Problem:

- An RCC rectangular beam of size 230X600mm overall is to carry a super imposed load of 40KN/m over an effective span of 6m. Find the area of tension and compression reinforcement. Use M20 & Fe500 steel. Take effective cover 40mm on both sides.

T-Beam Sections

Unit 2- Design of Beams

Cognitive level –Application

Design of Singly reinforced Beams

Given – Clear span, bearing, super imposed UDL, end condition(SS & cantilever), grade of concrete or Exposure condition of concrete, grade of steel.

To find – Design the beam for flexure and shear. Check for deflection.

Typical Problem:

- Design a singly reinforced beam of clear span 6m to support a working live load of 15KN/m. Use M20 & Fe500 steel. Sketch the reinforcement details.

- Design a cantilever beam of clear span 3.5m to support a working live load of 15KN/m. Use M20 & Fe500 steel. Sketch the reinforcement details.

Design of Doubly reinforced Beams

Given – Clear span, bearing, super imposed UDL, Size of beam, effective cover on both sides, grade of concrete or Exposure condition of concrete, grade of steel.

To find – Design the beam for flexure (Find A_{st} and A_{sc})

Typical Problem:

- Design a simply supported beam of effective span 8m is subjected to an UDL of 35KN/m. Size of the beam is restricted to 300X700mm with an effective cover of 50mm. Use M20 & Fe500 steel. Sketch the reinforcement details.

Unit 3- Design of Slabs

Cognitive level –Application

Design of One way Slab

Typical Problem:

- A room has clear dimension 7mX3m. The live load on the slab is 3KN/m^2 and floor finish load of 1KN/m^2 using M20 grade concrete and Fe 415 steel. The slab is supported on 230mm thick wall.

Design of One way continuous Slab

Typical Problem:

- Design a one way continuous two span slab of effective span 4.5m each. The live load on the slab is 3KN/m^2 and a floor finish(imposed dead load) of 1.5KN/m^2. Use M20 grade concrete and Fe 500 grade steel.
- Design a continuous slab for an office floor. The slab is continuous over beams spaced at 4m c/c. It carries an imposed dead load of 1 kN/$m^2$and a live load of 4kN/m^2. Assume width of rib as 230mm. Use M20 grade concrete and Fe415 steel. (Design the slab for the maximum moment which occurs at support next to the end support). Take l/d ratio as 30 and sketch the reinforcement details.

Design of Two way slab (Corners are not held down)

Typical Problem:

- Design a slab over a room of internal dimensions 4mX5m supported on 230mm thick brick wall having a live load of 2KN/m^2, floor finish 1KN/m^2. All the edges are simply supported (The corners are free to lift). Take M20 concrete and Fe415 steel. Sketch the reinforcement

details.

- A slab over a room is 5mX5m. The edges of the slab is simply supported on all the sides and corners are not held down. The live load on the slab is 3KN/m^2, the slab has a bearing of 230mm on the supporting walls. Assume exposure condition to environment can be classified as mild. Grade of steel Fe415, design the slab.

Design of Two way slab (Corners are held down)

Typical Problem:

- Design a slab over a room of internal dimensions 4mX5m supported on 230mm thick brick wall all the edges are simply supported (the corners of the slab is held down). Live load on slab 3KN/m^2, floor finish 1KN/m^2. Take M20 concrete and Fe415 steel. Sketch the reinforcement details.

Unit 4- Design of Column and Footings
Cognitive level –Application

Design of Axially loaded short Column

Type 1 :

Given - Size of column, A_{sc}, grade of concrete & steel
To find – Ultimate and Working load.

Typical Problem:

- A reinforced concrete short square column of size 300mm is reinforced with 4 bars of 20mmϕ. Find the ultimate load capacity of the column using M20 & Fe415 steel. What will be the allowable service load?

Type 2 :

Given – Working axial load, shape of the column, grade of concrete & steel, assume A_{sc}=0.8 to 6%
To find – Size of column and A_{sc}

Typical Problem:

- Design an RCC rectangular short column to resist an axial load of 800KN. Use M20 concrete and Fe415 steel. Assume 0.8% steel of column area.

Type 3 :

Given – Size and shape of column, axial working load, effective length, grade of concrete & steel
To find – A_{sc} and Percentage of steel

Typical Problem:

- Design necessary reinforcement for an RCC column of size 400X600mm to carry an axial working load of 2000KN. The effective length of the column is 3m. Use M20 & Fe415 steel.

- Design a circular column of diameter 450mm subjected to a load of 1200 KN. The column is having lateral ties. The column is 3m long and is effectively held in position at both ends but not restrained against rotation. Use M25 concrete and Fe415 steel.

Design of uniaxial short Column

- Determine the reinforcement to be provided in a square column subjected to uniaxial bending with the following data :

- Size of the column = 450X450mm
- Grade of concrete = M25
- Grade of steel = 500N/mm^2
- Factored load = 2500kN
- Factored moment = 150kN-m
- Arrangement of reinforcement = On two sides.
  Assume 25mm bars with 40mm cover.

- Design the column from the following details using SP 16 charts.
  - Size of column = 300X450mm
  - Pu=1200KN
  - Assume d'=50mm
  - Mu=150kN-m
  - Use M25 and Fe415 steel. Provide reinforcement distributed equally on two sides.

Design of Isolated Footing (Sqaure& Rectangle)

Given - Size of column, Column load, SBC, grade of concrete & steel
To find – Design the size of footing, depth of footing , A_{st}, check for One way & Two way shear.

Typical Problem:

- Design a square footing to carry a column load of 1100KN from a 400X400mm column. The SBC of the soil is 100KN/m^2. Use M20 & Fe415 steel.

- Design a rectangular footing for a column of size 300X500mm supporting an axial factored load of 1500KN. SBC of soil 200KN/m^2. Use M20 & Fe415 steel.

Unit 5- Design of Staircase & Lintels

Cognitive level –Application

Design of Staircase

Typical Problem:

- The main stair of an office building has to be located in a hall measuring 3.3mX5.5m. The vertical distance between the floor is 3.6m. Design the stairs. The LL on the stair is 4KN/m^2. Use M20 grade concrete and Fe415 steel.

Design of Lintels

Typical Problem:

- Design a lintel using the following data:
  - Width of opening = 2.4m
  - Height of brick wall above lintel = 4m
  - Thickness of wall = 230mm
  - Bearing = 230mm
  - Grade of concrete = M20
  - Grade of steel = Fe415,
  - Density of brick wall = 19.2KN/m^3

  Check for flexure and shear. Sketch the reinforcement details.

- Design a lintel using the following data :
  - Width of opening = 2.4m
  - Height of brick wall above lintel = 1.5m
  - Thickness of wall = 230mm
  - Grade of concrete = M20
  - Grade of steel = Fe415,
  - Density of brick wall = 19.2KN/m^3

  Check for flexure and shear. Sketch the reinforcement details.

Unit 6- Pre-Stressed Concrete

Cognitive level –Remember

- Explain the principle of prestressing.
- What are the advantages and disadvantages of prestressing?
- Explain the grades of concrete and steel used in PSC.
- Mention the systems of pre-stress and its losses.

Cognitive level –Understand

- Distinguish between RCC and PSC.
- Difference between pre-tensioned and post-tensioned members.
- Under what circumstances PSC members are preferred.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: **WATER RESOURCES ENGINEERING**		
Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE52T**
Type of Course: **Lectures, Self Study & Student activities**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 100 Marks

Prerequisites: Basic knowledge of **Hydraulics, Water supply Engineering.**

Course Objectives:

1. To apply knowledge of Hydraulics in understanding the principles and problems in the area of water resource engineering.
2. Understand the importance of water conservation and water management for sustainable development.
3. Understand the various systems and methods of irrigation for economic development of the society.
4. To apply the technical knowledge in understanding the functions of various Hydraulic structures.

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Illustrate the objectives and quantification of water resources development.	**R/U**	1,2	03
CO2	Explain the importance and principles of hydrology	**R/U/A**	1,2,3,6,7,10	08
CO3	Inference the various systems and methods of irrigation for economic development of the society.	**R/U**	1,2,5,6,7,10	10
CO4	Examine the site selection and structural details of water retaining structures.	**R/U/A**	1,2,5,6,7,10	10
C05	Summarize the details and working principles of distribution, cross drainage and diversion works.	**R/U**	1,2,5,6,7,10	14
C06	Elaborate the protection of ground water and water resources management	**R/U**	1,4,5,6,7,10	07
C07	Engage as lifelong learners and possess knowledge for sustainable engineering solutions in global, economical and environmental issues	**U/A**	1 to 10	*
		Total sessions		**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:CreationE:Evaluation
***Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Mapping of COs with POs	PROGRAMME OUTCOME									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic Knowledge	Discipline Knowledge	Experiments & practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Lifelong learning
WATER RESOURCES ENGINEERING	**3**	**3**	**1**	**1**	**3**	**3**	**3**	**--**	**--**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENT	HOURS
1	**INTRODUCTION TO WATER RESOURCES ENGINEERING** Introduction and objects of water resource development, world water resources, water resources of India and Karnataka, Necessity of irrigation in India, Advantages & Disadvantages of Irrigation	03
2	**HYDROLOGY** Introduction and importance of hydrology Hydrologic cycle, Precipitation ,forms of precipitation, types of precipitation, Rainfall in India ,Measurement of rainfall,types of rain gauges(Simon's rain gauge and floating type rain gauge).Mean annual rainfall and methods of computation of average rainfall, (simple problems). Definition of Hydrograph. Definitions of Abstractions from precipitation (Evaporation, Transpiration, Evapotranspiration, Interception, Depression storage, Infiltration), Run-off and Estimation of runoff (Runoff co-efficient & Empirical formula methods-only theory), Factors affecting run-off.	08
3	**METHODS OF IRRIGATION AND WATER REQUIREMENT OF CROPS:** Methods of irrigation, Subsurface irrigation, Surface irrigation (Border strip method, Furrow method, Basin method), Sprinkler irrigation, Drip irrigation, Advantages and disadvantages of Drip Irrigation & Sprinkler irrigation. Quality of water for Irrigation, water requirements of crops, Base period, duty, delta and their relationship (simple problems). Definitions of Gross command area ,cultivable command area , intensity of irrigation, Annual irrigation intensity, Net and gross Sown area, Net & gross irrigated area, Time factor, Capacity factor ,Full supply co-efficient Factors affecting duty, methods of improving duty. Crop seasons – Rabi and Kharif, Irrigation water efficiency. Soil moisture irrigation relationship, Definitions of field capacity, soil moisture	10

UNIT	COURSE CONTENT	HOURS
	content, permanent wilting point, available moisture, soil moisture deficiency. Optimum moisture content, Root zone depth.	
4	**RESERVOIRS AND DAMS:** Introduction, site selection for reservoirs and dams, Earthen dams, Typical cross section of different types of earthen dam, causes of failures of earthen dams (structural failures). Gravity dams, Elementary profile of a gravity dam, list various forces acting on gravity dam, modes of failure of gravity dams, Inspection galleries. Spillways and its types (Straight drop, Ogee spillway, Chute Spill way, volute type Syphon spillway). Reservoir sedimentation	10
5	**DISTRIBUTION WORKS:** Canal and its classification (based on alignment, function), Layout of canal system, Canal lining and Maintenance of canals. **CROSS DRAINAGE WORKS:** Types of cross drainage works, Aqueduct, Canal siphon, Super passage, Level crossing, Inlet and outlet. **DIVERSION HEAD WORKS:** Definition, Location, layout and components of diversion head works, Sketches and description of Weirs, barrage, Body wall of a weir, divide wall Approach channel, canal head regulator, and Fish ladder Difference between weir and barrage.	14
6	**GROUND WATER ENGINEERING:** Ground water and its importance, Aquifer, Aquiclude, Aquitard, Aquifuge Aquifer properties -porosity, ground water yield, specific yield, specific retention, permeability, transmissibility. Artificial recharge of ground water and its methods , Ground water pollution protection of wells, Legislation provisions for ground water protection **WATER RESOURCE MANAGEMENT:** Watershed management and its importance, National water policy, Inter basin water transfer. Definition and application of Cloud seeding.	07

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video

SUGGESTED LIST OF STUDENT ACTIVITIES

1. Visit to nearby Irrigation projects (Existing or on-going)& prepare a detailed report.
2. Visit to nearby meteorological station & collect the meteorological data for past 5 years & prepare a report.
3. Calculate the average rainfall for mini water shed by collecting the meteorological data.
4. Visit to nearby lakes or irrigation tanks& study its present status, suggest restoration measures & prepare a report.
5. Seminars on following topics
   i)Cloud seeding ii) Water shed management iii) Rain water harvesting iv) Restoration of lakes & Reservoirs v) Remote sensing & GIS applications in water resources engineering vi) Urban flood management.
6. Visit nearby agricultural field where micro irrigation techniques are implemented & prepare a report.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, **Good4**, Exemplary**5**)

1. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**,Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE			Marks weightage	weightage (%)	A*	B*
			Cognitive Levels						
			R	U	Ap				
1	INTRODUCTION TO WATER RESOURCES ENGINEERING	02	40% **2**	60% **3**	00% **0**	05	3.5	1	0
2	HYDROLOGY	08	16% **5**	35% **15**	50% **10**	30	20.7	2	2
3	METHODS OF IRRIGATION AND WATER REQUIREMENT OF CROPS	10	0% **5**	25% **15**	75% **10**	30	20.7	2	2
4	RESERVOIRS AND DAMS	10	0% **5**	100% **25**	0% **0**	30	20.7	2	2
5	DISTRIBUTION WORKS CROSS DRAINAGE WORKS, DIVERSION WORKS	14	0% **0**	50% **17**	50% **18**	35	24	1	3
6	GROUND WATER ENGINEERING: WATER RESOURCE MANAGEMENT:	08	0% **0**	50% **7**	50% **8**	15	10.4	1	1
Total		52	**11.7** **17**	**56.5** **82**	**31.8** **46**	145	100	9	10

Legend: R; Remember, U: Understand A: Application Ay: Analysis C: Creation E: Evaluation

A*-SEE QUESTIONS TO BE SET FOR (05 MARKS) in PART – A

B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**68.2**
2	Applying the knowledge acquired from the course	**31.8**
3	Analysis	
4	Synthesis (Creating new knowledge)	
5	Evaluation	

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	Test 1	20	Blue books	1,2,
					Test 2			3,4
					Test 3			5,6
				Student activities		05	Report	1,2,3,4,5,6,7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1 & 2,3Delivery of course
	End of Course Survey			End of the course			Questionn aires	1,2,3,4,5,6,&7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator : CO's:____			Units:__

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	VI SEM	WATER RESOURCES ENGINEERING	20
	Year: 2017-18	Course code:15CE52T	

Name of Course coordinator
CO1,CO2
Answer all questions

Question		M	CL	CO	PO
1	List any five advantages of irrigation.	5	R/U	CO1	1,2,4
2	With a neat diagram explain Hydrologic cycle.	5	R/U	CO2	1,2,4
3	With a neat diagram explain the working of Floating type of automatic rain gauge.	10	R/U	CO2	1,2,4
	or Explain the various factors affecting runoff.	10	R/U	**CO2**	1,2,4

TEXT BOOKS&REFERENCES

TEXT BOOKS

1. Irrigation and water power engineering-by B.C.Punmia, Pande, B.B.Lal Lakshmi Publications, 7/21, Ansari Raod, Daryaganj, New Delhi - 110 002.
2. Irrigation and Hydraulic structures S.K.Garg (Khanna Publishers, Delhi)
3. Ground water- H.M.Raghunath, New age international publisher
4. Irrigation Engineering- R.K.Sharma and T.K.Sharma (S.Chand and Company Ltd)
5. Irrigation Engineering-N.N. Basak McGraw Hill Education India Private Ltd New Delhi

REFERENCE BOOKS

1. Principles and practice of irrigation engineering S.K.Sharma(S.Chand and company Pvt. Ltd. Ramnagar, New Delhi - 110 055
2.Irrigation Engineering - voi I, II and III K.R. Sharma
3.Theory and design of irrigation structures Varshney, S.C., Gupta AndR.L.Gupta
4.A text book of irrigation engineering and Hydraulics structures R.K.Sharma (Oxford - IBH publishing Co.,)
5. Hydrology – Principles, Analysis and design, New age international publisher

MODEL QUESTION PAPER (SEE)

Code: 15CE52T

Diploma in Civil Engineering

III Semester

Course title: WATER RESOURCES ENGINEERING

Time: 3 Hours] **[Max Marks: 100]**

***Note*:** i) Answer any SIX questions from PART - A. Each question caries 05 marks.
ii) Answer any SEVEN Questions from PART - B. Each question caries 10 marks.

PART – A

1. List any five advantages of irrigation.
2. Write a note short note on forms of precipitation.
3. Determine the average rainfall over the catchment area by the Thiessen polygon method. The rainfall recorded at the various rain gauge stations and areas of the Thiessen polygons are tabulated below.

Area of Thiessen polygon (km^2)	Precipitation (cm)
50	3.5
105	4.2
84	5.4
145	4.8
45	4.4

4. Compare Sprinkler irrigation with drip irrigation.
5. Define Base period, Duty, Delta, Permanent wilting point and Field capacity
6. Sketch the elementary profile of gravity Dam.
7. Write a short note on reservoir sedimentation.
8. Explain the difference between Weir and Barrage.
9. Define the following
   i) Aquifer ii) Aquifuge iii) Porosity iv) Specificyield v) Permeability

PART – B

10. Explain hydrologic cycle with a neat sketch.
11. Explain the factors affecting run off of a catchment area.
12. Explain various methods of improving Duty.
13. The cultivable command area of a water course is 1200 hectares. Intensity of sugarcane and wheat crops are 20% and 40% respectively. The duties for the crops at the head of the water course are 730 hectares/cumec and 1800 hectares/cumec, respectively. Find the discharge required at the head of the water- course.
14. Draw a neat diagram of typical cross section of a gravity dam.
15. What are spill ways? With a neat diagram explain Chute spillway.
16. With a neat diagram explain classification of canal based on alignment.
17. With a neat diagram explain syphon Aqueduct.
18. Draw a typical layout of Diversion head works and its components.

19. What is artificial recharge of ground water? List various methods and explain any one method.

MODEL QUESTION BANK

CO 1: Understand the objectives and quantification of water resources development.

REMEMBER LEVEL QUESTIONS

1. Write a brief note on world water resources
2. Write a brief note on water resources of India
3. Write a brief note on water resources of Karnataka

UNDERSTANDING LEVEL QUESTIONS

1. What are the advantages of irrigation?
2. What are the disadvantages of irrigation?
3. What are the objectives of water resources development**?**
4. List the necessity of Irrigation in India

APPLICATION LEVEL QUESTIONS

1. Explain how principles of Hydrology is applied in water resources projects

CO 2: Understand the importance and principles of hydrology

REMEMBER LEVEL QUESTIONS

1. List the various methods of estimating of runoff.
2. Explain various methods of estimating of runoff.
3. What is precipitation and list different forms of precipitation
4. Define the following terms (a) Evaporation, (b)Transpiration, (c)Evapotranspiration, (d)Interception, (e)Depression storage, (f) Infiltration (g) Run-off(h) catchment

UNDERSTANDING LEVEL QUESTIONS

1. With a neat diagram explain Hydrologic cycle.
2. Explain Cyclonic Precipitation.
3. Explain Convective Precipitation.
4. Explain Orographic Precipitation.
5. Mention the difference between convective precipitation and cyclonic precipitation.
6. Mention the difference between convective precipitation and orographic precipitation.
7. Mention the difference between convective precipitation and cyclonic precipitation.
8. Mention the difference between recording and non-recording type of rain gauges.
9. With a neat diagram explain the working of Symon's Rain gauge.
10. With a neat diagram explain the working of Floating type of automatic rain gauge.
11. Explain Runoff co-efficient method for estimation of runoff in a catchment.
12. Explain Empirical formulae method for estimation of runoff in a catchment.
13. Explain the various factors affecting runoff.

APPLICATION LEVEL QUESTIONS

1. The isohyetal map for 24 hour storm gave the areas enclosed between different isohyets, as follows:

Isohyets in mm	38	37	36	35	34	33	32
Enclosed area in Sq.km	72	102	216	310	379	419	488

Determine the average depth of rainfall over the catchment

2. Determine the average rainfall over the catchment area by the Thiessen polygon method. The rainfall recorded at the various rain gauge stations and areas of the Thiessen polygons are tabulated below.

Area of Thiessen polygon (km^2)	Precipitation (cm)
50	3.5
105	4.2
84	5.4
145	4.8
45	4.4

CO 3: Understand the various systems and methods of irrigation for economic development of the society.

REMEMBER LEVEL QUESTIONS

1. Define the following

(a) Gross command area ,(b) cultivable command area , (c) intensity of irrigation, (d) Annual irrigation intensity, (e)Net and gross Sown area, (f)Net & gross irrigated area, (g)Time factor, (h) Capacity factor, (i) Full supply co-efficient (j) Duty (k) Delta (l) Base Period

2. **Define (a)** Field capacity, (b) Soil moisture content, (C) Permanent wilting point, (d) Available moisture, (e) Soil moisture deficiency, (f) Optimum moisture content, (g) Root zone depth.

UNDERSTANDING LEVEL QUESTIONS

1. Mention the difference between surface and subsurface method of irrigation.
2. Explain Border strip method of Irrigation.
3. Explain Furrow method of irrigation.
4. Explain Basin method of Irrigation.
5. Explain Sprinkler method of irrigation.
6. Write short notes on Drip irrigation.
7. What are the advantages and disadvantages of sprinkler irrigation?

8. Mention the advantages and disadvantages of Drip irrigation.
9. What is Irrigation water efficiency
10. What are the factors affecting Duty
11. Mention the various methods of improving Duty

APPLICATION LEVEL QUESTIONS

1. The cultivable command area of a water course is 1200 hectares. Intensity of sugarcane and wheat crops are 20% and 40% respectively. The duties for the crops at the head of the water course are 730 hectares/cumec and 1800 hectares/cumec, respectively. Find the discharge required at the head of the water- course.
2. Determine delta for a crop having base period 140 days and duty 4000 hectares/ cumec.
3. The gross area of an irrigation project is 80,000 ha. Out of this, about 8,000 ha. Have been utilized for construction of dwellings, roads, bridges, etc. The area to be cultivated during rabi is 55,000ha. and during kharif is 48,000 ha. The duty of canal water for rabi crops is 5,000 ha per cumec and for kharif crops is 3,000 ha per cumec. Find the design discharge for the canal after giving 15% allowance for peak discharge and loss of water in transit. What would be the annual intensity of irrigation?
4. Determine reservoir capacity for command area of 60,000 ha, canal losses= 15%, Base period, Duty and intensity of irrigation is as under.

Crop	Base period (Days)	Duty (ha/cumec)	Irrigation Intensity (%)
Sugarcane	360	1700	20
Cotton	180	1500	10
Wheat	120	1800	20
Rice	120	700	15
Vegetables	120	700	15

CO 4: Understand the site selection and structural details of water retaining structures.

UNDERSTANDING LEVEL QUESTIONS

1. Mention the factors to be considered for selection of site for a reservoir.
2. Draw typical cross section of different types of Earthen dam.

Draw typical cross section of Gravity dam
Write short notes on Inspection gallery
Write short notes on Reservoir sedimentation
What are spill ways? List different types of spill ways
With a neat diagram explain Straight drop spill way
With a neat diagram explain Ogee spillway
With a neat diagram explain Chute Spill way
With a neat diagram explain Syphon spillway

APPLICATION LEVEL QUESTIONS

List the various forces acting on Gravity dam
List the various modes of failure of gravity dam
Explain the various causes for structural failures of earthen dam

CO 5:Understand details and working principles of distribution, cross drainage and diversion works.

UNDERSTANDING LEVEL QUESTIONS

1. Explain the classification of canal based on alignment
2. Explain the classification of canal based on function
3. With a neat diagram explain layout of canal system
4. Write short notes on maintenance of canal
5. What are the advantages of canal lining?
6. With a neat diagram explain the working of Aqueduct.
7. With a neat diagram explain the working of Syphon Aqueduct.
8. With a neat diagram explain the working of Canal syphon.
9. With a neat diagram explain the working of Super passage.
12. With a neat diagram explain the working of level crossing.
13. With a neat diagram explain the workingInlet and outlet.
14. Draw a layout showing components of diversion head works.
15. With a neat sketch explain canal head Regulator
16. Mention the difference between weir and barrage
17. With a neat diagram explain the working of Fish ladder

CO 6:Understand protection of ground water and water resources management

UNDERSTANDING LEVEL QUESTIONS

1. Explain the importance of ground water
2. Define the following terms
   (a) Aquifer, (b) Aquiclude, (c)Aquitard ,(d)Aquifuge
   Aquifer properties –(a) porosity, (b) ground water yield, (c) specific yield,(d) specific retention,(e) permeability, (f) transmissibility
3. Explain various methods of artificial recharge of ground water
4. Explain the causes of ground water pollution
5. Write short note on protection of wells.
6. Explain the legislation provisions for ground water protection
7. Explain the various water conservation measures
8. What is water shed management? Explain the importance of watershed management
9. Write short notes on National water policy
10. What is inter basin transfer of water? Explain the advantages and disadvantages of inter basin transfer of water.

	Course Title: **ESTIMATION AND COSTING**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE53T**
	Type of Course: **Lectures, Practices, Student activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Pre-requisites: Knowledge of basic Mathematics, Materials of Construction, Construction Technology, Building Planning and Drawing.

Course Objectives:

1. To differentiate the types of Estimation, adopt specification and Unit Rates.
2. To analyse rates for different items of works.
3. To interpret the drawings and estimate the Quantities of various items in civil engineering structures.
4. To understand departmental procedures and Take measurement of completed work

On successful completion of this course, the student will be able to:

Course Outcome		**CL**	**Linked PO**	**Teaching Hrs**
CO1	Compare different types of estimate, units of measurements & payments for different item of works in construction and illustrate a relationship to Bill of Quantities and Scheduled rates.	**R/U/Ap**	1,2,5, 7,10	04
CO2	Explain the specifications of different Items of works.	**R/U**	1,2,3,5,6,7,10	05
CO3	Analyse the rates of different Items of works.	**Ap/Ay**	1,2,5,6,7	08
CO4	Estimate the quantities and evaluate the abstract cost for different types of buildings by Long wall-short wall method	**Ay/Ap/E**	1,2,3,5,6,7,10	13
CO5	Estimate the quantities and evaluate the abstract cost for different types of buildings by Centre line method	**Ay/Ap/E**	1,2,3,5,6,7,10	13
CO6	Estimate the quantities of earth works and evaluate the abstract cost for road works	**Ay/Ap/E**	1,2,3,5,6,7,10	09
CO7	Organize Quantity surveying for any kind of civil structures using modern tools and manage the project problems, formulate and solve in teams, in order to improve future problem solving ability and able to present it.	**R/U/Ap/ Ay/C**	1 to 10	-
TOTAL				52

COURSE CONTENT

UNIT	MAJOR TOPICS	HOURS ALLOTTED
	PART-A	
1	INTRODUCTION TO ESTIMATION	04
2	SPECIFICATIONS	05
3	ANALYSIS OF RATES	08
	PART-B	
4	DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS	27
5	ESTIMATION OF ROAD WORKS	08
	TOTAL	**52**

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
ESTIMATION AND COSTING	3	3	3	1	3	3	3	1	1	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENTS	HOURS
1.0	**INTRODUCTION TO ESTIMATION** 1. Introduction to estimating: different items of works and types of estimates. 2. Units of measurements and units of payment of different items of work. 3. Deduction of Openings in different items of works and Measurements as per BIS-2000. 4. Bill of Quantities (BOQ), Scheduled rates, Lead Statements.	04
2.0	**SPECIFICATIONS** Earthwork in excavation for foundation, Cement concrete in foundation, Brick masonry, R.C.C Work, Plastering in Cement mortar, Pointing with cement mortar, Cement concrete flooring, Granite / Vitrified / Marble flooring, Centering and shuttering works, Distempering, Exterior painting (Cement), Woodwork for windows and doors, Painting woodwork and steel, Glazing works for building. Application of specifications in BOQ.	05
3.0	**ANALYSIS OF RATES** Analysis of rates for the following items of works. Earthwork excavation and filling, Cement concrete bed in foundation, Brick masonry in C.M for superstructure, Hollow concrete / solid concrete blocks masonry in CM, Plastering with cement mortar, Pointing with cement mortar, Painting the old and new wood work & Steel work, CC Flooring, Granite / Vitrified // Marble flooring, Panelled and glazed doors and windows, R.C.C roofing slab, Distempering, Corrugated galvanized iron sheet roofing.	08
4.0	**DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS USING LONG WALL SHORT WALL METHOD** Prepare the detailed and abstract estimate of, 1. One room building- Ground floor with flat RCC roof 2. Two room building- Ground floor with flat RCC roof 3. 1BHK Residential building - Ground floor with flat RCC roof and Pitched roof with load bearing wall. 4. 2BHK Residential building - Ground floor with flat RCC roof for framed structures. 5. Building with semi circular/ Hexagonal room walls – Ground floor with flat RCC roof. 6. School building – Ground floor with flat RCC roof.	13
5.0	**DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS USING CENTRE LINE METHOD** Prepare the detailed and abstract estimate of, 1. One room building- Ground floor with flat RCC roof 2. Two room building- Ground floor with flat RCC roof 3. 1BHK Residential building - Ground floor with flat RCC roof and Pitched roof with load bearing wall. 4. 2BHK Residential building - Ground floor with flat RCC roof for framed structures. 5. Building with semi circular/ Hexagonal room walls – Ground floor with flat RCC roof.	13

	School building – Ground floor with flat RCC roof.	
6.0	**ESTIMATION OF ROAD WORKS** Detailed Estimates and Abstract of Cost of Road work. 1. Compute earth work quantities from given cross sectional details. 2. Preparation of Detailed Estimates and Abstract of Cost of Bituminous & concrete Roads	08

COURSE DELIVERY: The course will be delivered through lectures and Power point presentations/ Videos, demonstrations etc.

STUDENT SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Prepare Check list for different items of following type of Civil Engineering works.
   a. Load Bearing Building Structure.
   b. Framed structure type of building
   c. W.B.M.Road
   d. Septic Tank
   e. Community well
2. Writing the rules of deduction of openings for below mentioned items of work as per IS 1200.
   a. Brick / Stone masonry
   b. Plastering / Pointing
3. Preparing detailed estimate of a RCC single & two storied existing residential building for all items of work.
4. Prepare the lead statement for earth work excavation for a Road.
5. Prepare the lead and lift statement for a building.
6. Student should visit the site and study the no of labours required for a particular item of work and compare it with the SR by doing Rate analysis as per site observation.
7. Collect the market data for cost of construction materials and implement in rate analysis and compare it with the SR book.
8. Rate analysis to be done for construction activities by using alternate materials like M-sand for River sand and analyse the difference of rates.
9. Rate analysis for works under Lump sum (LS) head to be studied in detail and compared with present SR.
10. Detailed estimate of any building before project to be compared during execution and after completion of project.
11. Reconciliation of materials for a particular item need to done for an ongoing project.
12. Detailed estimate for any two or more residential buildings to be compared and rate per unit area to be find out which will help in present market survey.
13. Visit any construction site and study weekly/monthly RA bill submission from Contractors.
14. Collecting old set of tender document and writing a report on it.

15. Collection of tender notices published in newspapers for various items of civil engineering works (at least 5) write salient features of them.
16. Drafting a tender notice for construction of a civil engineering work (W. B. M. Road, residential building)
17. Preparation of tender document for the building (detailed estimate prepared for RCC. building in estimating and costing shall be used) of various account forms from PWD & writing report on it.
18. Writing a report on store procedure and account producer of PWD for it (Guest lecture of PWD official may be arranged.)
19. Writing detailed specifications for one item from each of following :
    a. Irrigation engineering system
    b. Transportation engineering system.
    c. Environment engineering system.
    d. Building construction system

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5.**

2. Reports should be made available along with bluebooks to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	2				
2.Team's roles & duties	3				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3, CO4
					Test 3			CO5, CO6
				Activities		05	Written Report	CO1,CO2,CO3, CO4,CO5,CO6, CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	CO1,CO2,CO3, CO4,CO5,CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1 ,CO2,CO3,CO4 Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1,CO2,CO3, CO4,CO5,CO6,CO7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)

2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels						Marks weightage	weightage (%)	A*	B*	C*
			R	U	Ap	Ay	C	E					
1	INTRODUCTION TO ESTIMATION	4	60% **12**	40% **8**	0% **0**	0% **0**	0% **0**	0% **0**	20	13.3	2	0	0
2	SPECIFICATIONS	5	33% **8**	53% **10**	13% **2**	0% **0**	0% **0**	0% **0**	20	13.3	2	0	0
3	ANALYSIS OF RATES	08	13% **4**	20% **6**	67% **10**	0% **0**	0% **0**	0% **0**	20	13.3	2	0	0
4 &5	DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS	27	10% **5**	10% **5**	80% **40**	0% **0**	0% **0**	0% **0**	50	33.3	0	1	0
6	ESTIMATION OF ROAD WORKS	08	8% **4**	32% **12**	60% **24**	0% **0**	0% **0**	0% **0**	40	26.6	0	0	2
Total		52	**21%** **33**	**26%** **41**	**37%** **76**	**0%** **0**	**0%** **0**	**0%** **0**	150	100	6	1	2

A-SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – A (6 questions of 10 marks each)*
B- SEE QUESTIONS TO BE SET FOR (50MARKS) in PART –B compulsory for 50 marks*
C- SEE QUESTIONS TO BE SET FOR (40MARKS) in PART – C two questions of 20 marks*

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	47%
2	Applying the knowledge acquired from the course	37%
3	Analysis	0%
4	Synthesis (Creating new knowledge)	0%
5	Evaluation	0%

MODEL Q.P FOR -CIE (TESTS)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/ 6 th week of sem 10-11 Am	V sem	ESTIMATION AND COSTING	20
	Year: 2015-16	Course code: 15CE53T	

Name of Course coordinator : **Course Outcomes : 1 & 2**

Note: Answer all questions

	Questions	M	CL	CO	PO
1	What is an Estimate? What are its types? Explain anyone briefly. OR Write a short note on, a. BOQ b. Lead statement	5	R	1	1,2,5
2	List the conditions of Deductions of openings during plastering.	5	R/U	1	2,5
3	Write down detailed specification of the following, a. Plastering in Cement mortar 1:6 b. Cement concrete in Foundation 1:2:4	5	R/U	1	1,2,3,4, 5
4	Define Analysis of Rates. Explain the various steps taken into consideration for preparing detailed Analysis of rates. OR Analyse the rates of 1cumof RCC(1:2:4) slab reinforced with MS reinforcement upto 90kg/cum of CC including Centering and Shuttering laid in position, complete in all respects. Assume suitable market rates.	5	Ap/An/E	1	2,4,5,7, 10

REFERENCE TEXT BOOKS

1. Dutta B N, "*Estimation and costing in civil engineering theory and practice*", 27th edition, UBS Publisher's Distributors (P) Ltd New Delhi.
2. D.D.Kohli & Ar.R.C.Kohli, "*Estimating and Costing(CIVIL)*"2013 edition, S.CHAND Publications.
3. IS: 1200 Part 1 to 28, *Method of Measurement of Building and Civil Engineering Works.*
4. Chakroborti M, *"Estimating, costing and specifications in Civil Enginnering"-2006.*
5. Rangawala S C,*"Valuation of Real properties"* Charotar Publishing House -2008.

E-Learning

1. http://www.nprcet.org/civil/document/CE702-ESTIMATION.pdf
2. http://theconstructor.org/construction/reinforcement-quantity-estimation/6802/
3. https://www.youtube.com/watch?v=buUKMbXfEUI
4. http://218.248.45.169/download/training/ppt3.pdf
5. http://www.slideshare.net/thomasjbritto/estimating-andcosting-book
6. http://bieap.gov.in/Pdf/CTPaperIIYR2.pdf
7. https://www.wbdg.org/ccb/DOD/UFC/ufc_3_740_05.pdf
8. http://bie.telangana.gov.in/Pdf/estimatingandcosting.pdf
9. http://cpwd.gov.in/Publication/Specs2009V1.pdf

MODEL QUESTION PAPER
ESTIMATING AND COSTING-I

Time: 3hours Max.marks:100

PART –A

1. Answer any one from the following (10x1=10)
   a. What is an Estimate? What are its types? Explain any one briefly.
   b. Write a short note on, a) BOQ, b) Lead statement.

2. Write the detailed specification(any one) (10x1=10)
   a. Concreting for RCC Slab 1:1.5:3 & Earthwork in foundation.
   b. Plastering in Cement mortar & Granite/Vitrified/Marble flooring.

3. Prepare Rate analysis for any **one** of the following(10x1=10)
   a. Concreting for RCC Slab 1:1.5:3
   b. Earthwork in foundation.

PART –B

4. Prepare detailed and abstract estimate for the following items of the building as shown in fig (by any method)

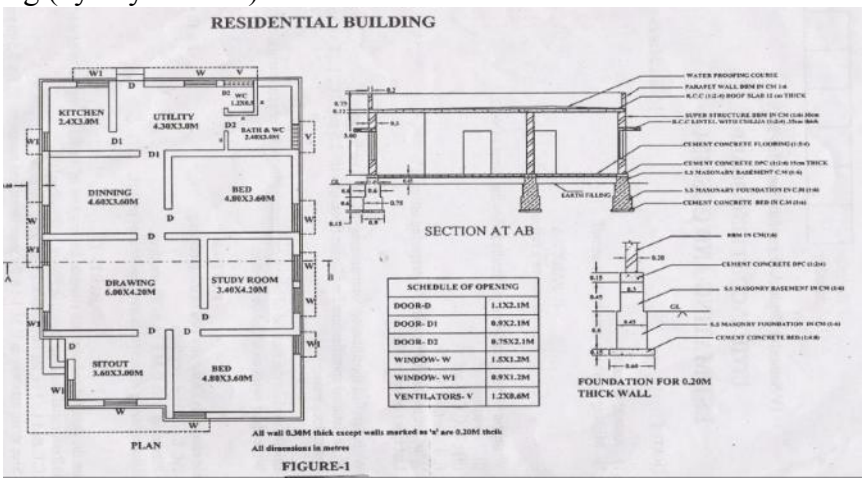


FIGURE-1

-50m

   a. Earthwork excavation in foundation.
   b. Brick work in cement mortar in foundation and plinth.
   c. Internal Plastering excluding Bath and W/C.
   d. RCC for Lintels and Chajjas above opening.(with 1.5% steel)
   e. External plastering.

PART –C

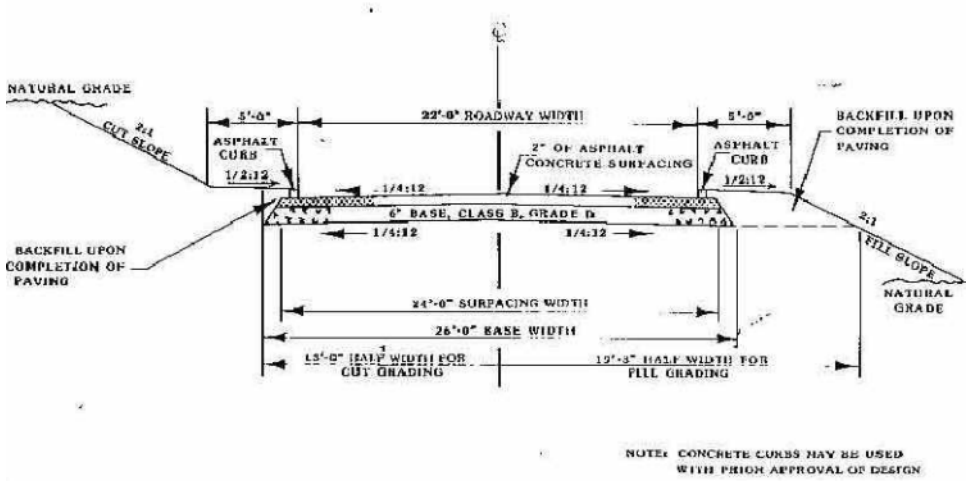
5. Estimate the quantity of earthwork for the portion of a road between chainages 0 to 10 from the following data, lengths being measured with a standard 20m chain.

Chains	0	1	2	3	4	5	6	7	8	9
G.L.	131.1	131.2	130.9	130.8	130.7	130.6	130.4	129.1	129.5	129

The formation level at 0 chainage is 130.0 and the road is in a rising gradient of 1 in 200. The width of formation 9 m. and the side slopes 1.5: 1 in banking and 1:1 in cutting. The lateral slope of the ground may be assumed as level. -20m

OR

Estimate the quantities of the following items of works for the cross section of a 1km long road shown in fig.



1. Earthwork excavation for the pavement shown in figure
2. 6" Base concrete for the road.
3. Top concrete surface.
4. 2" Asphalt layer above top layer.
5. Asphalt kerbing on both sides. -20m

Model Questions Bank

Unit 1- INTRODUCTION TO ESTIMATION
Cognitive level –Remember 1. What is an Estimate? What are the types of Estimation? 2. Explain briefly detailed and Abstract Estimate. 3. List the units of measurements for the following items of works a. Earthwork excavation. b. Plastering in CM 1:6 c. Pointing in CM 1:6 4. List the points to be kept in mind for opening deduction while doing External Plastering. 5. List the points to be kept in mind for opening deduction while doing Internal Plastering. 6. Write a short note on, a) BOQ, b) Lead statement.
Cognitive level –Understand 1. Write the procedure to be adopted for calculating the quantities for Earthwork Excavation. 2. Differentiate Preliminary Estimate and Item rate Estimate.

Unit 2- SPECIFICATIONS
Cognitive level –Remember 1. Write down the detailed Specifications for the following a. Plastering in Cement mortar 1:6 b. Terrazzo flooring. c. Cement concrete 1:2:4 in foundation and Plinth. d. Distempering for internal walls. e. Pointing with cement mortar.
Cognitive level –Understand 1. Differentiate between General specification and detailed specification.
Unit 3- ANALYSIS OF RATES
Cognitive level –Remember 1. Define Analysis of rates. Explain the various steps taken into consideration for

preparing detailed Analysis of rates.

2. List the Type of labours to be considered for different construction activities while doing analysis of rates.
3. Format a typical Rate analysis sheet for any construction work in separate heads, Materials cost, labour cost, taxes, profit, contingencies etc.

Cognitive level –Understand

1. What are the importances of preparing Rate analysis?
2. How to arrive Material rate and labour rate.
3. Mention the basic information requirement for Rate analysis.

Cognitive level –Application

1. Analyse the rates for the below construction activities by using present SR book.
   a. Plastering in Cement mortar 1:6
   b. Terrazzo flooring.
   c. Cement concrete 1:2:4 in foundation and Plinth.
   d. Distempering for internal walls.
   e. Pointing with cement mortar

Unit 4- DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS

Cognitive level –Remember

Cognitive level –Understand

1. Explain the method of taking out the quantities by long wall & short wall method and centre line method.

Cognitive level –Application

1.

Unit 5- ESTIMATION OF ROAD WORKS

Cognitive level –Remember

1. Estimate the quantity of earthwork for the portion of a road between chainages 0 to 10 from the following data, lengths being measured with a standard 20m chain.

Chainages	0	1	2	3	4	5	6	7	8	9
G.L.	131.1	131.2	130.9	130.8	130.7	130.6	130.4	129.1	129.5	129

The formation level at 0 chainage is 130.0 and the road is in a rising gradient of 1 in 200. The width of formation 9 m. and the side slopes 1 1/2 : 1 in banking and 1:1 in cutting. The lateral slope of the ground may be assumed as level. -20m

Cognitive level –Understand

Cognitive level –Remember

1. Estimate the quantity of earthwork for the portion of a road between chainages 0 to 10 from the following data, lengths being measured with a standard 20m chain.

Chainages	0	1	2	3	4	5	6	7	8	9
G.L.	131.1	131.2	130.9	130.8	130.7	130.6	130.4	129.1	129.5	129

The formation level at 0 chainage is 130.0 and the road is in a rising gradient of 1 in 200. The width of formation 9 m. and the side slopes 1 1/2 : 1 in banking and 1:1 in cutting. The lateral slope of the ground may be assumed as level. -20m

	TRANSPORTATION ENGINEERING		
	Credits (L:T:P) 4**:0:0**	Total Contact Hours: **52**	Course Code: **15CE54T**
	Type of Course: Lecture, Case study, Mini projects	Credit :4	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Pre-requisite: Knowledge of Survey, Construction Technology, Building materials.

Course objectives

1. To distinguish between different modes of transportation and importance of bridges and tunnel.
2. To understand the functions of various components of roads, railways, tunnel, and bridges.
3. To understand the importance of surveys, alignment and geometric features of Highways, bridges, Railways and tunnel.
4. To differentiate between types of highway pavements, their construction and advantages.
5. To realize the significance of road safety by incorporating the concepts of Traffic Engineering.
6. To understand the importance of highway drainage and road arboriculture.
7. To classify the types of stations, yards, tunnels, harbour, airport and bridge.
8. To realize the importance of safety in railways by understanding the concepts of track maintenance, points and crossing and signals.

At the end of the course the student should be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Classify the different modes of transportation and describe highway geometrics.	***R/U***	1,2,5,6,	**08**
CO2	Select suitable road materials for the design of different types of pavements and plan proper drainage system.	***R/U/Ap***	1,2,5,6,8,10	**10**
CO3	Identify - types of bridges, components of bridges and select suitable bridge foundations.	***R/U/Ap***	1,2,5,6,9	**08**
CO4	Explain various components of a railway track.	***R/U/Ap***	1,2,5,9	**10**
CO5	Outline the process of railway track construction; classify railway stations, suburban railway system and recognise the importance of railway track maintenance.	***R/U/Ap***	1,2,4,5,8,10	**12**
CO6	Describe various components of tunnel, airport and harbour engineering.	***R/U/Ap***	1, 2,5,6,7,9,10	**04**
CO7	Perform the suggested activities individually or in team and have fundamental knowledge of modes of transportation.	***R/U/Ap***	1 to10	*
			Total sessions	**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:CreationE:Evaluation

***Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
TRANSPORTATION ENGINEERING	**3**	**3**	**1**	**3**	**3**	**3**	**2**	**2**	**1**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNIT	COURSE CONTENTS	Hours allotted
1	**HIGHWAY**	8
	1.1 Introduction: Importance of transportation - different modes of transportation –surface transportation, water transportation and air transportation.	
	1.2 Highways: Highway planning, factors controlling highway alignment, Engineering surveys.Importance and objectives of highway geometric design - highway cross sectional elements. Sight distances, concept of super elevation, widening of roads at horizontal curves, gradients and its types, elements of horizontal and vertical alignments, cross-sections of different types of roads.	
2	**2.1 Highway Materials and Pavements:** Types of bitumen, Properties of bitumen, Soil stabilisation principles and methods, Requirements of highway pavements, Types of pavement, Flexible pavements-construction of WBM and WMM roads, , construction of bituminous roads,(Bitumen bound macadam only)Rigid pavements- advantages and disadvantages of CC roads, construction of CC roads, joints in CC roads, comparison between flexible and rigid pavements, Overlays.	10
	2.2 Road drainage: Significance and requirements of highway drainage, subsurface highway drainage, objects of Road Arboriculture.	
3	**BRIDGE ENGINEERING**	8
	Introduction, component parts of a bridge, terms used in bridge engineering- water way, afflux, economic span of a bridge, scouring, free board, classification of bridges, selection of site for bridge, concept of coffer dams. Bridge sub structure- abutments, piers, wing walls, bearings-functions, requirements, types only. Highway bridges-permanent bridges (Steel, RCC T-Beam Bridge), flyovers.	

UNIT	COURSE CONTENTS	Hours allotted
4	**RAILWAY ENGINEERING**	10
	4.1 Introduction Role of Indian railways, General features of Indian railways. Gauge, different gauges on IR, Uni-gauge policy and its benefits.	
	4.2 Railway track. Permanentway, Various components and requirements of a good track,factors to be considered while selecting a good alignment, forces acting on the track, concept of coning of wheels and tilting of rails, Gradient and its types.	
	4.3 Track Components Rails - Functions, types and requirements, wear - types and methods to reduce wear, creep, causes, effects and prevention. Sleepers - Functions, requirements, PSC monoblock sleeper with pandrol clips, sleeper density. Ballast - Functions, requirements, broken stone ballast. Track fittings and fastenings - Purpose, fish plates, only elastic fastenings used in concrete sleepers. Rail joints and welding of rails - Types of rail joints, comparison of short welded, long welded and continuous welded rails.	
5	**5.1 Points and crossings** Turnout and its necessity, sketch of constituents of a turnout. Track junctions - crossover between two parallel tracks, Diamond crossing, Scissor crossover. Level Crossings- objects of providing level crossings, typical layout of a square level crossing. Track maintenance - Necessity, advantages and essentials of track maintenance, duties of a PWI.	12
	5.2 Railway stations and yards Classification of railway stations on operational and functional considerations (explain only A- class block station for double line) wayside station on a single line section, types of yards, explain Marshalling yard. Signalling and interlocking - Objectives, signals required at stations, Interlocking and its essential regulations.	
	5.3 Suburban railways in metro cities Tube railways and elevated railways, typical cross-section of underground railway (tunnel circular section) and elevated railways with dimensions.	
6.	**TUNNEL ,AIR PORT AND HARBOURS**	4
	Tunnels: Terminology, advantages of tunnels, Size and shapes of tunnels- horse shoe, egg shape, segmental roof section, transferring alignment inside the tunnel, mucking, concept of shafts, objects of tunnel lining, ventilation and drainage in tunnels.	
	Airport – Terminology, Aerodrome, Apron, Hanger, Runway, Taxiway, Terminal area, Wind rose. **Harbour**- Terminology, Dock, Port, Breakwater, Jetties, Quays, Dredging, Light house, Buoys and Beacons.	

Course Delivery: The course will be delivered through lectures, demonstration, Presentations and suggested activities.

SUGGESTED STUDENT ACTIVITIES

1. Visit a highway construction site and collect cross sectional drawings and topo sheets and prepare a power point presentation with photographs and videos.
2. Prepare a comparative chart showing various types of roads such as WBM, Bituminous roads, Concrete roads.
3. Visit a highway construction site, identify various types of soils, the test procedures as per relevant IS codes and inference based on the test results.
4. Draw the cross sectional details of Village roads, MDR, SH, NH using CADD and prepare a chart.
5. Collect the parameters of road intersection in the locality and prepare a model.
6. Prepare a model showing the cross sectional details of various types of roads such as bituminous and concrete roads.
7. Taking the measurements of an existing box culvert and prepare a model of the same.
8. Prepare a model of a typical bridge structure showing the component parts of bridge.
9. Prepare a presentation on comparison between RCC and PSC bridges with proper photographs and videos.
10. Prepare a chart showing the various road signs used by collecting the information from nearby RTO and prepare report and presentation it.
11. Visit nearest railway station and collect the information regarding railway track such as ballast, sleeper, gauge and signals and prepare a presentation and submit a report.
12. Collect information regarding various types of railway gauges used in India and other countries, prepare a chart and present it.
13. Collect videos showing the various forces acting on a railway track and present in the class.
14. Collect photographs and videos of crossings and prepare a presentation on it.
15. Collect videos related to track laying procedure and give seminar in the class.
16. Give a presentation on production of railway sleepers.
17. Collect information about alternate modes of transport (Mass Rapid Transport system) and make a presentation on it.
18. Explain the airport components in the class with the aid of presentation.
19. Explain the construction of tunnel with the help of video in the class room and submit a report.
20. Explain different types of tunnels with the help of presentation.
21. Prepare a presentation on component parts of Harbour.
22. Collect different IRC codes pertaining to highway geometric design and prepare a chart.
23. Prepare a presentation and report on Maglev Trains.
24. Prepare a presentation and report on Bullet Trains.
25. Give a seminar on the use of eco-toilets in trains.
26. Give a seminar on the use of bio toilets in trains.

27. Prepare a model of a typical railway track.
28. Prepare a presentation on sky bus technology.
29. Seminar on Intelligent Transport System (ITS).
30. Collect the information regarding various railway divisions in India and their functions.
31. Collect the information regarding the functions and importance of the following agencies regarding road projects.
    - National Highway Authority of India
    - Indian Road Congress
    - Karnataka Rural Infrastructure Development Corporation
    - Public Works Department
    - Rural Development and Panchayath Raj Department
32. Collect the information and prepare a presentation on the following topics.
    - Pradhan Mantri Gram Sadak Yojana (PMGSY)
    - Golden Quadrilateral Project
    - National Highway grid
    - Public Private Partnership (PPP) road projects
    - Renumbering of Indian National Highways
    - Use of road reflectors, delineators, and road markings

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1,** Developing **2,** Satisfactory **3,** Good **4** and Exemplary **5**)
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	**Students score (Group of five students)**				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1,** Developing **2,** Satisfactory **3,** Good **4,**Exemplary5				
1.Literature	5				
2.Fulfill team's roles & duties	2				
3.Conclusion	3				
4.Convensions	4				
Total	13				

Average=(Total /4)	3.25=4					

Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2.Fulfil team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Rare Error	No Error

Course Assessment and Evaluation Scheme:

	What		**To whom**	**When/Where (Frequency in the course)**		**Max Marks**	**Evidence collected**	**Course outcomes**
Direct Assessment method	CIE	IA	Students	Three tests (Average of three tests)	Test-1	20	Blue books	CO1,CO2
					Test-2			CO3,CO4
					Test-3			CO5,CO6
				Mini project		05	Assignment books	CO1 to CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	CO1 to CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1,CO2,CO3, Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 to CO7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels						Marks weightage	weightage (%)	A*	B*
			R	U	Ap	Ay	C	E				
1	1.1 Introduction to Highway Engineering 1.2Highways	8	25%	25%	50%	0%	0%	0%	20	13	2	1
			5	5	10	0	0	0				
2	2.1 Highway Materials and Pavements 2.2 Road drainage	10	20%	40%	40%	00%	00%	00%	25	18	1	2
			5	10	10	0	0	0				
3	Introduction to Bridges	8	33.33 %	66.66 %	00%	0%	0%	0%	30	20	2	2
			10	20	0	0	0	0				
4	4.1Introduction 4.2 Railway track. 4.3 Track Components	10	25%	25%	25%	25%	00%	00%	20	14	2	1
			5	5	5	5	0	0				
5	5.1 Points and crossings 5.2 Railway stations and yards 5.3 Suburban railways in metro cities	12	20%	80%	00%	00%	0%	0%	35	25	1	3
			5	20	0	0	0	0				
6	6.1 Introduction to Tunnel Engineering 6.2 Terms used in Airport and Harbour	4	60%	40%	0%	0%	0%	0%	15	10	1	1
			15	10	0	0	0	0				
Total		52	**31%**	**48%**	**17%**	**4%**	**0%**	**0%**	145	100	9	10
			45	**70**	**25**	**05**	**0**	**0**				

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A
B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1	Remembering and Understanding :	- 79% weightage
2	Applying the knowledge acquired from the course :	- 17 % weightage
3	Analysis :	- 04% weightage
4	Evaluation :	- 0% weightage
5	Creating new knowledge :	- 0% weightage

Model Question Paper for CIE

Test/Date and Time	**Semester/year**		**Course/Course Code**	**Max Marks**
Ex: I test/6 th week of sem 10-11 Am	**V SEM**		Transportation Engineering	**20**
	Year: 2015-16		**Course code:15CE54T**	

Name of Course coordinator :
Course outcome :CO1, CO2
Note: Answer all questions

Question		**M**	**CL**	**CO**	**PO**
1	Explain the role and importance of transportation. OR Explain the various factors controlling the alignment of roads.	05	U	**1**	1,2, 5,6,
2	Draw a typical cross-section of a national highway.	05	U	**1**	1,2, 5,6,
3	What is meant by soil stabilisation? And what are its principles?	05	R	**2**	1,2, 5,6, 8,10
4	Explain briefly sub surface drainage system with a neat sketch. OR Explain the method of construction of WBM road width a neat sketch.	05	U	**2**	1,2, 5,6, 8,10

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Text Books:

1. Khanna S.K. and Justo C.E.G, Highway Engineering, Nemchand and Bros, Roorkee.
2. Kadiyali L.R, "Highway Engineering", Khanna Publishers, New Delhi.
3. Satish Chandra and Agarwal M M, Railway Engineering, Oxford university press.

Reference Books:

1.Subramanyam. K.P, "Transportation Engineering", Scitech Publications, Chennai.
2. Khanna SK and Justo CEG, "Highway Material Testing Laboratory Manual", Nemchand and Bros. Roorkee.
3. Dr. S K Sharma, Highway Engineering, S Chand and company, New Delhi.
4. J S Mundrey, Railway track engineering, McGraw Hill education, New Delhi.
5. Paul H Wright and Karen K Dixon, Highway Engineering, Wiley pub, New Delhi.
6. James H Banks, Tata Mcgraw-Hill, New Delhi.

MODEL QUESTION PAPER

DIPLOMA IN CIVIL ENGINEERING
FIFTH SEMESTER
TRANSPORTATION ENGINEERING

Maximum Marks: 100 marks. Time: 03 hours.

PART-A

Answer any six questions. Each question carries five marks each.

1. Explain the role and importance of transportation.
2. What is meant by super elevation? And list the objects and advantages.
3. What are the necessities of providing Highway drainage?
4. Explain are the component parts of a bridge?
5. What is meant by bridge bearing? and list its functions
6. What are the general features of Indian railways?
7. What are the various forces acting on the track?
8. List the duties of PWI.
9. List the purpose of drainage of tunnel and its types.

PART-B

Answer any seven questions. Each question carries ten marks each.

1. Mention the various surveys to be conducted for road alignment and explain briefly preliminary and final location of survey.
2. Explain the method of construction of WBM road with a neat sketch.
3. Explain briefly sub surface drainage system with a neat sketch.
4. List the classification of bridges according to all the parameters.
5. Explain briefly the sub structure components of a bridge with a sketch.
6. What are the various components and requirements of a good track?
7. What is meant by creep? List the causes, effects and prevention of creep.
8. a) Draw a typical cross-section of an underground railway tunnel circular in section and an elevated railway (Metro rail).
9. a)What are the advantages of tunnelling?
   b) List the objects of lining and ventilation in tunnels.
10. Define the terms:- Aerodrome, Hanger, Runway, Brake water, Jetties.

-**-**-**-

MODEL QUESTION BANK:-

UNIT-1

Cognitive level- Remembering

1. What are the different modes of transportation?
2. What are the objects of highway planning?
3. What is meant by super elevation? And list the objects and advantages.
4. Define curve and what are its advantages? Also list the type of curves.
5. List the objects and requirements of a transition curve.
6. What is gradient? And list its objects and types.

Cognitive level- Understanding

1. Explain the role and importance of transportation.
2. Explain the various factors controlling the alignment of roads.
3. What are the objects of highway geometrics? And list the factors which affects the design of geometrics.
4. Explain briefly cross-sectional elements of highways.
5. Explain the necessity of widening of roads in curves.
6. Draw a typical cross-section of a national highway.

Cognitive level- Application

1. Mention the various surveys to be conducted for road alignment and explain briefly preliminary and final location of survey.

UNIT-2

Cognitive level- Remembering

1. What is meant by soil stabilisation? And what are its principles?
2. What are requirements of a good highway pavement?
3. Write a short note on Overlays.
4. What are the necessities of providing Highway drainage?
5. What are the requirements of a good drainage system?

Cognitive level- Understanding

1. Explain briefly methods of soil stabilisation.
2. Explain briefly the materials and its qualities which are used in highway pavements.
3. Explain the method of construction of WBM road width a neat sketch.
4. Explain the method of construction of Bitumen bound macadam road.
5. Explain the construction of CC roads.
6. Explain the different types of joints used in CC roads.
7. Explain briefly sub surface drainage system with a neat sketch.

Cognitive level- Application

1. Comparison between flexible pavement and rigid pavement.
2. What are the objects of road Arboriculture?

UNIT-3

Cognitive level- Remembering

1. What are the component parts of a bridge? with examples.
2. List the classification of bridges according to all the parameters.
3. Define the terms: water way, afflux, economic span of a bridge, scouring, free board.
4. What is a coffer dam and list its requirements? .
5. What is meant by bridge bearing? and list its functions
6. What are the types of bridge bearings?

Cognitive level- Understanding

1. What are the points to be considered while selecting a site for bridge.
2. Explain briefly the sub structure components with a sketch.
3. Write a short note on flyovers.

UNIT-4

Cognitive level- Remembering

1. What are the general features of Indian railways?
2. What are the factors to be considered while selecting a good railyway alignment?
3. What are the various components and requirements of a good track?
4. What are the various forces acting on the track?
5. What is meant by creep? List the causes, effects and prevention of creep.
6. What are the qualities of broken stone ballast.

Cognitive level- Understanding

1. Explain the role of Indian railways.
2. Define gauge and list the benefits of UNI-GAUGE policy.
3. Differentiate between Conning wheels and Tilting of rails.
4. List the functions and requirements of rails.
5. Explain with a neat sketch a flat footed rail.
6. List the methods to reduce the wear of rails.
7. List the functions and requirements of sleepers.
8. Explain with a neat sketch monoblock PSC sleeper with pandrol clips.
9. List the functions and requirements of ballast.

UNIT-5

Cognitive level- Remembering

1. What are the purpose of providing fittings and fastenings in tracks.

2. What is meant by buckling of track? List it causes and prevention.
3. List the necessities, advantages and essentials of a track maintenance.
4. What are the objects of providing level crossings? List its types and draw a typical layout of a square level crossing.
5. What are the types of yards? And list the functioning of Marshalling yard.
6. List the objects of signalling.
7. What is meant by Inter-locking and list its essential regulations.

Cognitive level- Understanding

1. List the elastic fastenings and explain fish plate.
2. What is meant by turn out? And draw a typical sketch of a turn out and label the components.
3. Draw the layout of track junctions cross over between two parallel tracks.
4. Draw the layout of Diamond crossing and Scissor crossing.
5. List the types of rail joints.
6. Comparison between short welded, long welded and continuous welded rails.
7. List the duties of PWI.
8. Draw the classification chart of railway stations based on operations and functions.
9. Explain A-class block station for a double line section.
10. Explain way side station on a single line section.
11. What are the signals required at railway stations?
12. Draw a typical cross-section of an elevated railway (Metro rail).

Unit-6

Cognitive level- Remembering

1. Define the terms:- tunnel, shaft, mucking
2. What are the advantages of tunnelling?
3. List the shapes of tunnel.
4. List the purpose of drainage of tunnel and its types.
5. List the objects of tunnel lining and ventilation.
6. Define the terms:- Airport, runway, wind rose.
7. Define the terms:-Harbour, dock, Jetties.
8. Define the terms:- Brake water, Quays, Buoys.
9. Define the terms:- Port, light house, Beacons.

Cognitive level- Understanding

1. Draw a typical cross-section of an underground railway tunnel circular in section.
2. Comparison between Horse shoe, egg shape and segmental tunnel sections.

	Course Title: **IRRIGATION AND BRIDGE DRAWING**		
	Credits (L:T:P) 0**:2:4**	Total Contact Hours: **78**	Course Code: 15CE55D
	Type of Course: **Drawing, Case study**	**Credit : 03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Pre-requisite: Concepts of Basic Civil Engineering Drawing, Water Resources Engineering and Transportation engineering.

Course objectives

1. To know and draw the various components of earthen dam and canals including plan and cross section.
2. To understand the requirement of tank sluice, tank weirs and draw the various views.
3. To understand and draw the various views of culverts and bridges.
4. To prepare a case study on an existing bridge or irrigation structure.

COURSE OUTCOMES

On successful completion of the course, the student should be able to;

COURSE OUTCOMES		CL	Linked PO	Teaching Hrs
CO1	Distinguish type of earthen dam, canal sections and draw the various views from the given data.	R/U/A	1,2,3,5,8,9,10	9
CO2	Distinguish and select suitable type of tank sluice and weir and draw the various views from the given data.	R/U/A/An	1,2,3,5,8,9,10	33
CO3	Develop/Draw culverts, bridges and their suitability to the site conditions and prepare the drawings for the given data.	R/U/A/An/C	1,2,3,5,8,9,10	27
CO4	Conduct a case study on an existing bridge or irrigation structure and prepare a mini report.	R/U/A/An/C/E	1 to 10	9

Legend: R: Remember, U: Understand, A: Apply, An: Analyse, S: Synthesise, E:Evaluate

Programme Outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Lifelong learning
IRRIGATION AND BRIDGE DRAWING	**3**	**3**	**3**	**2**	**1**	**1**	**1**	**2**	**3**	**2**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNITS	COURSE CONTENT	HOURS ALLOCATED
UNIT 1	1(a).EARTHEN DAMS (i) Types of earthen bunds, details of earthen bund such as side slope, revetment, hearting, core walls, rock toe and drainage arrangements as per standards. (ii) Draw the cross section and sectional plan showing details of drainage arrangements of the following using given data (without design). • Earthen bund with homogeneous materials • Earthen bund with hearting • Earthen bund with core wall 1(b).CANALS Components of canal. Draw the cross section of the following canals showing components for the given data (without design). • Canal in full cutting • Canal in full Embankment • Canal in partial cutting and partial embankment	09
UNIT 2	**TANK SLUICE** 1. For the given discharge determination of the size of the orifice 2. Draw the longitudinal section, half plan at top, half plan at foundation level ,half front elevation and half sectional elevation of the following for the given data (without structural design). • Head and Gibbet wall type-slab barrel with plug Arrangement. • Tower head type- slab barrel with shutter arrangement • Pipe sluice -Tower head and head -gibbet wall type with plug arrangement	18
UNIT 3	**TANKS WEIRS** 1. Components of tank weir-body wall, abutment, wing walls, return wall, bund, protection works (solid, grouted apron, stone revetment), Cut off wall and back batter. 2. Determination of the length of waste weir for a given catchment area. 3. Draw the half longitudinal section, half front elevation, half plan at top, half plan at foundation level & cross section of the following types of weir for the given data. • Waste weir with water cushion • Surplus weir with Stepped apron (Calculate bottom width of Abutments, wing wall and return wall using thumb rule)	15

UNIT 4	**CULVERTS** Components of culvert, Calculation of flood discharge at culvert using empirical formula, determination of linear water way and number of openings from the given data. Draw the half longitudinal section, half longitudinal elevation, half plan at top, half plan at foundation level & cross section for the following • Single span slab culvert with splayed wing walls • Two span slab culvert with return wing walls • Two span box culvert with splayed wing walls • Pipe culvert	15
UNIT 5	**R.C.C. T - BEAM BRIDGE (Railways & Highways)** 1. General Principles involved in the design of RCC t beam bridge (with out design) 2. Components of bridge, Calculation of flood discharge at bridge using empirical formula, determination of linear water way and number of openings from the given data. 3. Details of abutment, piers, wing walls etc to be determined using thumb rules and standard practice. 4. Draw the half longitudinal section, half longitudinal elevation, half plan at top, half plan at foundation level & cross section half through pier and half through centre span of the following types of weir for the given data. • Two span RCC T- beam highway bridge with return wing walls. • Two span RCC T-beam highway bridge with splayed wing walls. • Two span RCC T-Beam railway bridge with splayed wing walls.	12
	Case study/mini project	09
	Total	78

Course Delivery:

- The course content may be delivered using models and Videos

SUGGESTED STUDENT ACTIVITIES

Identify the spoiled earthen embankment nearby and prepare a report with drawing

1. Visit to a nearby canal, take the field data and draw the c/s of canal.
2. Identify and take the details of existing tank weir/tank sluice in the vicinity of your area and draw all the views.
3. Identify and take the details of existing culvert/highway bridge/railway bridge nearby and draw all the views.
4. For the given data prepare a model of any one of the following.
   - Tank sluice
   - Tank weir
   - Culvert
   - Railway/Highway bridge

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

(Unsatisfactory- **1,** Developing **-2,** Satisfactory **-3,** Good- **4,** Exemplary- **5**)

2. Report should contain log sheet, respective drawings and photos

3. Reports should be made available to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1,** Developing **2,** Satisfactory **3,** Good **4,**Exemplary5				
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Convensions and log sheet	5				
Total	13				
Average=(Total /4)	3.25= 4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE Cognitive Levels						Marks weightage		weightage (%)	SEE Question to be set
			R	U	Ap	Ay	C	E				
1	Earthen dams and canals	9	20%	40%	40%	0%	0%	0%	15	50	34	1
			3	**6**	**6**	**0**	**0**	**0**				
2	Tank sluice	18	20%	40%	30%	10%	0%	0%	35			
			7	**14**	**10**	**4**	**0**	**0**				
3	Tank weirs	15	20%	40%	30%	10%	0%	0%	50		33	1
			10	**20**	**15**	**5**	**0**	**0**				
4	Culverts	36	20%	40%	30%	10%	0%	0%	50		33	1
5	T-beam bridges		**10**	**20**	**15**	**5**	**0**	**0**				
Total		**78**	20%	40%	31%	9%	0%	0%	150		100	3
			30	**60**	**46**	**14**	**0**	**0**				

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**50**
2	Applying the knowledge acquired from the course	**30**
3	Analysis	**10**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**0**

Reference Books

1. Irrigation manual – Ellis. Tamil Nadu Govt. Publication
2. Irrigation Drawing - Sathyanarayana murthy (Subhash stores Bangalore)
3. Design of bridge - by N. Krishna murthy (Subhash stores Bangalore)
4. Bridge Engineering - Johnson D. Vector Oxford IBH Publications
5. Design and construction of highways bridge - K. S. Rekshit (New Central Book Agency Calcutta - 9
6. Irrigation Engineering and hydraulic structures - S.K. Garg (Khanna Publishers, Delhi)
7. Bridge Engineering - J.S. Allegia (Charotar book stall anand)
8. Irrigation and water power engineering - B.C.Punmia, Pande, B.B.Lal Lakshmi Publications, 7/21, Ansari Road, Daryaganj, New Delhi - 110 002.
9. Principles and practice of irrigation engineering - S.K.Sharma (S.Chand and company Pvt. Ltd. Ramnagar, New Delhi - 110 055
10. Irrigation Engineering - vol I, II and III K.R. Sharma
    A text book of irrigation engineering and Hydraulics structures R.K.Sharma(Oxford - IBH publishing Co.,)
11. Bridge engineering by ponnuswamy (Mc Graw Hill Education, Publication)
12. Civil Engineering Drawing Manual - TTTI Publications.

COURSE CONTENT AND EVALUATION CHART FOR SEE

Course assessment and evaluation chart:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct assessment	CIE	IA	Students	Graded exercises (Average marks of all 16 drawing sheets)	20	Drawing sheets / Index sheets	1to 4
				Student Activities/ Case Study	05	Report + photos	1 to 4
	SEE	end exam		End of the course	100	Answer scripts at BTE	1 to 4
Indirect assessment	student feedback on course		Students	Middle of the course		Feedback forms	Delivery of course
	End of course survey			End of the course		Questionnaires	Effectiveness of delivery of instructions & assessment methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. Rubrics to be devised appropriately by the concerned faculty to assess Case study / Student activities.

GRADED EXERCISES

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
1	**Earthen bunds and canals**	2	Earthen bunds	3
		1	Canals	3
2	**Tank Sluice**	4	Tank Sluice with Head and Gibbet wall type and plug arrangement	1
			Tank sluice with Tower head type and shutter arrangement	1
			Pipe sluice with Tower head and plug arrangement	1
			Pipe sluice with head and gibbet wall type and plug arrangement	1
3	**Tanks/waste weirs**	2	Waste weir with water cushion	1
			Surplus weir with Stepped apron	1
4	**Culverts**	4	Single span slab culvert with splayed wing walls	1
			Two span slab culvert with return wing walls	1
			Two span box culvert with splayed wing walls	1
			Pipe culvert with return wing walls or splayed wing wall	1
5	**R.C.C. T - Beam Bridge (Railways & Highways)**	3	(i)Two span R.C.C. T - Beam highway Bridge with return wing wall	1
			(ii) Two span RCC T-beam Highway bridge with splayed wing walls.	1
			(iii)A two span RCC T-Beam Railway bridge with splayed wing walls.	1
	TOTAL	**16**		19

Note:

(1) Student should submit all the 16 drawing sheet compulsorily.

(2) Each drawing sheet should be evaluated for 20 marks as and when exercise is completed.

(3) Index sheet with signature of Candidate, Course co- ordinator and Programme Co-ordinator should be submitted during IA Verification.

Name of the Institution
Department of Civil Engineering

IRRIGATION AND BRIDGE DRAWING Code: **15CE55D**

INDEX SHEET V SEM 2017-2018

BATCH- ___

Evaluation of Drawing Sheets and Internal Assessment Marks

Name of the Candidate :_ _____

Reg No:_____

Unit No	Topic of the Unit	Sheet no	Date	Title of the Sheet	Max Marks	Marks Obtained	Average IA Marks Unit wise
1	**Earthen bunds and canals**	1		(i)Earthen bunds	20		
		2		(ii)Earthen bunds	20		
		3		Canals	20		
2	**Tank Sluice**	4		Tank Sluice with Head and Gibbet wall type and plug arrangement	20		
		5		Tank Sluice with Tower head type and shutter arrangement	20		
		6		Pipe sluice with Tower head and plug arrangement	20		
		7		Pipe sluice with Head and Gibbet wall type and plug arrangement	20		
3	**Tanks/waste weirs**	8		Waste weir with water cushion	20		
		9		Surplus weir with Stepped apron	20		
4	**Culverts**	10		Single span slab culvert with splayed wing walls	20		
		11		Two span slab culvert with return wing walls	20		
		12		Two span box culvert with splayed wing walls	20		
		13		Pipe culvert with return wing walls or splayed wing wall	20		
5	**R.C.C. T - Beam Bridge (Railways & Highways)**	14		(i)Two span R.C.C. T - Beam highway Bridge with return wing wall	20		
		15		Two span RCC T-beam Highway bridge with splayed wing walls.	20		
		16		(iii)A two span RCC T-Beam Railway bridge with splayed wing walls.	20		

Average IA Marks = $\frac{\textit{Total Internal Marks Obtained}}{\textit{Total Internal Marks}} = \frac{(\ 320\ )}{20} =$

Course Outcome IA =

Unit	I	II	III	IV	V	Average IA Unit Wise $\frac{(U1+U2+U3+U4+U5)}{5}$
CO	CO1	CO2	CO3	CO4	CO5	
Marks						

Sig. of Student Sig. of Course co-ordinator Sig.of Programme Co-ordinator

Fifth Semester Diploma Examination
MODEL QUESTION PAPER
IRRIGATION AND BRIDGE DRAWING

Time: 4 Hours Max. Marks: 100

Note:

- Assume the missing data suitably.
- Drawing should be neat and fully dimensioned.
- Answer any one question from Q1, Q2
- Question no-3 is compulsory.

PART-A

Q1(a). Draw the cross sections of an Earthen bund with core wall to suitable scale to the following details

Bed level	100.00m
Hard soil level	98.00m
Top bund level	105.00m
MWL	104.00m
FTL	103.00m
Top width of bund	3.0m
U/S slope	1½:1(H:V)
D/S slope	2:1 (H:V)

Core Wall:
Top width 1.0m
Bottom width at bed level-2.0m
Bottom width at Hard soil level -1.5m
Revetment on u/s is of 0.45m thick with 0.15m Gravel backing
Provide Rock toe on the downstream side. - 15 Marks

Q1(b) The following are the details of a " TANK SLUICE" with tower head

Top width of bund	2m.
Front slope of bund	1.5 : 1
Rear slope of bund	2 : 1
Top Bund Level	126
Maximum Water Level	125.2
Full Tank Level	124.60
Sill Level	121.50
Top level of tower head	125.50

The tower head consists of a masonry well of internal diameter of 1.2 m with 400mm shell thickness from top to bottom

Size of sluice barrel = 600mm wide and 750 mm. deep , thickness of side walls = 450 mm.
Thickness of RCC slab over barrel = 150mm.
Size of rear cistern = 1.2 m x 1.2 m.
Thickness of cistern walls = 450 mm.
Assume any necessary data and draw to a suitable scale the following views

i) Longitudinal Section - 20 Marks
ii) Plan at Top. - 15 Marks

Q.(2) Following are the details of "Tank weir" with stepped apron

Hydraulic particulars:

Catchment area - 4km^2

Ryve's constant – 8.5

Head of water over the weir is restricted to 1.00m

Calculate the length of the weir -05marks

Constructional details:

Top width of bund	-	2.00 m
TBL	-	29.00 m
MWL	-	28.00 m
FTL	-	27.00 m
Bed level of tank	-	26.00 m
Upstream slope of bund	-	1.5:1
Downstream slope of bund	-	2:1
Top of foundation level	-	24.80 m
Bottom of foundation level	-	24.20 m
Ground level at D/S side of weir	-	25.20 m
Top of U/S return wall	-	27.90 m
Top of D/S return wall	-	26.20 m
Crest width of body wall	-	1.00 m
Bottom width of body wall	-	2.00 m
Splay of wing wall on U/S side	-	1 in 3
Splay of wing wall on D/S side	-	1 in 5

Provide 600mm thick stepped apron for a length of 3.00m at RL+26.00 and 3.5m at RL+25.20m.Suitable grouted apron is to be provided beyond solid apron

Dam stone of size 100mm x100mm x1m are to be fixed in the body wall at 1.00m C/C

Top width of abutment, Wings, Return wall – 450mm

Bottom width of these walls may be taken as 0.4H; Where H is the height of wall.

Assume any other necessary data suitably and draw to a suitable scale the following views.

(i) Cross section across the body wall. – 25 Marks

(ii) Half plan at top & half plan at bottom. -20 Marks

Q3. Following are the details for a RCC Slab Culvert proposed across a stream

(a) Hydraulic Particulars:

Catchment Area	-	4.5 Sq. Km
Ryve's constant	-	7.5
Velocity of flow through vent	-	1.75 m/sec
Average bed width of stream	-	9 m
Assume afflux	-	150 mm

(b) Constructional Details:

No. of Spans	-	2
Bank slope	-	1:1
Bed level of stream	-	100.00 m
H.F,L	-	102.00 m
G.L & Road Formation Level	-	103.00 m
Hard rock level	-	98.50 m
Road Width	-	7.50m
Thickness of RCC slab	-	0.30m
Thickness of wearing course	-	0.10m

Bearing slab on abutment & pier - 0.30m
Top and bottom width of pier - 0.9m
Top width of abutment - 1.00m
Bottom width of abutment
(Front face vertical) - 1.50m
Parapet wall - 200mm thick
RCC railings work 0.90m high, between RCC piers of 0.15mX0.15m at 2m c / c
Wing Wall: Return type, top width 0.45m, front face is vertical.
Provide protection works both u/s and d/s
Calculate linear waterway and span -10 Marks
Assuming any other data, draw to a scale of 1:50 the following views.
(i) Half longitudinal elevation and half longitudinal section -20 Marks
(ii) Half plan at top and half plan at bottom -20 Marks

MODEL QUESTION BANK

Question for 15 Marks

1. For the given details of earthen dam draw the cross-section of the earthen dam showing -top width, bottom width, u/s and d/s slopes, revetment, hearting material, casing material, grip trenches, counter berm, phreatic line, and all levels.
2. For the given details of earthen dam draw the cross-section of the earthen dam with puddle core wall also draw the plan showing the drainage arrangements.
3. For the given details draw the cross-section of canal in full embankment.
4. For the given details draw the cross-section of canal in full cutting.
5. For the given details draw the cross-section of canal in partial cutting and partial embankment.

Questions for 35 marks:

1. For the given hydraulic particulars design the diameter of orifice required in tank sluice with head and gibbet wall type, slab barrel with plug arrangement, draw the longitudinal section showing all the details.
2. For the given data, draw the longitudinal section, half plan at top and half plan at foundation level of tank sluice with head and gibbet wall type, rectangular barrel with plug arrangement showing all the details.
3. For the given data, draw the longitudinal section, half front elevation and half sectional elevation of tank sluice with head and gibbet wall type, rectangular barrel and plug arrangement showing all the details.
4. For the given data, draw the longitudinal section, half front elevation and half sectional elevation of a tank sluice with tower head type, slab barrel and shutter arrangement showing all the details.

5. For the given data, draw the longitudinal section, half plan at top and half plan at foundation level of a pipe sluice with tower head type and plug arrangement showing all the details.

6. For the given data, draw the longitudinal section, half plan at top and half plan at foundation level of a pipe sluice with head and gibbet wall type and plug arrangement showing all the details

7. For the given data, draw the longitudinal section, half front elevation and half sectional elevation of a pipe sluice with head and gibbet wall type and plug arrangement showing all the details.

8. For the given data, draw the longitudinal section, half front elevation and half sectional elevation of a pipe sluice with tower head type and plug arrangement showing all the details.

Questions for 50 Marks:

1 For the given data draw the half sectional elevation, half front elevation, half plan at foundation, half plan at top and cross section of tank weir with water cushion.

2 For the given data draw the half sectional elevation, half front elevation, half plan at foundation, half plan at top and cross section of tank weir with stepped apron

3 For the given data draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a single span slab culvert with splayed wing wall.

4 For the given data, draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a two span slab culvert with return wing wall

5 For the given data, draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a two span box culvert with splayed wing wall.

6 For the given data, draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a pipe culvert with splayed wing wall.

7 For the given data, draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a pipe culvert.

8 For the given hydraulic parameters such as catchment area, ryve's constant, calculate the discharge in the drain, also calculate the linear waterway and span. Draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a two span R.C.C T-beam road bridge with return wing wall for the given data

9 For the given data, Draw the half sectional elevation, half front elevation, half plan at foundation ,half plan at top, half cross section through pier and half cross section through centre span of a two span R.C.C T-beam road bridge with return wing wall

10 For the given hydraulic parameters such as catchment area, ryve's constant, calculate the discharge in the drain, also calculate the linear waterway and span. Draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a two span R.C.C T-beam road bridge with splayed wing wall for the given data.

11 For the given data, Draw the half sectional elevation, half front elevation, half plan at foundation, half plan at top, half cross section through pier and half cross section through centre span of a two span R.C.C T-beam road bridge with splayed wing wall

12 For the given hydraulic parameters such as catchment area, ryve's constant, calculate the discharge in the drain, also calculate the linear waterway and span. Draw the half sectional elevation, half front elevation, half plan at foundation and half plan at top of a two span R.C.C T-beam railway bridge with splayed wing wall for the given data

13. For the given data, Draw the half sectional elevation, half front elevation, half plan at foundation ,half plan at top, half cross section through pier and half cross section through centre span of a two span R.C.C T-beam railway bridge with splayed wing wall.

	Course Title: **CONSTRUCTION PRACTICE**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE56P**
	Type of Course: **Practices, Demo, Student activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre-requisites: Knowledge of Materials of Construction, Construction Technology and Surveying.

Course Objective:

1. To give idea of basic setting out operations and construction of masonry units.
2. To estimate the quantity of steel reinforcement required for different elements of work
3. To realize the importance of form work, scaffolding and shuttering
4. To create awareness about various tests and repair methods used in buildings.

On successful completion of this course, the student will be able to

Course Outcome		Experiments linked	CL	Linked PO	Teaching Hrs
CO1	Plan setting out operations effectively ,estimate the amount of earth work and use various tools and safety equipments	1,2,3	**R/ Ap/Ay/C/E**	1,2,3,4, 5,8,9,10	12
CO2	Construct basic types of brick masonry arrangements and calculate the quantity of materials	4,5,6	**R/ Ap/Ay/C/E**	1,2,3,4, 5,6,8,9,10	15
CO3	Prepare bar bending schedules and estimate the quantity of steel required for various elements.	7,8,9,10,11	**R/ Ap/Ay/C/E**	1,2,3,4, 5,6,7,8,9,10	27
CO4	Perform plastering, painting, plumbing and repair works carried out at site..	12,13,14,15	**R/ Ap/Ay/C/E**	1,2,3,4,5,6 8,9,10	12
CO5	Recall the concept of water proofing, laying tiles, scaffolding, symbols ,sign conventions of traffic, architecture & should be in a position to supervise the same after the demo.	16,17,18,19	**R/ Ap/Ay/C/E**	1,2,3,4,5,6, 8,9,10	12
				Total sessions	**78**
Legend- R; Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation					

Mapping Course Outcomes with Program Outcomes

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments And Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
CONSTRUCTION PRACTICE	3	3	3	3	3	3	2	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

EXPERIMENT NO	CONTENTS	HOURS
1	Study of construction tools, plumbing tools and sanitary fixtures,	3
2	Demonstration of safety kits and accessories used at construction site -Personal Protective Equipment (PPE).	3
3	Setting out center line for a small building, and estimate the quantity of earth work by LWS/Center line method	6
4	Construct One brick thick wall in English bond to a height of one meter in cement mortar including L-junction and T-junction (1 meter length) and also calculate the quantities.	6
5	Construct One and half thick brick wall in English bond to a height of one meter in cement mortar.	6
6	Construct One and half Brick thick pillar to a height of one meter in cement mortar.	3
7	Prepare Bar bending schedule & Fabrication of reinforcements for a Doubly Reinforced beam	6
8	Prepare Bar bending schedule & Fabrication of reinforcements for a Two way slab	6
9	Prepare Bar bending schedule & Fabrication of reinforcements for a lintel with chejja	3
10	Prepare Bar bending schedule & Fabrication of reinforcements for a column with footing	6
11	Fabrication of timber or steel formwork for a monolithically casted beam and slab. (Procedure, Sketch, Tools, Observation Tabulation & Calculation of quantity of materials required only).	6
12	Plastering for a new masonry wall surface (1 square metre area) with CM (1:6)	3
13	Painting for a given area (1 square meter area).	3
14	Fixing of doors and windows	3
15	Prepare a plan for PVC pipe layout using valves, fixtures, adhesive solvents and fittings from over head tank to wash basin/tap and execute it.	3
	Demo only	
16	Water proofing for roof & crack inhibition methods (Grouting) in buildings	3
17	Laying of floor tiles	3
18	Construction of Single and Double Scaffolding	3
19	Study of Symbols and sign conventions related to Architecture – Traffic – Electrical Circuits - Plumbing & welding	3

COMPULSORY SUGGESTED STUDENT ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage. Student has to be assigned with activities in below mentioned areas. Each student must be able to get the exposure of mentioned items.

SL NO	Items	EXPOSURE UNDER FOLLOWING ITEMS	REPORTS TO BE COLLECTED/PREPARED
1	EXCAVATION FOR BUILDING	1. Setting out corner benchmarks. 2. Survey for ground levels. 3. Excavation to approved depth. 4. Dressing of loose soil. 5. Constructing dewatering wells and interconnecting trenches. 6. Marking boundaries of the building. 7. Constructing protection bunds and drains	1. Checklist for- excavation 2. Plans of ground levels (block levels) 3. Plan and sections of architectural good for construction drawing 4. Reference coordinates buildings/blocks coordinates' .w.r.t total station. 5. soil investigation report 6. Photos and videos of the group under training 7. Weekly Progress report of implant training 8. Methodology 9. Specifications 10.List of tools and equipment used 11.Various Tests on materials 12.Frequency of material testing 13.Test reports 14.Stages of inspection
2	ANTI TERMITE TREATMENT	1. Methodology 2. Types of anti-termite 3. Anti termite treatment will be done in 3 stages- 4. Before foundation PCC 5. Before plinth PCC 6. Periphery of the building before flagging course.	1. Checklist for- ANTI TERMITE TREATMENT 2. Weekly Progress report of implant training 3. Methodology 4. Specifications 5. List of tools and equipment used 6. Various Tests on materials 7. Frequency of material testing 8. Test reports 9. Stages of inspection
3	SOLING	1. Preparation of sub grade 2. Laying and Packing of Soling Stones 3. Consolidation of Soling	1. Checklist for- SOLING 2. Weekly Progress report of implant training 3. Methodology 4. Specifications 5. List of tools and equipment used 6. Various Tests on materials 7. Frequency of material testing 8. Test reports 9. Stages of inspection
4	PLAIN CEMENT CONCRETE	1. Excavation dimensions, depth of excavation as per required RL and gridlines will be checked before start of PCC and necessary shuttering will be done. 2. Tools required like panja, rammer etc. compaction manually or mechanical compactors. 3. will be ensured before start of work. 4. Grade of concrete will be C.C.1:4:8 or as per the	1. Checklist for PLAIN CEMENT CONCRETE 2. Level Records to be of final excavated area. (For individual footings).

SL NO	Items	EXPOSURE UNDER FOLLOWING ITEMS	REPORTS TO BE COLLECTED/PREPARED
		specifications. 5. After setting of the PCC, curing of concrete will be done by sprinkling water on it for 15 days.	
5	FOOTING CONCRETE	1. Shuttering procedure 2. Concreting procedure 3. Reinforcement procedure 4. Detailing of reinforcement 5. Curing procedure	6. Checklist for footing concrete 7. Cube register. (page) 8. Bar bending schedule 9. Pour card 10. List of tools and equipments used
6	COLUMN CONCRETE	1. Starter Concreting 2. Reinforcement 3. Detailing of reinforcement Shuttering 4. Scaffolding 5. Concreting **6.** Curing	1. Checklist for column concrete 2. Cube register. 3. Bar bending schedule 4. Pour card
7	EARTH FILLING	1. The maximum dry density and optimum moisture content of the approved soil for backfilling will be calculated by doing Proctor test. 2. The earth transported and dumped 3. Care shall be taken that the loose depth of filling is not more than 300 mm. 4. 8-10T roller shall be passed over loosely filled soil to get 200mm thick compacted fill. 5. water to sprinkle shall be decided practically depending upon the core tests. 6. compacted by using steel rammers and plate compactors. 7. Core cutter tests	1. Checklist for BACK FILLING 2. Approval of Quality of soil. 3. Level Record 4. Records to be of core tests
8	PLINTH BEAMS	1. Reinforcement 2. Shuttering 3. Detailing of reinforcement Scaffolding 4. Concreting 5. Curing	1. Checklist for plinth beam concrete 2. Approval of Quality of soil. 3. Level Record Records to be of core tests
9	ROOF SLAB CONCRETE	1. Form work 2. Reinforcement 3. Detailing of reinforcement Construction Joint 4. Production and placement of concrete 5. Curing	1. Checklist for slab casting 2. Approval of Quality of soil. 3. Level Record Records to be of core tests
10	CONCRETE BLOCK MASONRY	1. Materials:-Blocks, Mortar, Sand, Cement 2. Workmanship 3. Curing	1. Checklist for Block Masonry 2. Quality approval of blocks

SL NO	Items	EXPOSURE UNDER FOLLOWING ITEMS	REPORTS TO BE COLLECTED/PREPARED
11	WOODEN & ALUMINIUM DOOR/WINDOW /VENTILATORS FRAMES PANNELED DOOR SHUTTERS/ FLUSH DOOR SHUTTER	1. The sectional drawings 2. Bull marks" or "thiyas" 3. Arrangement for hold fasts 4. Check for common top Level of frames and its true plumb & line 5. Rebate notch provided in frame and shutter thickness will be matching. 6. Check the opening side of shutter before fixing frames 7. Horizontal bracing	Checklist for- DOOR/WINDOW/VENTILATORS FRAMES AND SHUTTERS
12	TOILET WATER PROOFING	1. chemical surface 2. The sunken portion 3. A coat of waterproof plastering 4. Corner concrete 5. Screed concrete 6. Curing.	1. Checklist for Toilet water proofing 2. Quality approval of chemicals
13	TERRACE WATER PROOFING	1. Water proofing agent. 2. The slope 3. The finishing course 4. Insulation or under bed. 5. Water test	1. Checklist for terrace water proofing 2. Quality approval of chemicals
14	PLASTERING – INTERNAL & EXTERNAL	1. Material 2. Workmanship 3. External and internal plaster 4. Scaffolding 5. Curing	Checklist for Plastering
15	TILE WORK FLOORING Or TILING	1. TILES: The type, quality, size, thickness and colour of tiles for flooring, 2. Procedure for LAYING 3. SKIRTING AND DADO **4.** CURING:	Checklist for- TILING
16	PAINTING WORKS	1. Painting Works 2. General Specifications 3. For Gypsum Plaster Surfaces- 4. For Cement Plaster Surfaces: 5. Colour Wash **6.** Cement Paint	Checklist for- PAINTING

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary5)
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4,Exemplary5				
1.Organisation	1				
2.Fulfill team's roles	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfil team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Rare Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Twice test (average of two tests)	Test 1	10	Blue books	CO1,CO2
					Test 2			CO3,CO4,CO5
				Graded exercises		10	Record	All CO's
				Suggested Activity		05	Reports	All CO's
	SEE	End Exam		End of the course		50	Answer scripts at BTE	CO1,CO2,CO3,CO4,CO5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		---	Feedback forms	CO1,CO2 Delivery of course
	End of Course Survey			End of the course		---	Questionnaires	CO1,CO2,CO3,CO4,CO5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
1. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% Weightage
1	Remembering and Understanding	**10**
2	Applying the knowledge acquired from the course	**60**
3	Analysis	**10**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**0**

Sl No	Scheme of End Examination	Marks
1	Procedure, Sketch, Tools, Observation,	10
2	Tabulation & Calculation of quantity of materials required	10
3	Conducting exercise	10
4	Record, Mini project report on suggested activities	10
5	Viva-voce	10
	Total	**50**

Note: Record & Report on suggested activities are mandatory during SEE.

Reference Books

1 A textbook of Building construction - Bindra & Arora (Dhanpat Rai & Sons Delhi - 6)
2 A text book of Building construction - Sushil Kumar (Standard publishers)
3 S.P.34 BIS Publication
4 A text book of Structural Design & Drawing - Singh (India publishing house)
5 A text book of Practical Building construction - Mantri (Mantri publications)
6 Plumbing by A. Johnson
7 Plumbing instruction and design by L.V. Ripka
8 Plumbing by Harald E Babit
9 Plumbing by John H Inns

List of Equipments

Sl.No	Equipment Name	Quantity
1	Trowel	15
2	Mortar pans	20
3	Plumb bob	15
4	Shovel	05
5	Spades	05
6	Pick axes	10
7	Bar bending table	02
8	Wire brush	05
9	Spirit level	05
10	Tubular scaffolding	02 units
11	Tri square	05
12	Bar bending tools	02 sets
13	Ultra sonic pulse velocity test equipment	01 set
14	Personal protective equipment	02 sets
15	Grouting hand pump with nozzle	02 sets
16	Plumbing tools kit	02 sets
17	Valves different sizes	06 No's
18	Pipe wrench	05 No's
19	Plumbing and sanitary fixtures, fittings	05 sets
20	Threading die set	02 No's
21	Model of door and window with fastenings	01Each
22	Symbols and sign conventions charts related to Architecture – Traffic – Electrical Circuits - Plumbing & welding	01set
23	Brushes and rollers of different sizes	03set
24	Sand paper	03set
25	Scrappers	03set
26	Mixing pan	03set
27	Putty blades	03set

	Course Title: PROFESSIONAL PRACTICE		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE57P**
	Type of Course: **Tutorial and practice**	Credit **:03**	Core/ Elective: **Core(practice)**
CIE- 25 Marks			SEE- 50 Marks

PREREQUISITES: Basic Computer Skills, Communication Skills in English.

COURSE OBJECTIVES: Students should be able:

1. To develop manual writing skills.
2. To identify and explain the impacts of civil engineering on global, economic, environmental and societal issues.
3. To demonstrate the ability to learn on their own and imbibe the culture of life-long learning.
4. To apply the principles of leadership and attitudes for effectively managing civil engineering projects.
5. To explain key concepts and problem solving processes used in civil engineering management, business, public policy, and public administration including the legal aspects of civil engineering.

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Follow student ethics, acquire information from various sources and develop techniques to solve any problem, and engage in, life-long learning for self-development	***1,2,3,4***	***R/U/Ap/ An***	1,2,3,4, 5,7,8,9, 10	**24**
CO2	Practise teambuilding to develop solutions for well-defined problems and inculcate ability to reason critically, to form intelligent opinions, to make good decisions, leadership skills, observations, effective time management	***5,6***	***R/U/Ap/ An/E***	1,2,3,5, 6,7,8,9, 10	**12**
CO3	Acquire information through expert lectures, describe tendering processes, and make effective, professional presentation on identified topics.	***7,8,9***	***R/U/Ap/ An***	1 to 10	**27**
CO4	Create awareness to the society by highlighting the importance of sustainability of natural resources and retain balance of environment and to serve the community and uphold the idea of "Help ever, hurt never" as his motto and contribute his bit to make the world order politically powerful, socially stable, economically efficient and spiritually strong.	***10, 11,12***	***R/U/Ap/ An***	1 to 10	**15**
				Total sessions	**52**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
PROFESSIONAL PRACTICE	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNIT	MAJOR TOPICS		HOURS ALLOTTED	
CO1	Self-Development (Individual practices)	Student ethics & anthems	6	24
		Problem solving technique	9	
		Information, Search, Data collection	3	
		Task Management	6	
CO2	Development in groups (Team work Exercises)	Team building activities	6	12
		Group Discussion	6	
Report evaluations through check list				
CO3	Professional fundamentals	Guest lectures	9	27
		Mock Tendering process	9	
		Seminar Presentation	9	
CO4	Communicate effectively in society	societal moral Activities	6	15
		Life skills	6	
		Modular courses	3	
Consolidated Report evaluations				
		TOTAL		**78**

Note:

1. Due to intensive nature of this course, full attendance is required.
2. The subject teachers are free to design any assignment relevant to the topic.
3. Evaluation check list (Annexure) should be attached to the report for each units.
4. Several suggested topics has been provided at the end of the document.
5. Students should dedicate minimum six hours of outside study, rigorous reading, and intensive writing per week and submit report on time, in both paper and soft copy through e-mails.

DETAILED COURSE CONTENT

Unit1	STUDENT ETHICS AND ANTHEMS	6hours

1. In each and every professional practices class students should attend elegantly in formal dress
2. To organise and attend every national festival in colleges developing national integrity protecting national pride.
3. Keeping classrooms, college premises clean.
4. Give way to lecturers while walking in the corridor.
5. Wish the lecturers
6. Handwriting
7. Communicate in English in every professional practice classes.
8. Do not write anything on the desk, wall etc
9. Behaviour of students should be gentle, polite and respectful with elders,
10. Interpersonal relationship with classmates and helping others
11. Should not destroy Any public property
12. Don't spit anywhere in college, Avoid Sticking chewing gum to benches
13. Students should be kind to animals.
14. Maintain personal health and hygiene- Awareness about Regular habits, keep yourself clean, regularly cut nails, visiting regularly spiritual places, Prayer.
15. Protect the natural resources
16. Practice physical exercise every day –"Sound body sound mind"
17. Reading English newspapers daily and watching news
18. To maintain the discipline in public places, and college events/functions
19. Eating habits-dos and don'ts-avoid over eating.
20. Always speaking truth, being honest.
21. Develop Adaptability to different situations.
22. Love yourself
23. Boost your self-esteem, self-confidence, positive attitude.
24. Always have a tendency to face the Challenges, Never miss an opportunity.
25. To know /aware about the ill effects of smoking, alcohol consumptions.
26. Control in spending money
27. Right use of technology
28. Active participation in co-curricular activities
29. Maintain peace and harmony, avoid groupism
30. Always give way to ambulance, or emergency vehicle.
31. Patience

Guide for conducting & Graded activities preparations

1. Each students should take any of the topic or similar ethical topics above and speak in creative way how one should follow the ethical values.
2. After each student speaking, discussion about the topic involving lecturers and students.
3. Hence forth in each and every classes students should take an oath that they will follow the student ethics

REPORT

Self-appraisal Evaluation check list (Annexure) should be filled by students

All writing assignments are expected to be turned in on within stipulated time to facilitate the writing development process;

Unit2	Problem Solving techniques (Any one technique may be considered)	9hours

Trial and error, SWOT analysis, Brain storming, Lateral thinking, 5W 1H & 5W Analysis

Eg:

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats.

Following points will be useful for doing SWOT (Personal / Problem).

a) Your past experiences, b) Achievements, c) Failures, d) Feedback from others etc

Guide for conducting & Graded activities preparations

Student should be given brief idea about problem solving technique by Presentation

Example for SWOT : Problem-Low performance of student (xyz) in exams

Conduct complete survey of yourself to attain SWOT

By identifying the swot personally arrive plans/ strategy to solve your problem

Strength	Weakness
S1.Hard working S2.Commitment S3. Good handwriting S4. Good in practical's	W1 Weak in mathematics W2 Think negative in exam W3 Easily get distracted W4 Regular illness.
Opportunity	**Threat**
O1. Library O2. Internet resources O3. Job Placement O4. Intelligent friends	T1. Television & mobile T2. Limited Time T3. Disturbing environment T4. Financial problems

Examples:

1. Converting weakness to strength by available opportunity (S1 &O1)–Plan 1 eg: Hard working by using books in library
2. To minimizing the effect of threat by your strength (S2 & T1)- Commitment for not to use mobile and watch television
3. Minimizing weakness by available Opportunity (W1 & O1)–Plan 2 eg: by Using library books work hard on mathematics

Similar strategies can be prepared for solving problem

1)Increase strength by opportunity (SO). 2) Suppress threat by your strength(ST). 3)Minimize weakness by opportunity (WO). 4) Minimize weakness by threat (WT) 5)Supress weakness by your strength (SW) which leads to TWOS matrix

Each student should practise

Exercise 1: Each student should work out personal SWOT for his development.

Exercise 2: Choose any other problem.

Similar can be done for your project work.

Example for 5W analysis- Problem-I will be late to class

Questioning series of "why" to the problem, it will get you root cause of problem

Why I am late to the class - because vehicle break down

Why vehicle break down- I dint service my vehicle

Why I dint service my vehicle – I woke up late

Why I woke up late-I sleep late

Why I sleep late- I watch television late night – which is the root cause for the problem

REPORT (2 problem) should include STEPS IN PROBLEM SOLVING,

1)Identify and clarify the problem,

2)Information gathering related to problem,

3)Evaluate the evidence,

4)Consider alternative solutions and their implications,

5)Choose and implement the best alternative,

6) Report Review

Evaluation check list (Annexure) should be filled by course coordinator

Word processing document

Unit3	Information Search ,data collection	3hours

1. Collection of data for valuation of old building
2. Collection of details of BOT project under execution.
3. Collection of Data and case study of failure of RCC structure.
4. Collection of information on any topic from journal available in library
5. Collecting an estimate from P.W.D.
6. International Plumbing code and material specifications from market.
7. Collecting market rates for material and labor for building items .
8. Collecting D.S.R. /C.S.R. from PWD and its use for preparing revise estimate.
9. Collection and reading of drawings of buildings from architect / Practicing engineers and listing of various features from the drawings.
10. Market survey for pumps ,pipes and peripherals required for multi storied buildings
11. Non Conventional Energy Sources with focus on solar energy
12. Elevators installation and maintenance

Any other suitable areas (general)

13. Five success Stories of First Generation Entrepreneurs
14. Assessing Entrepreneurial Competencies
15. Business Opportunity Selection and Guidance
16. Planning for completion & Growth
17. Problem solving-An Entrepreneur skill

Guide for conducting & Graded activities preparations

1. Word processing document.
2. Document should include graphicals such as flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.
3. Arrange an exhibition, & displaying the best of all.
4. Carry out class Oral presentation.
5. Note making based on reading comprehension
6. Follow **SQ3R** method **(Search, Read, Recite, Review)**of reading,
7. techniques on Voice modulation, body language in communication

Evaluation check list (Annexure) should be filled by course coordinator

Evaluvation check list

Unit4	TASK MANAGEMENT	8hours

Any two from the list suggested

1. Collect the complete details of e-tendering, process , live paper advertisement.
2. Write on Mix Proportioning Of Self-Compacting Concrete By Different Mix Procedures
3. Develop a new Technology To Manufacture Common Building Burnt Brick
4. Preparing models using development of surfaces.
5. Collect and study IS code for Engineering Drawing or any other course.
6. Case Study Of Occupational Hazards Of Asbestos Industries : Ramco Industries, Karur
7. Case Study On nearby Building Cracks And Causes And Its Prevention
8. Case study of Ferro-cement and model making technique .
9. Collect the information about Environmental Aspects of LEED for Existing Buildings, and case study of LEED certified building.
10. Design a Roof Top Rainwater Harvesting At your Campus,
11. Auto workshop / Garage layout/ Nearby Petrol Pump Layout
12. Select different materials with specifications for at least 10 different grouts / Admixture and list the important behaviour/ properties desirable.
13. Select 5 different market steels used in civil engineering applications and Collecting information from Market: Nomenclatures and specifications
14. Manufacturing process, properties and applications of following materials – Ceramics, Gypsum board, Epoxy.
15. Develop a plan of Treatment And Reuse Of Automobile Service Station Wastewater For Vegetation.

Guide for conducting & Graded activities preparations

TASK MANAGEMENT

1. Students should be provided with the knowledge of introduction to task management, task identification, task planning, organizing and execution, closing the task.
2. Each student should be given different task to avoid duplication
3. Student should decide any task to be completed in a stipulated time with the help of teacher.
4. write a report considering various steps in task management.
5. And present it Professional way keeping in mind Presentation Skills Body language, Dress, Posture, Gestures, Eye contact and facial expression, Stage fright, Voice and language, Volume, Pitch, Inflection, Speed, Pause, Pronunciation, Articulation, Language, Practice of speech. Correct using Organs of speech, symbols, articulation of speech sounds- stress and intonation, clarrifing doubts.

Documentation Word processing a document

Evaluation check list (Annexure) should be filled by course coordinator

Unit5	 **Team Building and Leadership activity (any one for each group)** 	4hours

1. Ask the participants to get inside a circle so that no one's feet are touching theground outside of the circle. Once everyone has accomplished that task, the facilitator should applaud them and then remove 2-3 of the circles.Those participants who have lost their circle, now must join other circles. Again no feet can touch the ground outside of the circles.The facilitator continues to remove circles until only one is left. At this pointeveryone must try to fit their feet in the remaining circle. The more creative the solution, the better
2. Name of Activity: Balloon Towers-Instructions: Total group divides into smaller groups of 6-8 people. Each group is given 100 balloons and a roll of masking tape.The goal is to make a free standing tower (i.e. cannot attach off of ceiling, prop against wall, etc.)
3. Give each group an identical bag of construction materials. This can include canvas tarp, construction materials, such as pipes and connectors or newspapers, tape and straws, or lots of amusing recycled junk that doesn't necessarily have a name. Divide this equally so both groups will have identical supplies and put the supplies in paper bags. Using these materials each group must build half a bridge that begins on their side of the space and meets in the middle of the space with the other half of the bridge built by the other. Each half of the bridge must mirror the other exactly. Pace a tarp between the groups so they can't see each other's work. Groups must verbally communicate building techniques through the tarp so that they match and meet in the middle. They cannot touch the tarp. When groups think they have accomplished the task, remove the tarp and see how close they are.
4. Name of Activity:See, Run, Do (Materials Needed: A completed poster, Posterboard,Scissors,Glue,Construction paper,Markers/crayons/pencilsPreparation)
   Decide on the concept you want to teach a group (example: 4-H fundraising, communication) Make a poster that represents that concept. Bring all supplies needed to reconstruct the poster and enough for teams of 4-5.Instructions: Post the poster outside the room where no one can see it. Divide the group into teams of 4-5. One person is going to be "seer" – only this person can see the poster and s/he must tell the runner what he sees. Another person is the "runner" must run from the worktable to the seer. The rest of the team are the "doers" – must reconstruct the poster as the runner tells them, based on what the seer tells the runner. The runner can run as many times as necessary to get the correct information.
5. Objects are scattered in an indoor or outdoor place. In pairs, one person verbally guides his/her partner, a blindfolded person, through the minefield.
6. Tie the tire 5-6 feet above the ground. It should be tied off in 3-4 directions sothat it does not move too much. The object of the game is for everyone to pass through the center hole of the tire as quickly as possible without touching the sides of the tire. The group must decide on two people who will be designated as the spotters; they are responsible for helping the first and last persons through the tire. Then the group should decide on a strategy that will get everyone through the tire quickly and safely. If anyone touches the side of the tire the group must start again. The facilitator should be the judge of this.
7. Beforehand, tie two pieces of string around the eraser end of a pencil,Ask everyone to find a 4 members group.Choose one of the groups, and ask the players to stand back to back. Tie the two pieces of string around their waists so that the pencil is hanging down between them. Place the bottle on the floor between them. Challenge them to lower the pencil into the bottle without using their hands
8. Ask participants to stand on top of the sheet. Once all are on the sheet, tell them that they must turn it over without stepping off it. All participants must be standing on the sheet at all times. There can be no stacking or people on top of each other.

Guide for conducting & Graded activities preparations

Write a page how you conducted the activity? What did you learn from this activity?
Photographs of conducting activity with word processing document
Evaluation check list (Annexure) should be filled by course coordinator

Unit6	Group Discussion :	8hours

The topic of group discussions may be selected by the faculty members. (one from civil engineering and one from general topic for each group)

Some of the suggested civil engineering topics are –

1. Role of civil engineer in disaster management.
2. Scope of out sourcing of civil engineering services.
3. Pollution control
4. Recent trends in civil engineering as a service industry.
5. Waterproofing and leakage prevention.
6. Troubleshooting in plumbing system.
7. Causes of failure of road.

Some of the suggested topics are –

1. Education topics.
2. Sports topics.
3. current affairs
4. Social topics.
5. Management topics.
6. Economics and Business topics
7. Political topics.

***Some topics have been provided at the end of the document (Annexure).**

Guide for conducting & Graded activities preparations

The students should discuss in group of six to eight students and write a brief report on the same as a part of term work.

Group discussion technique –Ways to carry out group discussion

1. Introduction to group discussion,
2. Students should be given tips to work effectively in teams.
3. Establish good rapport.
4. Show interest with others and work effectively with them to meet common objective.
5. Working in teams understands and work within the dynamics of a groups.
6. Leadership in teams
7. Handling frustrations in group
8. Tips to provide and accept feedback in a constructive and considerate way ,
9. Initiating and concluding
10. Noting down, agenda and minutes of discussion/meeting.
11. Eye movement, fixations, regression, visual wandering. body language in communication
12. Interview technique necessity, tips for handling common questions.

Documentation

1. Evaluation check lists
2. Word processing document.
3. Prepare minutes of discussion.
4. Write thorough description of the topic discussed
5. Evaluation check list (Annexure) should be filled by course coordinator

Document expected to be turned in on within stipulated time to facilitate the writing development process.

Unit 7	Guest Lectures	12hours

The **Guest Lectures** from field/industry experts, professionals to be arranged (3 Hrs duration), from the following or alike topics and one video watching / listening .

1. HRD and civil engineering projects.
2. Project planning and execution of civil engineering projects.
3. PWD system of accounts
4. Contract Management
5. RCC design and detailing
6. Construction of highway, material of construction ,machinery used and manpower requirement
7. To set up a small scale industry.
8. Planning and design of irrigation project.
9. Construction of Flyovers: Special Features
10. Ready Mix concrete
11. Safety in Construction
12. Computer aided drafting
13. Industrial hygiene.
14. Composite Materials.
15. Ceramics
16. Safety Engineering and Waste elimination
17. Pollution control.
18. Non destructive testing.
19. Acoustics.
20. Illumination / Lighting system.
21. Fire Fighting / Safety Precautions and First aids.
22. Topics related to Social Awareness such as – Traffic Control System,
23. Career opportunities,
24. Communication in Industry,
25. Yoga Meditation,
26. Aids awareness and health awareness.
27. Professional communication

Guide for conducting & Graded activities preparations

Ways to conduct guest lectures

1. Watch and make a report on topic of your Guest Lecture talk.
2. Watch/listen an informative session on social activities or technical aspects.
3. Audio/visual record
4. Opportunity should be provided for Interpretation with experts
5. Should provide the information on method of note taking, actual Listening & Listening skills

Documentation

1. Make a report (2+1) on the programme.
2. The brief two reports to be submitted on the guest lecture by each student as a part of Term work.
3. Make a report on topic of your Video session
4. Any one mandatory hand written document others can be word processing document
5. All writing assignments are expected to be turned in on within stipulated time
6. Duplication of document should be avoided within students
7. Evaluation check list (Annexure) should be filled by course coordinator

Unit 8	Mock Tendering Processfor construction work	9hours

1. Students should be divided into groups each groups should act as a construction company
2. Arrange a guest lecturers from PWD/ZP/RDPR/KRIDL/KHB or lecturers for providing Tutorial or presentation on tendering process
3. Lecturer- act as a Client, All the groups as–Bidders or one of the group can assist lecturer to be a Client

Guide for conducting & Graded activities preparations

STEPS	DESCRIPTION	ROLES AND RESPONSIBILITIES
Tender process is determined	Identifying the work Ex: construction of compound wall, Small building etc. Sample document link **http://ssakarnataka.gov.in/pdfs/ tenders/NewSchBuildConstTender.pdf**	Lecturer/one of the group
Request for tender is prepared	The tenderer shall examine carefully all the tender documents consisting of Tender application form 1. Invitation for tenders 2. Instructions to tenderers 3. Form of tender agreement and qualification information 4. Conditions of contract 5. Contract data 6. Specifications 7. Tender drawings 8. Bill of quantities	Lecturer/one of the group
Launching of tenders	Advertisement of tenders or Tender Invitation	Display in notice board
Application response 1. Reception of bid 2. Opening of bid	Financial against your offered price, stay competitive in your offer by knowing the market rate in construction industry taking different scheduled rates from different districts. QUOTATION OF RATES **Other required/supporting documents :** Completeness of the tender document, Financial against current work load, Similar past experience, Comments from third party on your past and current performance, Current resources that you have (Technical staff, machine, Plant, Equipment and supporting staff.)	All groups
Comments and Discussion should be carried out about the deficiency and appreciation of tender bid given by each group		
Pre-qualification (Scrutiny of tenders) 1. Review of Documents 2. Technical evaluation 3. Financial assessment of best combined offers	Evaluation of bid Comparative statement	Lecturer/one of the group
Awarding contract for best document prepared	**Points to remember on other documents** Signing the agreement, Commencement of work, Period of completion, Liquidated damages, Period and value of running/on account bill, Security deposit, Refund of security deposit, Secured advance, Income tax deduction, WCT / VAT / cess / service tax, Defects liability period, Period of final measurement, Place of arbitration, Insurance.	Whole process and Tender document should be prepared as grade exercise by each student from all groups

Evaluation check list (Annexure) should be filled by course coordinator

Unit9	Seminar Presentation	8hours

1. The students should select a topic for Seminar based on recent developments in civil engineering field, emerging technology etc.
2. Each student shall submit a report of at least 10 pages and deliver a seminar (Presentation time – 10 minutes)

Guide for conducting & Graded activities preparations

1. Working in teams understand and work within the dynamics of a groups.
2. Tips to work effectively in teams, establish good rapport,
3. Interest with others and work effectively with them to meet common objectives,
4. Tips to provide and accept feedback in a constructive and considerate way
5. Leadership in teams,
6. Handling frustrations in group.
7. Body language in communication
8. Presentation techniques

Documentation

Student shoud prepare the slides as per presentation techniques.
Prepare handouts and submit both in paper and e-formats.
Evaluation check list (Annexure) should be filled by course coordinator

Unit 10	Student moral Activities:	8hours

Conduct ANY ONE of the following activities through active participation of students

i) Rally for energy conservation / tree plantation.

ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc.

Guide for conducting & Graded activities preparations

The students in a group of 3 to 4 will perform any one of the following activities (others similar activities may be considered)

Activity : Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)

Write report and arrange an exhibition, displaying the social service etc on the topic given by your teacher.
Evaluation check list (Annexure) should be filled by course coordinator

Unit 11	Life skills (any two)	4hours

1. Arrange any one training in the following areas a) Yoga. b) Meditation c) Mudra d) Telephonic etiquettes e) email etiquettes f) Etiquette in Social and office settings. i)Set the goal for personal development. j)Develop good habits to overcome stress. g) Conduct aptitude, general knowledge test, IQ test, Solve Puzzles.

Students in group (5-6) will demonstrate an understanding of, and participate in, use life skills (given below) to achieve and extend personal potential to respond effectively to challenges in his or her own world.

1. Identify safety signs, Demonstrate knowledge of traffic rules and safety Follow traffic rules, Read and understand basic safety procedures, Obey safety rules when walking during the day or at night, obtain a learner's permit, then a driver's license, Obtain car insurance Demonstrate knowledge and ability to evacuate a building in an emergency.
2. Achieving self-awareness -- Identify emotions. Use appropriate methods to cope with

stress. Awareness about never taking action against self when in pain, critical thinking

3. How to Search for a job/ occupational choices. -Apply for a job.-Interview for a job. Obtain special vocational education or job training.
4. Manage a savings and checking account, Maintain a personal budget and keep records, Demonstrate personal finance decision-making skills, Calculate and pay taxes. Use credit responsibly.
5. Demonstrate knowledge of civil rights and responsibilities. Get legal aid. Report a crime. Register with Selective Service at age 18. Vote
6. Perform or arrange for home maintenance, Perform housekeeping tasks, Wash clothing. Iron, mend, and store clothing.
7. Obtain health care, Demonstrate knowledge of common illnesses, prevention and treatment. Maintain physical fitness, nutrition and weight. Avoid substance abuse.
8. Clean food preparation areas, Store food properly, Prepare meals, read labels, and follow recipes. Demonstrate appropriate eating habits. Plan and eat balanced meals.

Guide for conducting & Graded activities preparations

Documentation

1. Current life skills mentioned by each students

✍ Write a paragraph (200words) of experience gained in the activity or views in the form of feedback to the mentor. (Avoid duplication of reports)

3. Create an Individual Career Plan
4. Evaluation check list (Annexure) should be filled by course coordinator

Unit12	**Modular courses**

A course module should be designed in the following areas for max. 12 hrs. Batch size – min. 15 students. Course may be organized internally or with the help of external organizations.

a. Basic computer courses
b. CAD- software/ E-tabs/prime vera.
c. Personality development.
d. Entrepreneurship development. Etc

Guide for conducting & Graded activities preparations

Documentation

Prepare advertising sheets or brochure

Evaluation check list (Annexure) should be filled by course coordinator

Course Delivery:

The course will be delivered through Demonstration, Expert lectures, videos presentations and practices

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

	Bloom's Category	% Weightage
1	Understanding	30
2	Applying the knowledge acquired from the course	25
3	Analysis	25
4	Evaluation& Creating new knowledge	20

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Based on evaluation checklist	25	Consolidated Report Audio/visual record	1,2,3,4
				End of the course	50	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Student activities report for 25 marks (Consolidated evaluation checklists –Annexure)
2. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

TEXT BOOKS:

1. An Introduction to Professional English and Soft Skills: by Bikram K. Das, Kalyani Samantray, Cambridge Press.
2. Business correspondence and Report ✍ writing: by R. C. Sharma & Krishna Mohan Developing Communication Skills: by Krishan Mohan & Meera Bannerji
3. Group Discussions by Sudha Publications And Ramesh Publishing House, New Delhi
4. Vocabulary Improvement: Words Made Easy: by Diana Bonet
5. Word Power Made Easy: by Norman Lewis

REFERENCE BOOKS:

1. Communication Skills, Sanjay Kumar and PushpLata, Oxford University Press.
2. Chrissie Wright (Ed.); Handbook of Practical Communication Skills; JAICO Books
3. Effective Communication and soft Skills, NitinBhatnagar and MamtaBhatnagar, Pearson Publication.
4. Communicative English for Engineers and professionals, NitinBhatnagar and MamtaBhatnagar, Pearson Publication.
5. Communication Skills and soft skills- An integrated approach, Kumar, Pearson Publication
6. Communication Skills for Engineers, Mishra, Pearson Publication
7. K.K.Sinha, Business Communication, Galgotia Publishing Company, New Delhi, 1999.
8. R.K.Bansal& J.B. Harrison, spoken English for India, Orient Longman.

Recommended Readings:

1. Business @ The Speed of thought, Bill Gates.
2. My Experiments with Truth, M.K.Ghandhi
3. Wings of Fire, A.P.J. Kalam
4. An Autobiography, JwaharLal Nehru.

Professional Practice

5. ASCE. Civil Engineering Body of Knowledge for the 21st Century. Second Ed. ASCE Press, 2008.
6. Board for Professional Engineers, Land Surveyors, and Geologists. Professional Engineers ACT. Department of Consumer Affairs, 2011.
7. Grigg, N. S., M. E. Criswell, D. G. Fontane, and T. J. Siller. Civil Engineering Practice in the Twenty-First Century. ASCE Press, 2001.

✍ writing, Presentation, and Documentation

8. Choi, Ying-Kit. Principles of Applied Civil Engineering Design. ASCE Press, 2004.
9. Jeter, S. and J. Donnell. ✍ writing Style and Standards in Undergraduate Reports. Second Ed. College Publishing, 2011.
10. Paradis, J. G. and M. L. Zimmerman. The MIT Guide to Science and Engineering Communication. Second Ed. MIT Press, 2002.

Management, Supervision, and Leadership

11. Bittel, L. R. What Every Supervisor Should Know. Sixth Ed. McGraw-Hill, 1992.
12. Martin, S. Managing Without Managers. Sage Publications, 1983.
13. Northouse, P. G. Leadership. Fifth Ed. Sage Publications, 2010.
14. PMI. A Guide to the Project Management Body of Knowledge. Forth Ed. PMI, 2008.
15. IIT Delhi, Modern Technology – the Untold Story
16. English Conversation Practice by Grant Taylor
17. Business correspondence and Report ✍ writing: by R. C. Sharma & Krishna Mohan
18. Chrissie Wright (Ed.); Handbook of Practical Communication Skills; JAICO Books.
19. Veena Kumar, The Sounds of English, Makaav Educational Software, New Delhi.

Scheme of Examination		
1	Verification of consolidated reports and check lists + viva about report	20
2	Write about 50 words how did you conduct mock tendering process or Write about 50 words (Any one out of 12 exercise- Examiner choice)	10
3	Individual Power point Presentation (only six slides) hand-outs should be attached to Answer script	
	Communication skills	10
	Presentation techniques (based on slides)	5
4	1. What can you do for our nation 2. Your strength 3. Long term and short term goals	5
	Total	**50**

List of Equipments and Apparatus.

Sl.No	Name of Equipments and Apparatus	No
1	LCD Projector- White screen	1
2	Computers with Internet facility	10
3	Printers	02
4	UPS	01
5	Speakers	01

Sl.No	Name of Equipments and Apparatus	No
6	Microphone	01
7	Electronic podium	01

ANNEXURE

Evaluation check lists for Units 1 STUDENT ETHICS AND ANTHEMS

Note : Only this checklist should be self evaluated by each students & all the other Units should be evaluated by Course coordinator

* Marks allotment should be given for each performance indicators if Unsatisfactory-0, Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

For every task, students should bring the respective evaluation checklist of each unit

SL. NO	PERFORMANCE INDICATORS	MARKS*
	Student ethics and anthems (self evaluation by students)	
1	In each and every professional practices class I have/ will always attend elegantly in formal dress	
2	I will organise and attend every national festival in colleges developing national integrity protecting national pride.	
3	I will always Keep classrooms, college premises clean. I will not write anything on the desk, wall etc, Avoid Stick chewing gum to benches. I will not destroy any public property, Always protect natural resources	
4	I will respect & wish the lecturers, Give way to lecturers while walking in the corridor. Don't spit anywhere in college.	
5	I will communicate in English in every professional practice classes.	
6	I will develop Interpersonal relationship with classmates and helping others, My Behaviour will always be gentle, polite and respectful with elders. Always give way to ambulance, or emergency vehicle, I ll be kind to animals.	
7	Maintain personal health and hygiene-Awareness about Regular habits, keep myself clean, regularly cut nails, visiting regularly spiritual places, Prayer. Eating habits-dos and don'ts-avoid over eating.	
8	Reading English newspapers daily and watching news, Practice physical exercise every day –"Sound body sound mind". To know /aware about the ill effects of smoking, alcohol consumptions, Right use of technology, Control in spending money	
9	To maintain the discipline in public places, and college events/functions, Maintain peace and harmony, avoid groupism, Active participation in co-curricular activities	
10	Always speaking truth, being honest, Love myself, Boost my self-esteem, self-confidence, positive attitude, Patience. Develop Adaptability to different situations, Always have a tendency to face the Challenges, Never miss an opportunity.	
		Total

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 2 PROBLEM SOLVING TECHNIQUES

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Problem solving technique	
1	Whether student has attended the session	
2	Dress code	
3	Selection of Problem	
4	Information gathered	
5	Development of solution	
6	Participation	
7	Whether student ask doubt	
8	Report submitted in stipulated time	
9	Elegancy of report	
10	Communication	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____**out of 25**

Evaluation check lists for Units 3 INFORMATION, SEARCH, DATA COLLECTION

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Information, Search, Data collection	
1	Whether student has attended the session	
2	Whether collected information is related to topic	
3	Dress code	
4	Whether SQ3R method is followed	
5	How neat the document written or presented.	
6	Report quality (Reader friendly, graphical representation included)	
7	Stage fright, voice modulation, Pitch during presentation	
8	Volume, Speed, Gestures during presentation	
9	Pause, Pronunciation, Articulation during presentation	
10	Report completed in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 4 TASK MANAGEMENT

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Task Management	
1	Whether student has attended the session	
2	Identification of task	
3	Apply problem solving skills obtained in unit 2 to this task.	
4	Apply task management techniques -identification, planning, organizing and execution, closing the task done properly and explained neatly in the report.	
5	Depth of knowledge gained in search of information	
6	Positive approach in solving the task	
7	Elegancy of report	
8	Dress code	
9	Communication	
10	Report completed in stipulated time.	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 5 TEAM BUILDING ACTIVITY

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Team building activity	
1	Whether student has attended the session	
2	Whether student has participated in the activity (Photograph as proof of attendance has been attached in the report)	
3	Whether students in groups used to communicate things to one another?	
4	Solve the team building activity in most challenging way	
5	Student work together ? Or Whether student handle frustration in teams	
6	Leadership in teams,	
7	Did the group organize before they started? Student important in preplanning to the success of the activity?	
8	Report submitted in time	
9	Whether student has understood the importance of team building?	
10	Positive Attitude	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 6 Group Discussion

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Group discussion	
1	Whether student handle frustration in groups	
2	Note down the minutes of discussion	
3	Allowing others to speak, initiating and closing topic	
4	Leadership in teams,	
5	Whether discussion is related to topic	
6	Eye movement ,involvement	
7	Clarifying doubts with proofs	
8	Body language in communication, Dress, Posture, Gestures, Eye contact and facial expression.	
9	Stage fright, Voice and language, Volume, Pitch, Pronunciation, Language, clarrifing doubts.	
10	Repot completed in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 7 Guest lectures

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Guest Lectures	
1	Whether student has attended all the session	
2	Whether student was attentive during guest lectures (Interpret and crarify doubts)	
3	Document is as prescribed in syllabus (How neat the document written or presented and related to the lecture or video session)	
4	Comprehend relationships between ideas shared by speaker	
5	Take organized notes on lectures and listening passages	
6	Discuss and respond to content of a lecture or listening passage orally and/or in writing	
7	Whether the student has understood the importance of listening skills	
8	Dress code	
9	If students has done any duplication of report	
10	Report submitted in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 8 MOCK TENDERING PROCESS

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Mock tendering process	
1	Whether student has attended all the session	
2	Active Participation/ Involment	
3	Whether the student has understood the tendering process	
4	Whether the student has understood his role to be played in tendering process	
5	Information gathered about tendering process	
6	Whether students work in teams, Team coordination and equal participation	
7	Creative skills adopted in communicating/ role played in tendering process act	
8	Elegancy of tender document	
9	Dress code	
10	Report submitted in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 9 SEMINAR PRESENTATION

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Seminar presentation	
1	Whether student has participated in the seminar	
2	Whether students work in teams, Team coordination and equal participation	
3	Depth of knowledge about the topic , Information gathered, clarifying doubts.	
4	PPT includes presentation techniques	
5	Body language in communication, Professional Presentation Skills, Dress, Posture, Gestures	
6	Leadership in teams,	
7	Handouts submitted & ppt submitted in electronic format through email	
8	Eye contact and facial expression, Stage fright, Voice and language, Volume, Pitch	
9	Use of aids –OHP,LCD projector,	
10	Inflection, Speed, Pause, Pronunciation, Language, Practice of speech. Correct using Organs of speech, symbols, articulation of speech, sounds- stress and intonation	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 10 Social moral activities

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Social Moral Activities	
1	Whether student was aware of importance of social service.	
2	Identification of Societal problems	
3	What level of interest in national or humanity service of student.	
4	Whether student participate in the social service or any other prescribed event	
5	Creative skills adopted in communicating social service.	
6	Seeks assistance when needed.	
7	Whether student / coordinator satisfied by the action taken	
8	Whether the student has understood the importance of social activities	
9	Dress code	
10	Report completed in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 11 LIFE SKILLS

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Life skill	
1	Your long term and shot term goals defined	
2	Whether student attended the session	
3	Clear awareness of the individual current life skills	
4	Communication skill /creative skill adopted in demonstrating topic of life skills	
5	Whether the student has understood the importance of life skills	
6	Level of interest in practices	
7	Whether Individual Career Plan prepared	
8	Develops and applies strategies for managing personal work	
9	Dress code	
10	Report completed in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____ **out of 25**

Evaluation check lists for Units 12 MODULAR COURSES

* Marks allotment should be given for each performance indicators if Unsatisfactory-0 , Satisfactory-1, Good -2, Better-3, Best-4, Excellent-5

SL. NO	PERFORMANCE INDICATORS	MARKS
	Modular courses	
1	Whether student attended the session	
2	Content is described appropriately	
3	Usage of additional tools/ aids like pictures, animations etc	
4	Advertisement sheets or brochure sheets is prepared	
5	Creative skill adopted in presenting topic of modular course in brochure sheets	
6	Whether the student has understood the importance of communication.	
7	Accuracy of delivering the ideas (if any errors)	
8	Inputs from lecturer has been incorporated	
9	Dress code	
10	Advertising sheets or brochure completed in stipulated time	
	Total	

$Marks = \frac{\text{Total (T) X 5}}{\text{No of performance indicator}}$	$Marks = \frac{5(\text{Total})}{10} = \frac{\text{Total (T)}}{2} =$ _____**out of 25**

CONSOLIDATED EVALUATION CHECKLIST

CO	**UNITS**		**Marks from respective evaluation sheets**
CO1	Self-Development (Individual practices)	Student ethics & anthems	
		Problem solving technique	
		Information, Search, Data collection	
		Task Management	
CO2	Development in groups (Team work Exercises)	Team building activities	
		Group Discussion	
CO3	Professional fundamentals	Guest lectures	
		Mock Tendering process	
		Seminar Presentation	
CO4	Communicate effectively in society	Social moral Activities	
		Life skills	
		Modular courses	
		TOTAL	

AVERAGE= Total / 12	25

Topic related to civil engineering as emerging trends

Topics on SUSTAINABILITY	Topics on CONCRETE Technology
1. Approaches To Greenbelt Design 2. Design Of Eco-Friendly Home For Conservation Of Energy 3. Eco Friendly Fuels 4. Eco-Friendly Campus 5. Environmental Aspects of LEED for Existing Buildings 6. Roof Top Rainwater Harvesting At your Campus, 7. Green Concrete 8. Noise Control Of Buildings 9. Passive Solar Buildings 10. Production of Biogas From Paddy Straw 11. rain water harvesting 12. Recycling and Reuse of Building Waste In Construction 13. Some Studies On Bamboo Reinforced Stabilized Red Soil Beam Prisms For Flexure 14. Bamboo as a Building Material 15. Ground Improvement Techniques 16. Ground Water Quality Analysis In your Town 17. Interlinking of Indian Rivers 18. Low Cost Liners For Canal 19. Measurement Of Evapotranspiration Using Lysimeter 20. New Techniques Of Waste Water Management 21. Novel Material For Water Treatment 22. Operation of a Bio-Solid Dewatering Facility 23. Planning And Design Of Water Supply Scheme And Peoples Participation In Village 24. Proposed Mini Hydel Project 25. Rain water Diversion 26. rain water harvesting and ground water conservation 27. Rainwater Management And Conjunctive Use 28. Sediment Yield In River Basin or dam Using Gis And Remote Sensing 29. Studies On Infiltration Tube Well System 30. Submerged Floating Tunnel	1. Advancement in Concerte Technology 2. Drability Of High Performance Concrete 3. Concepts Of Shotcrete Technology 4. Concrete Admixtures 5. Construction joint 6. Decorative concretes 7. Design And Estimation Of Ready Mix Concrete Plants 8. Design Of Economical Formworks And Scaffolding For Concrete Structures 9. Determination Of Aggregate Shape Factors Using Universal Thickness-Length Guage 10. Fly Ash Concrete 11. Flyash Concrete Door Shutters 12. Geopolymer Concrete 13. Geopolymer Mortar 14. Heavy Density Concretes For Nuclear Reactors 15. Mineral Admixtures For High Performance Concrete 16. Reactive Powder Concrete 17. Mix Design For Self Compacting Concrete 18. Monolithic Concrete Domes 19. Natural Fibres In Concrete 20. Plastic cracking of concrete 21. Polymer Modified Steel Fibre Reinforced Concrete 22. Preliminary Investigations On Red Soil Cement Stabilised Coconut Shell Blocks 23. Reactive Powder Concrete 24. Recycled Aggregate Concrete 25. Self Compacting Concrete (Scc) 26. prestressed concrete hollow-core units 27. Shotcrete Technology 28. Infrared Thermography In Concrete Engineering 29. Industrial Flooring by Tremix Vacuum System
Topics on Foundation Engineering	**Topics on Highway**
1. Hyperbolic Paraboloid Shell Foundation	1. Concrete Road Repair Solution

2. Design procedure for pile caps 3. Control Of Corrosion On Underwater Piles 4. Deep Foundations Case Histories 5. Design of Shallow Foundations 6. Analysis Of Stability Of existing Slopes 7. Development Of BC Soil Stabilised Building Blocks Using Lime And Flyash 8. DIAGRID 9. Soil Nailing	2. Antistripping Agents In Bituminous Mixes 3. Construction Challenges For Bridges In Hilly Area 4. Design Considerations For Roadside Safety 5. Cbr Value 6. Intelligent Transport System 7. Pavement Design By Using Geotextile 8. Urban Transport Planning Project 9. Road Accident Analysis And Engineering Measurement In your Area 10. Scientific Study Of Road Humps 11. Waste Polyethylene Carry Bags In Road Construction
Topics on Environmental Engineering	**Topics on Some emerging Civil engineering areas**
1. Advanced Wastewater Treatment 2. Air Pollution Studeis 3. Analysis Of Performance Of The Existing Sewage Treatment Plant 4. Biological Wastewater Treatment 5. bio-medical waste management and the strategy 6. Biomimicry 7. Civil/Environmental Engineering Projects Using GPS Information 8. Defluoridation Of Water Using Tamarind Gel 9. Domestic Water Treatment Plant 10. Hazardous Waste Disposal & Managment 11. Low Cost Technology For Fluoride Removal 12. Recycling Of Waste water 13. Treatment Of Sugar Waste Using Anaerobic Filter 14. Alum Recovery By Acidulation of Aluminum Hydroxide Sludge 15. Membrane Technology in Waste Water Management 31. The Sustainable Watershed Development 32. Artificial Recharge Of Ground Water 33. Water Quality Index study for a place 34. Water swing 35. Computer Aided Drought Analysis Of YOUR District And Its Management 36. Conservation By Waste Water Reclamation 37. Watershed Model for a your place 38. Drip Irrigation 39. Electrical Resistivity Survey For Ground Water Exploration	1. Demolition Of Building 2. Design Aspects For Terrorist Resistant Buildings 3. Correlation And Regression Analysis 4. Master Planning For Developing An Underdeveloped Area 5. Optimal Bus Deployment of your City Using GIS 6. Planning & implementing information system 7. Vision 2020 8. Golden Quadrilateral 9. Nort-South East-West coridor 10. Significance Of Nanotechnology In Construction Engineering 11. Skybus Technology 12. Smart Material and Smart Structures. 13. Space Hotel 14. Study Of De-watering Methods For Large Scale Construction Sites 15. Virtual Design and Construction Fundamentals 16. An approach to investigation 17. Fire-Resistant Plasterboard Walls in Fire 18. Bandra-Worli Sea Link 19. IRDP 20. Collapse of World Trade Center 21. Tsunami mitigation strategies 22. Tsunami Warning System 23. Value Engineering 24. DRRWH System - A need of an hour
Topics on Construction of materials	**Topics on Structures**
1. GYPSUM 2. Basalt Rock Fibre (BRF) 3. Low Cost Housing 4. Composite Materials 5. Compressive Strength Characteristics Of Stacked Stabilized Soil Cement Blocks	1. Wrapping Technology 2. Analysis and Design of Sheet Piles 3. Damping of Hysteresis Structures 4. Brick Masonary Building Model With Seismic loads 5. CFST Columns

6. Compressive Strength Of Stabilised Blocks And Masonary Prisms 7. Granite Stone Dust Cement Blocks 8. Design of Light Weight Fills Using EPS Geofoams 9. Brick Masonry Domes 10. Flyash Laterite Bricks 11. Liqueconss Floors And Roofs 12. Brick Masonry Dome 13. Low Cost Bricks Making 14. Low Cost Roofing Tiles 15. Mangalore Tile Waste As Coarse Aggregate In Concrete 16. Operational Research In Building Materials With A Detailed Study On Clay Blocks 17. Plastic As Soil Stabilizer 18. Rice Husk Ash Concrete Blocks 19. Study Of Laterite Particles In Adsorption Of Oil And Grease 20. Waste Plastic Fibre Reinforced Concrete Using Recycled Coarse Aggregate 21. Basalt Rock Fibre 22. biodrgradation plastic 23. Jute Fibre 24. Laminated Floorings	6. Design Of An Multistoried Building Using Staad Pro 7. Development length requirements in seismic force-resisting members 8. Earthquake Resistant Building Construction 9. Earthquake Resistant Design And Construction 10. Earthquake Resistant Structural Design 11. Flexural Behaviour Of Gfrp Wrapped Masonry Beams 12. Inspection of Short Span Bridges 13. Seismic Retrofitting of RC Frames. 14. Rehabilitation of Bridges & Buildings - Using Guniting Techniques 15. Retrofitting Using FRP Laminates 16. Strengthening Of RCC Flexure Members By Epoxy Bonded Steel Plates 17. Stress Ribbon Bridge 18. Wind Loading on Tall Buildings

Some of the suggested General Group discussions Topics are

1. Polythene bags must be banned!
2. Do we really need smart cities?
3. E – books or Printed books – what's your choice?
4. Is Facebook for the attention – seeking and lazy people?
5. Globalization and its impact on Indian Culture.
6. Analytically evaluate the solutions to traffic problems
7. Global warming is caused more by developed countries
8. Rain forests help in maintaining the earths ecosystem
9. English should be made the Official Language
10. Reservation for women would help the society
11. How to deal with terrorism
12. Water resources should be nationalized
13. Daughters are more caring than sons
14. Abortion and Euthanasia - Is it morally right for society?
15. NGOs - Do they serve people's interests?
16. Role of ethics in tobacco industry, liquor industry
17. Universal Disarmament Is a Must
18. Managers are born, not trained
19. Managerial skills learnt in the classroom
20. Women are good managers
21. India's growth rate is bridging gap between rich and poor.
22. 25% seats in private schools should be reserved for poor.
23. Law is the creation of the strong to rule the weak
24. A man with words and no deeds is like a garden full of weeds

25. If you give a man a fish, he eats it once. You teach a man to fish, you lose a business opportunity
26. Nuclear power is a safe source of energy
27. Inflation Impact of Globalization
28. Electronic media vs. print media
29. Corruption is the price we pay for democracy
30. Multinational corporations: Are they devils in disguise?
31. Advertising is a waste of resources.
32. Privatization will lead to less corruption.
33. China market - a threat to Indian market
34. Technology Creates Income Disparities
35. India should be reorganized into smaller states.
36. Rising petrol prices - Govt. can control?
37. Government should give up the control on CBI.
38. Smaller businesses and start-ups have more scope
39. Developing countries need trade, not aid.
40. Business and Ethics do not go together
41. Performance based bonuses for government employees should be welcomed
42. Ditching the Kyoto Protocol
43. Is India's objection on EU justified?.
44. FDI in Retail - Will really affect the farmers of India?
45. EU Zone Crisis - reason for rising value of dollar
46. US Debt Crisis - really has an impact on world market
47. Depreciation of Indian Rupee has only negative impact on the economy
48. Nokia and Microsoft are a planned alliance or desperate move?
49. Gold: Best investment or a bursting bubble?
50. Freedom of press should exist
51. India needs a strong dictator
52. Role of UN in peacekeeping
53. Media is a mixed blessing/How ethical is media?
54. General Interest topics for group discussion
55. Computer viruses are good
56. India should practice "Swadeshi"
57. Food Bill - Is it really something India needs?
58. Will India really be the superpower of 21st century?
59. Quality is a myth in India.
60. China - A threat to India?
61. Indian villages - our strength or our weakness?
62. Mobile phones - requirement of the day.
63. Cursing the weather is bad farming
64. Patience is a bitter plant but bears sweet fruits
65. If you want peace, prepare for war
66. Education is a progressive way of discovering your ignorance.
67. Capital punishment should be banned
68. Beauty contests degrade womanhood
69. If you are not a part of the solution, you are part of the problem
70. Examinations - has it killed education?
71. The medium of teaching in schools should be English
72. A room without books is like a body without soul.
73. Increasing no. of Engg. Colleges is a boon to society
74. Educated Indians lack national commitment.

75. E-Learning is good for the education system and society.
76. Social networking on Internet is a boon.
77. Hard work or Smart work - Which is important?
78. Education industry is a business these days.
79. MGNREGA : A key to increase employment in the country

	Course Title: **PROJECT WORK-I**		
	Credits (L:T:P) 0**:1:2**	Total Contact Hours:39	Course Code: 15CE58P
	Type of Course: **Project**	**Credit : -**	Core/ Elective: **Core**
CIE -25 MARKS	(5^{TH} SEMESTER)		SEE- NO SEE
CIE -25 MARKS	(6THSEMESTER)		SEE-50 MARKS

Pre-requisite: All courses of Civil engineering Programme &Inter disciplinary courses.

COURSE DESCRIPTION

The project is offered to the students in order to inculcate innovation attitude and develop skills. A group of minimum four to maximum of 6students work as a team for major project work.

Course objectives

The objective of the project is to develop capabilities, among the students, for a comprehensive analysis of implementation of Good Hygienic Practices in conducting investigation and report writing in a systematic way and to expand students understanding on the subject.

1. Plan and work out an action plan in a team for completion of a civil engineering problem
2. Instil students with skills of curiosity, initiative, independence, reflection and knowledge transfer which will allow them to manage new knowledge in their professional careers.
3. Provide students with quantitative and qualitative tools to identify, analyze and develop opportunities as well as to solve Civil Engineering problems;
4. Develop students' ability to think strategically, and to lead, motivate and manage with teams.
5. Develop students' written and oral communication competencies to enhance Technical effectiveness;
6. Enhance students' appreciation of the values of social responsibility, legal and ethical principles, through the analysis and discussion of relevant articles and real time projects.

Course Outcome Upon successful completion of this course, students will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	To reflect upon and explore problems in depth, to develop informed technical decisions to tackle them, with skills of curiosity, initiative, independence, reflection and knowledge transfer and to demonstrate ability to pursue new knowledge necessary to share their expertise in civil engineering arena.	R/U/Ap/ Ay/C/E	1 to 10	15
CO2	Appreciate the values of social, legal and ethical responsibility principles, through the analysis and discussion of problem and real time projects & will become lifelong learners, of the skills and competences necessary to successfully contribute.	R/U/Ap/ Ay/E/C	1 to 10	14
CO3	Prepare documents in team and enhance his written and oral communication presentations.	R/U/C/E	1 to10	10
			Total sessions	**39**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communicati on	Life long learning
PROJECT WORK	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

ROAD MAP FOR THE PROJECT

1. Carry out a session or a seminar from the project committee / Programme coordinator with the help of Innovation club / III cell for directing the students to identify project areas in any of their interested field, and even it may be of inter disciplinary. Power point presentation in seminar should include detail description of course, Project report formats, developing personnel writing skills.
2. The students shall form their own batch not less than 4 and maximum 6 and get registered with project coordinator through Project Proposal Proforma (Appendix 7).Students should take the approval from the project committee for the project.
3. After approval student should assign to the project guide in the beginning of 5^{th} semester.
4. Project should be finalized within a month (before first CIE) in the 5^{th} semester.
5. The types of project may include:
    a) Field study (empirical study).
    b) Statistical and case studies
    c) Experimental investigation,
    d) Computational work,
    e) Data collection and its analysis,
    f) Design oriented.
    g) Comprehensive case study (problem formulation, analysis and recommendations),
    h) Comparison of practices/ validation of theory/ method of testing, survey of quality Management practices

    The project should be challenging but manageable within the resources and time available.
6. Projects already conducted in Survey camp should not be repeated.
7. Projects of estimation of building should not be considered in as it appears in the student activities.
8. Students should undergo reviews for three times in 5^{th}semester during the internal assessment and three times in6^{th} semester during the internal assessment. Time table for IA should

include project review; each review should be evaluated for 25 marks and average of 3 should be taken for both 5th and 6th semester.

9. The IA marks will be evaluated based on oral presentation and assessment by the internal guide.
10. Real time problems, Industry related problems, should be chosen and it is a Responsibilities of the project committee / Programme coordinator/ Innovation club / I II cell to choose the appropriate project and to accept the Project Proposal through Proforma (Appendix 7).
11. **Identification of Topic:** The selection of topic is of crucial importance. It should be decided based on your understanding of the study, in the field and interest. The topic should be discussed with the Project Coordinator. It should be in harmony with your areas of interest and the specialization of the project supervisor. It is always better to identify a micro topic to remain focussed and complete the project on the time and with in the budget and resources. The topic should be clear, directional, focussed and feasible.
12. An outline of your project proposal from your end & synopsis will initiate a dialogue between you and your Project coordinator who will then help you to work on the chosen topic and report.
13. Student are advised to select project coordinator who are active professionals in the relevant area of the selected topic may be of any Programme/ Interdisciplinary/ other Institution/Industry approved by project committee/Innovation club/ I II cell.

Course Assessment and Evaluation Scheme for 5th semester

<table>
<tr><th></th><th colspan="2">What</th><th>To whom</th><th colspan="2">When/Where (Frequency in the course)</th><th>Max Marks</th><th>Evidence collected</th><th>Course outcomes</th></tr>
<tr><td rowspan="4">Direct Assessment meth</td><td rowspan="3">CIE</td><td rowspan="3">IA</td><td rowspan="4">Students</td><td rowspan="3">(Average of three reviews)</td><td>Review 1</td><td rowspan="3">25</td><td rowspan="3">1. Project Proposal Proforma.
2. Project Synopsis.
3. Promising Certificate of Originality
4. Plan & Schedule
5. Presentation hand outs</td><td rowspan="3">CO1, CO2, CO3</td></tr>
<tr><td>Review 2</td></tr>
<tr><td>Reviews 3</td></tr>
<tr><td colspan="2">(All review should be conducted during the IA and should be reflected in IA time table)</td></tr>
<tr><td>SEE</td><td>End Exam</td><td>End of the course</td><td colspan="3">No SEE for 5th semester only CIE</td></tr>
<tr><td rowspan="2">Indirect Assessment</td><td colspan="2">Student Feedback on course</td><td rowspan="2">Students</td><td colspan="2">Middle of the course</td><td colspan="2">Feedback forms</td><td>CO1Delivery of course</td></tr>
<tr><td colspan="2">End of Course Survey</td><td colspan="2">End of the course</td><td colspan="2">Questionnaires</td><td>CO1 to CO3 Effectiveness of Delivery of instructions & Assessment Methods</td></tr>
</table>

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

List of Documents to be produced during All threeREVIEWsin V semester (During CIE)

Document 1. Project Proposal Proforma. (Appendix 7) All the items should be filled. The signatures of student, coordinator, III cell (Industry Institute Interaction cell) Coordinator/ Program coordinator should be present. Approval of I.I.I coordinator/Program coordinator through discussion is mandatory for choosing the **appropriate** project.

Document 2. Project Synopsis. (Appendix 6) The synopsis should clearly state the objectives and research methodology, sampling, instruments to be used, limitations if any, and future direction for further research. Both Guide and student should sign on the Project Synopsis. What are-

a) The methodology you intend to adopt to carry out your study – tools and techniques to be used, if any;

b) Project involves any field work

Document 3. Promising Certificate of Originality**(**Appendix 5) should be filled. The signatures of student

Document 4. Plan &Schedule- Planning &Schedule should be re-scheduled for every submission.

Document 5. Presentation hand outs on past present and future activities to be carried out in a project

Note:

a) All signatures should be accompanied by the date of signature.

b) **Re-submission of Project Proposal:** In case of non-approval of the proposal the comments/suggestions for reformulating the project will be communicated to the student. In such case the revised project synopsis should be submitted with revised project proposal proforma and a copy of the rejected synopsis and project proposal proforma bearing the comments of the evaluator.

List of Documents to be produced during All three REVIEWs in V semester (During CIE)

1. **Literature survey**
2. Planning & Schedule should be re-scheduled
3. **Presentation of past, present & future progress of the project**

List of Documents to be produced during SEMESTER END EXAMINATION

Final REVIEW

1. **Project report**
2. **Presentation of project**
3. **Comments** of the project guide on the project work (not more than 1 page)

I.CIE ASSESSMENT FOR FINAL REVIEW(V semester)

1. **Literature survey** **05 Mark**
2. Planning & Schedule 05 Mark
3. **Presentation of past, present & future progress of the project 15 Mark**

25 Marks

Course Assessment and Evaluation Scheme for 6th semester:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	(Average of three reviews)	Review 1	25	**1.** Literature survey **2.** Plan & Schedule **3.** Presentation hand outs	CO1, CO2 CO3
					Review 2			
					Reviews 3		Project report	
	SEE	End Exam		--		--	--	--
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 to CO3Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

GUIDELINES AND FORMAT FOR PREPARING PROJECT REPORT FOR V/VI SEMESTER DIPLOMA IN CIVIL ENGINEERING

1. ARRANGEMENT OF CONTENTS:

The sequence in which the project report material should be arranged as follows:

1. Cover Page (see Appendix 1)
2. Title Page (see Appendix 2)
3. Bonafide Certificate (see Appendix 3)
4. Certificate (see Appendix 4)
5. Abstract (see Appendix 4)

6. Table of Contents
7. List of Tables
8. List of Figures
9. List of Photographs
10. List of Graphs
11. List of Abbreviations and Nomenclature
12. List of Symbols,
13. Chapters
14. References
15. Appendices

Each project report must adequately explain the research methodology adopted and the directions for future research in chapters. The project report should also contain the following: Copy of the **Approved Project Proposal** Proforma and Synopsis. **Promising Certificate of originality** duly signed by the student.

2. PREPARATION FORMAT:

Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in **Appendix 1& 2**.

Bonafide Certificate – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14, as per the format in **Appendix 3.**

The certificate shall carry the PROJECT COORDINATOR signature and shall be followed by the name, academic designation (not any other responsibilities of administrative nature)department and full address of the institution where the coordinator has guided the student. The term **'PROGRAMME COORDINATOR'** must be typed in capital letters between the coordinator's name and academic designation. Project coordinator may be of same **Programme**, or **Interdisciplinary** or **other Institution** or from **Industry**.

Abstract – Abstract should be one page synopsis of the project report typed single line spacing, Font Style Times New Roman and Font Size 12.

Table of Contents – The table of contents should list all material following it as well as any material which precedes it. The title page and Bonafide Certificate will be listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents of the project report is given in **Appendix 4**

List of Tables – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

List of Figures, graphs, Photographs – The list should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.

1. The figures, photographs and tables occurring in a chapter may be serially numbered as Fig. 1.1, 1.2 etc., where the first digit represents the chapter, the second digit represents Figure number.
2. The photographs may be represented as Photo 1.1, 1.2 etc., the first digit representing chapter and the second digit represents Photograph number.
3. The tables may be represented as Table 1.1, 1.2 etc., the first digit representing chapter and the second digit represents table number.
4. The graph should clearly indicate the points, which are used for drawing the curve or curves.
    a. All the letters in the graphs should be written with stencils.

List of Symbols, Abbreviations and Nomenclature –One and a half spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.

List of Equations-All the equations used in the thesis should be properly numbered chapter wise [eg. Eq.3.1 or eq.3.1 or 3.1 or (3.1)].The equations shown should be clearly referred and identified as Eq. or eq. followed by equation number. Repetition of the equations should be avoided. If needed, it may be referred by its number. Equations should never be mixed up with main text. It should be shown as separate object and Equation Editor can be used.

Chapters

The following is suggested format for arranging the project report matter into various chapters,each chapter may be further divided into several divisions and sub-divisions:

1. Introduction
2. Exhaustive Literature Survey/Review of Literature
3. Define the problem.
4. Body of project (Developing the main theme of the present investigationproject work)
5. Results and Discussions
6. Conclusions
7. Future Enhancements / Recommendations
8. Summary

Body of the project may include-(Design/ Input Data/Structure/Questionnaire/Analysis/Solution/Sampling/Tools/Techniques/ Processing and Analysing Data)

Each chapter should be given an appropriate title. Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited. Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

Arrangement of Paragraph in a Chapter:

1. Each paragraph in a chapter should be properly numbered for example, 2.1, 2.2 etc., where first digit represents the Chapter Number and second digit the paragraph number. There is no need to indicate the number for the first paragraph in a chapter.
2. Sub-paragraphs, if any indicated as 1.1.1, 1.1.2 etc. i.e. first digit representing the chapter, the second representing the paragraph and third representing the sub-paragraph.

Don't underline the headings or subheadings or side heading. Instead use the bold letters.

Appendices –Appendix showing the detailed data, design calculations, derivation etc, Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme. Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc. Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters. Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

Bibliography or List of References– References should be numbered from 1st chapter to the last chapter in ascending order and should be shown in square brackets. The bibliography list should be made strictly in alphabetical order of the name of the authors. The listing of references should be typed 4 spaces below the heading **REFERENCES** in alphabetical order in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details. A typical illustrative list given below relates to the citation example quoted above.

[Chapter]Author Name, 'Title of the book or paper', Publisher name, (year), Page No

REFERENCES

1. [1] Ariponnammal, S. and Natarajan, S. 'Transport Phonomena of SmSel – X Asx', Pramana(1994) – Journal of Physics Vol.42, No.1, pp.421-425.

Table and figures –In the references By the word Table, is meant tabulated numerical data in the body of theproject report as well as in the appendices. All other non-verbal materials used in the body of the project work and appendices such as charts, maps, photographs and diagrams may be considered as figures.

TYPING INSTRUCTIONS:

1. The impression on the typed copies should be black in colour.
2. The project report should be submitted in **A4** size(29 cm x 20 cm).
3. Bond paper should be used for the preparation of the project report.
4. Typing should be done on one side of the paper with character font in **size 12** of **Times New Roman.**
5. Single line spacing should be used for typing the general text.
6. Subheading should be typed in bold Font size 12 and heading bold Font size 14.
7. The layout should provide a margin of 1.50 Inches on the left, 1.00 Inches on the top, bottom and right.
8. The page numbers should be indicated at the top-middle or bottom-middle of the each page.
9. Heading s should be in bold should not underline the heading/subheadings and should not put colons (:) in headings or subheadings.

Header

When the header style is chosen, the header can have the Chapter number and Section number (e.g., Chapter 2, Section 3) on even numbered page headers and Chapter title or Section title on the odd numbered page header

Number of copies to be submitted by group:(3+1) Three (One for Library, One for department, One for Internal Guide.)&One copy for each batch member. The certificate should consists of names and roll numbers of all batch members for the above three copies. The certificate should consist of batch member name and his/her roll number for his personnel copy. Additional Soft copy of Project in the form of CD to the Library / Coordinator

Binding specifications

1. The project report should be hard bound Rexene of **Grey** colour **for Civil engineering** reports using transparent ors sheet cover should be **printed in black letters** and the text for printing should be identical.The dissertation shall be properly bound, using. The bound front cover should indicate in suitable embossed letter the following:(See the sample format of front cover Appendix 1)
2. **Two blank papers** should be provided at the beginning and at the end.

/*NOTE: do not number this page. Certificate and declaration pages are not numbered but by default they are roman i and roman ii pages. See the format in appendix***/**

APPENDIX 1 (Cover page)

(A typical Specimen of Cover Page)<Font Style Times New Roman – Bold>

TITLE OF PROJECT REPORT

<Font Size 18><1.5 line spacing>

A PROJECT REPORT

<Font Size 14>

Submitted by

<Font Size 14><Italic>

NAME OF THE CANDIDATE(S)

<Font Size 16>

in partial fulfilment for the award of the diploma of

<Font Size 14><1.5 line spacing><Italic>

DIPLOMA IN CIVIL ENGINEERING PROGRAMME

<Font Size 16>

IN

DEPARTMENT OF CIVIL ENGINEERING

<Font Size 14>

LOGO

NAME OF THE COLLEGE

<Font Size 14>

DEPARTMENT OF TECHNICAL EDUCATION

BENGALURU-560001

<Font Size 16><1.5 line spacing>

Year of submission: (MONTH & YEAR)

<Font Size 14>

APPENDIX 2 (Title page)

(A typical Specimen of Title Page) <Font Style Times New Roman – Bold>

A Project Report
on

<TITLE OF THE PROJECT WORK>

Submitted for partial fulfilment of the requirements for the award of the
of

DIPLOMA IN CIVIL ENGINEERING

IN

DIPLOMA IN CIVIL ENGINEERING PROGRAMME

BY
BATCH
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>

Under the guidance of

<Name of the Staff>

Department of _____
_____.

Department of Civil Engineering
<<**NAME OF INSTITUTE**>>
<<**ADDRESS OF INSTITUTE**>>

APPENDIX 3 (Certificate)

(A typical specimen of Bonafide Certificate)
<Font Style Times New Roman>

DEPARTMENT OF TECHNICAL EDUCATION
BENGALURU-560001

<Font Style Times New Roman – size -18>

CERTIFICATE

<Font Style Times New Roman – size -16>

<Font Style Times New Roman – size -14>

Certified that this project report **"…….TITLE OF THE PROJECT……..."**

is the bonafide work of "**……..NAME OF THE CANDIDATE…….……"**

who carried out the project work under my supervision.

<<Signature of the Head of the Department>>

SIGNATURE

<<Name>>

HEAD OF THE DEPARTMENT

<<Department>>

<<Full address of the Dept & College >>

<<Signature of the Project cordinator>>

SIGNATURE

<<Name>>

PROJECT CORDINATOR

<<Academic Designation>>

Department of Civil Engineering

<<Full address of the Dept & College >>

Examiners 1.....<<Signature, Name, Designation& Address>>.....

Examiners 2.....<<Signature, Name, Designation& Address>>.....

APPENDIX 4

(A typical specimen of table of contents) <Font Style Times New Roman>

TABLE OF CONTENTS

Note : Page numbers indicated above are just an illustrative examples.

CERTIFICATES

1. Company certificate (if any) on Company letter head, College certificate on **COLLEGE LETTER HEAD** with Guide, HODs signatures. Declaration of students' signatures on A4 paper. Acknowledgements in the respective order.

CERTIFICATE

This is to certify that the project work entitled "<**Title Of The Project Work>"** is a bonafide work carried out by <**Mr. / Ms. Name of the Student (Roll No.)>, <Mr. / Ms. Name of the Student (Roll No.)**>in partial fulfilment of the requirements for the award of DIPLOMA **INCIVIL ENGINEERING PROGRAMME** by the **DEPARTMENT OF TECHNICAL EDUATION-BENGALURU-560001**, under our guidance and supervision.

The results embodied in this report have not been submitted to any other university or institute for the award of any degree or diploma.

Internal Guide	Head of the Department
<Name of the Staff>	**<Name>**
<Designation> Department of Civil engineering	Department of Civil engineering
<Institute Name>	<Institute Name>.

DECLARATION

This is to certify that the work reported in the present project entitled "<**Title Of The Project Work>"** is a record of work done by us in the Department of Civil engineering, <Name of institutions>. The reports are based on the project work done entirely by us and not copied from any other source. I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

<**Mr. / Ms. Name of the Student >**

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude and indebtedness to my project supervisor _____ for his/her valuable suggestions and interest throughout the course of this project

I am also thankful to Head of the department <Name> for providing excellent infrastructure and a nice atmosphere for completing this project successfully

I convey my heartfelt thanks to the lab staff for allowing me to use the required equipment whenever needed

Finally, I would like to take this opportunity to thank my family for their support through the work. I sincerely acknowledge and thank all those who gave directly or indirectly their support in completion of this work

(Name of the student)

LIST OF FIGURES

A list of figures with figure number, figure title and page number and a list of tables with table number, table name and page number should be listed after abstract in a separate page for each with roman numbers like ii, iii..etc.

FOR EXAMPLE:

LIST OF FIGURES

LIST OF TABLES

FOR EXAMPLE:

LIST OF TABLES

APPENDIX 5
PROMISING CERTIFICATE OF ORIGINALITY

This is to certify that the project report chosen entitled_____
Submitted to **DEPARTMENT OF TECHNICAL EDUCATION** in partial fulfilment of the requirement for the award of the degree of **DIPLOMA IN CIVIL ENGINEERING, will** be a original work carried out by Mr./ Ms._____
The matter embodied in this SYNOPSIS is a genuine and project chosen by me will not be copied by any other source requirement of any course of study.

Enrolment No: _____ under the guidance of
Mr/Ms_____

Name of the student

Signature of the Student

Enrolment No :

Appendix 6
Format of Synopsis

1. Title of the Project
2. Objectives of the study
3. Rationale for the study
4. Statement of the Problem
5. Detailed Methodology to be used for carrying out the study
6. The expected contribution from the study (to perform any laboratory experiments)
7. List of activities to be carried out to complete the project (with the help of a bar chart showing the time schedule)
8. Places/labs/equipment and tools required and planning of arrangements
9. Problems envisaged in carrying out the project, if any.
10. Brief description of project in 100 words

PROFORMA FOR PROJECT PROPOSAL (Appendix 7)

PROJECT PROPOSAL FORMAT

Name of the Organisation	
Programme	
Project title:	
Names of Project Proponent groups	
Area of the project	
Project location:	
Proposed starting date:	Project duration:
Target date of completion	
Sponsorors	Self / Institute/Government / Industry/ Others
PROJECT DESCRIPTION	
BACKGROUND OF THE PROJECT/ SITUATION ANALYSIS 1. What prompted the project? 2. Is there an existing concern or potential problem that you want to address?	

Need and Justification of the project

OBJECTIVES OF THE PROJECT

OBJECTIVES	STRATEGIES
What does the project hope to achieve?	What are the strategies that must be done to meet the objectives?

METHODOLOGY

Expected results of the project	

DESIRED IMPACT AND OUTCOME OF THE PROJECT I. What are the long term effects of the project? (Economic, social, cultural, institutional, environmental, technological, etc.) II. What are the specific measures to sustain the project? III. What are the linkages with other initiatives or reforms in the sector and other development or governance concerns?	

Project implementation Plan (Follow up Plan)
(Project work Plan)

PHASES OF THE PROJECT (DATE)	ACTIVITIES	OUTPUT / TARGET	Project PERSON IN CHARGE	RESOURCES NEEDED	COST

***Note: Include Gantt chart if possible*

Project Beneficiaries :	Number of Beneficiaries from your project:
Location of Beneficiaries:	
Budget Requirement Prepared Y/N	Project budget:

RISK MANAGEMENT PLAN

I. What are the risks and factors that may hamper or hinder the successful implementation of project activities and achievement of project outputs? **II.** What are the measures that would mitigate the adverse effects resulting from such risks?	

PROJECT Coordinators Priority

Institution Staff / Industry person name	Organisation name	Designation	Contact Details	

DETAILED BUDGET REQUIREMENT

Budget Line Item	Description	Amount

OTHER RELEVANT INFORMATION

May include any other information that will support the request for funding, such as:

1. Brief enumeration of other stakeholders who pledged support to the project
2. Other projects that are lined-up to complement the current initiative.

ATTACHMENTS

1. Profile/brochure of the organization
2. Endorsement and recommendation letters
3. Other documents to support the request

Approved **Not approved**

(a) Name and designation of the Programme In charge

(b) Name and designation of other members (s) involved

Signature of the Programme In charge Signature of the Head/Director/Chairperson
Date:-Date:-
Stamp

STYLISTIC AND GRAMMAR ADVICE

Apostrophes

One of the most common mistakes in student writing is incorrect use of the apostrophe (‘), as in PC’s to mean a number of PCs. It is used in English to form contractions such as didn’t (did not), can’t (cannot) and it’s (it is). These uses should be avoided in academic writing and the words written out in full. The apostrophe is also used to denote possessive case, as in the dog’s bone or the student’s assignment. The rule here is that of the intended noun is singular (one dog) the apostrophe is placed before the s. The examples above refer to a single dog and a single student respectively. If the intended noun is plural and regularly formed, the apostrophe is placed before the s as in dogs’ (of the dogs). However if the noun has an irregular plural, e.g. child – children, the apostrophe is placed before the s as in children’s.

Acronyms

Computing/engineering are fields in which acronyms are heavily used to avoid repetition of long technical terms, e.g. RAM, LAN, VDU. Terms like VDU are now so commonly used by the population at large that it is rapidly becoming admissible to use them without explanation. However, most acronyms are familiar only to specialists within sub-fields of computing/engineering. When using an acronym for the first time, always precede it with the expanded version.

Colloquialisms

These are chatty, idiomatic or slang expressions that are appropriate in informal conversion but have no place in your report. For example;

Once Pat pulled his finger out, the team started to come together better and eventually we managed to hand something in that is pretty reasonable considering we didn’t know each other much before this report.

A related point is that in academic and technical writing the use of the first person ‘I’ is avoided as much as possible. In similar way, avoid referring to the reader as ‘you’.

Grammar

Do be careful to write in full sentences and to proof read the document to ensure not only that the text is grammatically sound, but also that it means exactly what was intended.

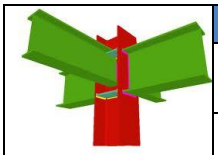
Jargon

Try to strike a good balance between use of jargon and appropriate use of technical terms. There is no merit in using so much obscure terminology that the document is virtually unreadable, but on the other hand, failure to use key words properly can lead to unnecessary wordiness and tends to give an unprofessional impression. It is important to be consistent in the use of terms, to define them if necessary and to use the same term for the same concept throughout.

Spelling

There should be no excuse for spelling mistakes in a word processed document.

Spelling errors create a bad impression. Always use a spell checker, they are invaluable for picking up typographical errors as well as genuine spelling mistakes. Note, however, that spelling checkers cannot detect cases where the wrong word happens to be a real word e.g. from – form. So a careful proof read is necessary.



Course Title: **DESIGN OF STEEL AND MASONARY STRUCTURES**		
Credits (L:T:P) **4:0:0**	Total Contact Hours: **52**	Course Code: 15CE61T
Type of Course: **Lecture, Mini projects**	**Credit :04**	Core/ Elective: **Core**
CIE -25 Marks		SEE-100 Marks

Pre-requisite: Knowledge of Strength of Materials, Material-Testing Lab, Materials of Construction.

Course Objectives

1. To provide basic knowledge in the areas of limit state method and the concept of design of structural steel elements.
2. To enable the students to identify, formulate, and solve engineering problems related to steel structural elements and masonry structures.
3. To give procedural knowledge to design a system, component or process as per needs and specifications of steel elements such as beams, tension members, compression members, bolted and welded connections subjected to various load combinations.
4. To imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design and detailing of steel elements.
5. Ability to engage in lifelong learning with the advancement in Steel and masonry structures.

Course Outcomes

At the end of the course the students should have the ability to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Use the basic knowledge of limit state method[#] to classify the various structural elements.	R/U	1,2,3,4,5,7	04
CO2	Develop the various types of structural connections considering different failure criteria and test their adequacy.	R/U/Ap/Ay	1,2,3,4,5,7	12
CO3	Design the flexural members considering the various failure patterns as per codal provisions.	R/U/Ap/Ay/C	1,2,4,5	07
CO4	Design the tension members considering the various failure patterns as per codal provisions.	R/U/Ap/Ay/C	1,2,4,5	09
CO5	Estimate the load carrying capacity of compression members and to propose suitable type of base.	R/U/Ap/An/C/E	1,2,4,5	12
CO6	Assess the various forces acting on the masonry structures and propose suitable cross sectional dimensions.	R/U/Ap/ Ay/ C/E	1,2,3,4,5, 6,7,8,9,10	08
CO7	Solve suggested or identified problems in design of steel and masonry structures individually or in teams and able to present it.	R/U/Ap/ Ay/ C/E	1,2,3,4,5, 6,7,8,9,10	*
			Total sessions	**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

 # IS 800-2007 must be used for analysis and design.

****Related to Student activity beyond classroom hours.***

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Design of steel and Masonry Structures	3	3	2	2	2	1	3	2	2	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNIT	CONTENTS	HOURS
1	Introduction	04
2	2.1 Bolted Connections	06
	2.2 Welded Connections	06
3	Flexural Members	07
4	Tension Members	09
5	5.1 Compression Members	06
	5.2 Column Bases	06
6	6.1 Analysis and Design of Masonry dams.	08
	6.2 Analysis and Design of Retaining walls.	
	TOTAL	**52**

Note:* IS 800-2007 must be used for analysis and design.

UNIT	CONTENTS	HOURS

1	**Introduction to Limit state design of steel structures** Advantages and disadvantages of Steel structures, structural steel sections, loads and load combinations, Limit state design- Design considerations, Failure criteria for steel, codal specifications and section classifications as per **IS 800-2007**.	**04**
2	**2.1 Bolted Connections** Introduction, advantages and disadvantages of bolted connections, Difference between unfinished bolts and High strength friction grip bolts (HSFG). Behaviour of bolted joints, failure of bolted joints, Simple problems on finding shear strength, bearing strength, tensile strength of bolts (bearing type only). Tensile strength of plate, Efficiency of the joint. Simple Lap Joint Design problems. Note: Excluding problems on HSFG Bolts and Long joints conditions.	**06**
	2.2 Welded Connections Introduction, advantages of welding, types of joints, weld symbols, specifications, effective area of weld, design strength of fillet weld, Simple problems on welded joints (fillet weld only).	**06**
3	**Flexural Members** Lateral buckling, Web buckling and crippling, Difference between laterally restrained and unrestrained beams, Determination of the moment capacity of laterally restrained beams. Design of laterally restrained simple beams using standard rolled steel sections only.	**07**
4	**Tension Members** Introduction, types of tension members, slenderness ratio, net area, behaviour of tension members, modes of failure, factors affecting the strength of tension member, design strength of tension member due to yielding of gross section, due to rupture of critical sections and block shear. Design of tension members.	**09**
5	**5.1 Compression Members** Columns –Classification, Boundary conditions, effective length, slenderness ratio. Design strength of Columns. Design of axially loaded Columns (Excluding Built up sections) Design of struts: Continues and Discontinues strut for given end conditions for axial load only.	**06**
	5.2Column Bases Introduction, Types of Column Bases, Slab base, Gusseted Base, Design of Slab base for axial Load.	**06**
6	**6.1 Analysis and Design of Masonry dams** Design of masonry dams with water face vertical , Distribution of pressure at foundation when the reservoir is full or empty.	**08**
	6.2 Analysis and Design of Retaining walls Theory of earth pressure – calculation of earth pressure by Rankin's method - with and without surcharge, Conditions of stability for no tension, middle third rule, Distribution of pressure at foundation, Design of masonry Retaining wall with earth face vertical.	
	TOTAL	**52**

Course Delivery: The course will be delivered through lectures, demonstration, Presentations and activities.

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Conduct a comparative study between a brittle and a ductile materials used in construction, Preparing a presentation report on the analysis of stress strain curve
2. Collect the map showing the Seismic zones of India and Basic wind speed throughout the country and analyse those maps.
3. Collect & Prepare a list of Indian Standard codes referred for structural steel design with the purpose of each code.
4. Prepare a chart showing various static and dynamic loads acting on the steel structures.
5. Visit a nearby construction site and identify the various types of connections used in steel structures and prepare a report. (steel Structures in railway stations, Bus terminals, Transmission towers)
6. Prepare a report and presentation on the topic "finite element analysis"
7. Prepare spread sheets for the following structural steel designs:
    a. Design of Beams
    b. Design of Columns
    c. Design of slab base
    d. Analysis and design of masonry dams
    e. Analysis and design of retaining wall
8. Prepare a report on the use of composite materials in construction and present it.
9. Collect the catalogues of various types of structural steel sections and prepare a presentation on that.
10. Prepare 2D & 3D models of various structural steel sections using CADD.
11. Prepare a report on the use of Concrete filled tubes in construction.
12. Prepare the structural detailing of designed sections as per SP 6-1 (1964): ISI Handbook for Structural Engineers -Part- 1
13. Prepare a model of Columns, Beam to beam connection, Beam to column connection slab base, masonry dams retaining wall
14. Prepare a presentation and project report on i) the different composite materials used in the construction. ii) Suspended Structures, iii) tubular structures.
15. Prepare report on Design and detailing of gantry girders
16. Prepare report on Design and detailing of Plate girders
17. Prepare report on Design and detailing of Column and beam Splices
18. Prepare report on Design and detailing of Lacings and battens
19. Prepare report on Design and detailing of Column to base connection

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary5)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary5				
1.Literature	5				
2.Fulfill team's roles & duties	2				
3.Conclusion	3				
4.Convensions	4				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfil team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Rare Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct method Assessment	CIE	IA	Students	Three tests (Average of three tests)	TEST 1	20	Blue books	CO1,CO2
					TEST II			CO3,CO4
					TEST III			CO5,CO6
				Mini project		05	Reports	CO1 to CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	CO1 to CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1 to CO3, Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 to CO7, Effectiveness of Delivery of instructions & Assessment Methods

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier: ***The following documents to be verified by CIE verifier at the end of semester***

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels						Marks weightage	weightage (%)	A *	B *
			R	U	Ap	Ay	C	E				
1	Introduction to Limit state design of steel structures	4	50%	50%	0%	0%	0%	0%	10	7	2	0
			5	**5**	**0**	**0**	**0**	**0**				
2	2.1 Bolted Connections 2.2 Welded Connections	12	15%	15%	28%	25%	7%	10%	35	24	1	2
			5	**5**	**10**	**10**	**2**	**3**				
3	Flexural Members	07	0%	25%	25%	25%	15 %	10%	20	14	1	1
			0	**5**	**5**	**5**	**3**	**2**				
4	Tension Members	09	0%	20%	20%	20%	20 %	20%	25	17	2	1
			0	**5**	**5**	**5**	**5**	**5**				
5	5.1Compression Members 5.2 Column Bases	12	0%	30%	30%	30%	5%	5%	35	24	1	2
			0	**10**	**10**	**10**	**2**	**3**				
6	6.1 Analysis and Design of Masonry dams 6.2 Analysis and Design of Retaining walls.	8	0%	25%	30%	30%	0%	15%	20	14	1	1
			0	**5**	**5**	**5**	**0**	**5**				
	Total	**52**	**10 %**	**30 %**	**28 %**	**20 %**	**4%**	**8%**	145	100	8	7
			10	**35**	**35**	**35**	**12**	**18**				

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A
B*- SEE QUESTIONS TO BE SET FOR (15MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	40%
2	Applying the knowledge acquired from the course	28%
3	Analysis	20%
4	Synthesis (Creating new knowledge)	4%
5	Evaluation	8%

Model Question Paper for CIE (Tests)

Test/Date and Time	Semester/year		Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	**VI SEM**		Design of Steel and Masonry Structures	**20**
	Year: 2015-16		**Course code:15CE61T**	

Name of Course coordinator :
Course outcome :CO1, CO2
Note: Answer all questions

	Question	M	CL	CO	PO
1	Calculate the strength of 20 mm diameter bolt of grade 4.6 if connected by a Lap joint. The main plates to be joined are 12 mm thick. OR A tie member in a truss is 200 x 10 mm in size it is welded to a 10 mm thick gusset plate by fillet weld. The overlap of the member is 300 mm and the weld size is 6 mm determine the design strength of the joint. If the welding is done on all the three sides.	**07**	Ay	**2**	**1,2, 3,5**
2	What are the advantages of steel as a structural material?	**04**	R	**1**	**1,2, 5**
3	List some of the bolts that are used in structural connections	**02**	U	**2**	**1,2, 3,5**
4	Design a lap joint between two plates of 20 mm and 12 mm thickness, so as to transmit a factored load of 70 kN using M16 bolts of grade 4.6 and grade 410 plates. OR An 150 x 100 x 10 mm angle section is to be connected to a 10 mm thick gusset plate at site. Design the fillet weld to carry a load equal to the strength of the member.	**07**	Ap	**2**	**1,2, 5**

Note: Internal choice may be given in each CO at the same cognitive level (CL).

TEXT BOOKS

1. M.L.Gambhir "Fundamentals of Structural Steel Design" Tata Mcgraw Hill, New Delhi
2. N. Subramanian, Design of Steel Structures Limit State Method, Oxford University Press, New Delhi
3. K.S. Duggal, "Limit State Design of Steel Structures", Tata Mcgraw Hill, New Delhi
4. S. S. Bhavikatti, Design of Steel Structures (By Limit State Method As Per IS: 800 2007)
5. L.S. Negi, Design of Steel Structures Second Edition, Mcgraw Hill Education.

Reference Books/Code Books

1. Gaylord and Gaylord, "Design of Steel Structures", Mcgraw Hill Publications, New York.
2. IS 800: 2007- General Construction in Steel- Code of Practice (Third Revision)
3. SP 6-1 (1964): ISI Handbook for Structural Engineers -Part- 1.

Web Links

1. http://nptel.ac.in/courses/105106112/
2. https://www.youtube.com/watch?v=EFBTSKPW5Ek
3.https://www.youtube.com/watch?v=4rRW8ampdc&list=PL5bDhnkL5C58uqazQ_zXxEGwtkSkU-3Bj&index=2
4. https://www.youtube.com/watch?v=C4Mm3mvN1P0
5. https://www.youtube.com/watch?v=g6sSbazsyLw

Model Question Paper

Diploma in Civil Engineering

6th semester

Course title: **DESIGN OF STEEL AND MASONRY STRUCTURES**

Time; 3Hrs. **Max. marks: 100**

Use of IS 800 -2007 is Permitted in the examination hall.
Missing data may be assumed suitably.

Part – A

Answer any five questions of the following. Each question carries five marks:

1. State the advantages and disadvantages of steel as a structural material?
2. State the advantages of using wide flanged beams over narrow ISMB beams.
3. Define i) effective length of weld, ii) throat thickness of the weld, iii) size of the weld.
4. Explain the failure criteria i) web buckling ii) web crippling
5. What are the different types of tension members?
6. Write short note on i) net sectional area ii) types of failures
7. Define i) effective length, ii) Slenderness ratio
8. Name the various conditions for the stability of the dam. Describe any one of them.

Part – B

Answer any five questions of the following. Each question carries fifteen marks:

1. Find the efficiency of the lap joint shown in figure. Given M20 bolts of grade 4.6 and Fe 410 plates.

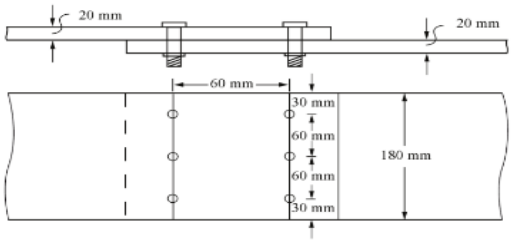


Figure 3.16

2. A tie member in a truss is 200 x 10 mm in size it is welded to a 10 mm thick gusset plate by fillet weld. The overlap of the member is 300 mm and the weld size is 6 mm determine the design strength of the joint. If the welding is done on all the three sides.

3. Design a Simply supported beam of span 5 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The beam is subjected to a dead load of 20 kN/m and imposed load of 30 kN/m. Assume Fe 410 grade steel.

4. Design a tension member using single angle section to carry a load of 100 kN. Use 16 mm diameter bolts, the length of the member is 2m. Ultimate stress= 410 N/mm^2, yield stress= 250 N/mm^2.

5. Design a column 3.5 m long in a building subjected to a factored load of 600 kN. Both the ends of the column are effectively restrained in direction and position. Use steel of grade Fe 410.

6. Design a slab base for an ISHB 450 @92.5 Kg/m carrying an axial load of 1500 kN @ working conditions. Adopt Fe 410 grade steel and M25 concrete also design the bolted connections.

7. A Masonry dam of trapezoidal section having water on vertical face is 16 m high. The base of the dam is 8 m wide and top 3 m wide. Find
a) Resultant thrust on the base per meter length of the dam
b) Point, where the resultant thrust cuts the base and
c) Intensities of maximum and minimum pressure at the base.
Take weight of masonry as 24 kN/m^3 and water as 10 kN/m^3.

Model Question Bank:

1. Introduction

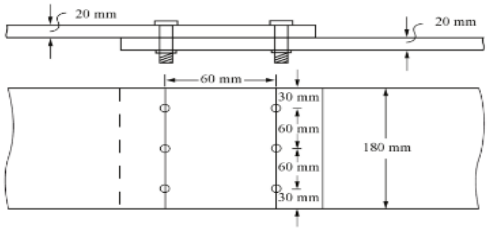
Cognitive Level: Remembering
1. State the advantages and disadvantages of steel as a structural material?
2. What are the types of structural steel?
3. What are the different types of loads acting on the steel structures?
4. What is meant by Limit state design?
5. State different limit states.
6. What is a partial safety factor?
7. Define design load.
8. Draw typical sections of structural steel sections.
9. Name some examples of steel structures.
10. Sketch the various structural shapes and name the components.

Cognitive Level: Understanding
1. Explain the different types of loads acting on the steel structures. 2. Mention the importance of load combinations in the design of steel structures. 3. State the advantages of using wide flanged beams over narrow ISMB beams. 4. Compare the limit state design method with ultimate load method and working stress method. 5. Discuss the importance of limit state of strength and limit state of serviceability in structural design. 6. Mention the important clauses used in the design of steel structural elements as per IS 800-2007

2.1 Bolted Connections

Cognitive Level: Remembering	
1	What are the advantages and disadvantages of bolted connections?
2	List some of the bolts that are used in structural connections.
3	What are the advantages of HSFG bolts?
4	Define the following i) Pitch ii) Gauge iii) Staggered pitch iv) Edge distance v) Lap
5	Define nominal diameter and gross diameter of bolt.
Cognitive Level: Understanding	
1	What are the types of failures occurring in bolted joints?
2	Write a note on minimum and maximum pitch.
3	What are the differences between unfinished and HSFG bolts.
4	What is the minimum pitch allowed in the code for bolted connections?
5	What is the minimum edge distance in the code for bolted connections?
6	What is the difference between the pitch and a staggered pitch?
7	Why minimum pitch values are specified in the code?
8	Define the efficiency of a joint. How to calculate the efficiency of a joint?
Cognitive Level: Application:	
1	Calculate the strength of 20 mm diameter bolt of grade 4.6 for the following cases. The main plates to be joined are 12 mm thick. a) Lap joint, b) Single cover butt joint: the cover plate being 8 mm thick, b) Single cover butt joint: the cover plate being 8 mm thick.
2	The plates of 6 mm thick tank are connected by a single bolted lap joint with 20 mm diameter bolts at 60 mm pitch, calculate the efficiency of the joint. Take fu of plate as 410 MPa and assume 4.6 grade of bolts.

Cognitive Level: Analysis	
1	The plates of a tank 8 mm thick are connected by a single bolted lap joint with 16 mm diameter bolts at 50 mm pitch calculate the efficiency of the joint. Take fu = 410 MPa. Assume 4.6 grade bolts.

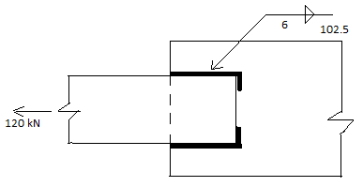
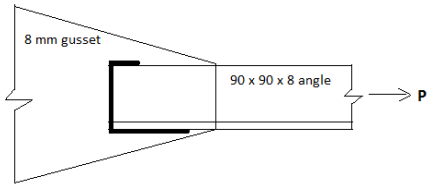
2	Find the efficiency of the lap joint shown in figure. Given M20 bolts of grade 4.6 and Fe 410 plates.  **Figure 3.16**

Cognitive Level: Application, Analysis & Evaluation	
1	Design a lap joint between two plates of 20 mm and 12 mm thickness, so as to transmit a factored load of 70 kN using M16 bolts of grade 4.6 and grade 410 plates.
2	Design a lap joint between two plates of size of 60 x 10 mm thick and 60 x 8 mm thick so as to transmit a factored load of 60 kN using a single row of M16 bolts of grade 4.6 and 410 grade plates.
3	Design a lap joint to connect two plates of 100 x 8 mm using M16 bolts and Fe-410 grade plate.
4	Two flats Fe 410 grade, each 210 mm x 8 mm are to be jointed using 16 mm diameter,4.6 grade bolts to form a lap joint, so as to transmit a load of 200 kN. Design the joint and determine the suitable pitch for the bolts.

2.2 Welded Connections

Cognitive Level: Remembering	
1	Define weld.
2	What are the advantages and disadvantages of welded joints?
3	List the various types of welded joints.
4	Define i) effective length of weld, ii) throat thickness of the weld, iii) size of the weld.
Cognitive Level: Understanding	
1	What are assumptions usually made in the analysis of welded joints.
2	What is effective area of a fillet weld?
3	What is the minimum overlap length of the plates in a lap joint?
4	What is the minimum size of the weld.

Cognitive Level: Application & Analysis	
1	A tie member in a truss is 200 x 10 mm in size it is welded to a 10 mm thick gusset plate by fillet weld. The overlap of the member is 300 mm and the weld size is 6 mm determine the design strength of the joint. If the welding is done on all the three sides.
2	A tie member in a truss ISMC 200 @ 218.763 N/m is welded to a 10 mm thick gusset plate by fillet weld. The overlap of the member is 250 mm and the weld size is 6 mm determine the design strength of the joint. If the welding is done on the two sides along the direction of load.

Cognitive Level: Application, Analysis & Evaluation	
1	Determine the size and length of the fillet weld for the lap joint to transmit a factored load of 120 kN as shown in figure, assuming site welds, Fe 410 steel, assume the width of the plate as 75 mm. 
2	An 150 x 100 x 10 mm angle section is to be connected to a 10 mm thick gusset plate at site. Design the fillet weld to carry a load equal to the strength of the member, Use IS 800-2007.
3	Design a fillet weld to join the tension member consisting of 2 ISA 100 x 75 x 8 mm to a 12 mm thick gusset plate. The factored tensile load is 410 kN.
4	A tie member of a truss consisting of an angle section ISA 100 x100x 10 mm of Fe 410 grade is welded to an 8 mm gusset plate. Design a weld to transmit a load equal to the full strength of the member.
5	Determine the effective throat dimension of a 10 mm fillet weld.
6	A tie member of a truss consisting of an angle section ISA 65 x 65 x 6 mm of Fe 410 grade is welded to an 8 mm gusset plate. Design a weld to transmit a load of 170 kN.
7	Design a joint of an angle section ISA 90 x 90 x 8 mm of Fe 410 grade when welded to a 8mm gusset plate on all the three sides as shown in the figure. 
8	A tie member of a roof truss consists of 2 ISA 100 x 75 x 8 mm the angles are connected to either side of a 10 mm gusset plates and the member is subjected to a working pull of 300 kN. Design the welded connection.
9	A tie member 75 mm X 8mm is to transmit a load of 90 kN. Design the fillet weld and calculate the necessary overlap.

3. Flexural Members

Cognitive Level: Remembering	
1	Mention the different types of sections used for beams.
2	Draw a neat sketch of ISMB 400 and mention its properties.
Cognitive Level: Understanding	
1	Mention the different types of failure in beams.
2	Differentiate between laterally restrained and laterally unrestrained beams.
3	Explain the failure criteria i) web buckling ii) web crippling

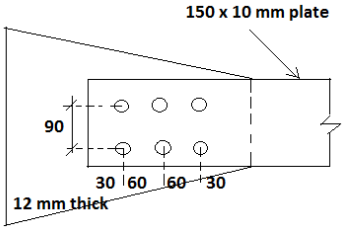
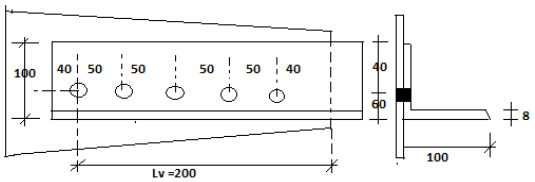
Cognitive Level: Application & Analysis	
1	Calculate the moment carrying capacity of a laterally restrained simply supported beam with ISMB 400 section for a length of 3 meters
2	Calculate the load carrying capacity of laterally restrained simply supported beam with ISMB 500 section for a length of 4 meters.

Cognitive Level: Application, Analysis & Evaluation	
1	Design a Simply supported beam of span 5 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The beam is subjected to a dead load of 20 kN/m and imposed load of 30 kN/m. Assume Fe 410 grade steel.
2	Design a Simply supported beam of span 6 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The beam is subjected to a dead load of 25 kN/m and live load of 40 kN/m. Assume Fe 410 grade steel.

4 .Tension Members

Cognitive Level: Remembering	
1	What are the different types of tension members?
2	Define tension member.
Cognitive Level: Understanding	
1	Write short note on i) slenderness ratio, ii) net sectional area iii) types of failures
2	What is meant by tensile stress? How it is calculated?

Cognitive Level: Application & Analysis	
1	An ISA 100 x 75 x 10 mm is connected by its longer leg with a gusset plate 12 mm thick with two 2-16 mm diameter bolts of grade 4.6. Determine the total net area and effective net area of the section.
2	A double angle tension member 75 x 50 x 8 mm is subjected to a service load of 300 kN it is connected to gusset plate with one line of 16 mm diameter bolts to longer legs. Determine the strength of the tension member. Assume that effective net area is equal to 0.80 times the net area.

Cognitive Level: Analysis & Evaluation	
1	Determine the tensile strength of the plate 150 mm x 10 mm connected to 12 mm thick gusset plate using M16 bolts, as shown in figure use property class 4.6 bolts. 
2	A single angle 120 x 120 x 8 mm connected to a gusset plate at the ends with 20 mm diameter bolts with the connection length of 200 mm to transfer tension determine the tensile capacity of the joint. 
3	Determine tensile strength of a channel ISJC 175 is connected to a gusset plate using 6 bolts of 16 mm diameter arranged in two rows with pitch 50 mm and edge distance 35 mm.

Cognitive Level: Application, Analysis & Evaluation	
1	Design a tension member to carry a factored tensile load of 400 kN, connected by shorter legs back to back. Length of the member is 3.0 m.
2	A T section 3.8 m long is to be provided to support a tensile load of 300 kN design the section.
3	Design a tension member using single angle section to carry a load of 100 kN. Use 16 mm diameter bolts, the length of the member is 2m. Ultimate stress= 410 N/mm2, yield stress= 250 N/mm2.

5.1 Compression Members

Cognitive Level: Remembering	
1	Define i) effective length, ii) Slenderness ratio iii) radius of gyration
2	Mention the different types of columns depending on their behaviour.
Cognitive Level: Understanding	
1	What is meant by strut?
2	Differentiate between the column and a strut.
3	Differentiate between short column and long column
4	Mention the end conditions of columns with their effective lengths as per IS standards

Cognitive Level: Application & Analysis	
1	Calculate the value of the least radius of gyration for a compound column consisting of ISHB 250 @ 536.6 N/m with one cover plate 300 x 20 mm on each flange.
2	Calculate the design compressive load for a column ISHB 350 @ 710.2 N/m, 3.5 m high. The column is restrained in direction and position at both the ends. Use steel of grade Fe 410.
3	A single angle discontinuous member ISA 120 x 120 x 10 mm with single bolted connection is 2.5 m long. Calculate the safe load carrying capacity of the section. If it is connected by one bolt at each end.
4	An ISA 100 x 100 x 6 mm (fy = 250 N/mm2) is used as a strut in a truss. The length of the strut between the intersections at each end is 3.0 m. Calculate the strength of the strut if a) it is connected by two bolts at each end b) it is connected by one bolt at each end c) it is welded at each end.
5	Calculate the strength of a discontinuous strut of length 3.2 m. The strut consists of two unequal angles 100 x 75 x 8 mm (fy = 250 N/mm2) with long legs connected and placed: a) on the opposite side of a gusset plate b) on the same side of a gusset plate

Cognitive Level: Application, Analysis & Evaluation	
1	Design a column 3.5 m long in a building subjected to a factored load of 600 kN. Both the ends of the column are effectively restrained in direction and position. Use steel of grade Fe 410.
2	Design a single angle discontinuous strut to carry a factored axial compressive load of 65 kN. The length of strut is 3.0 m between intersections. It is connected to 12 mm thick gusset plate by 20 mm diameter 4.6 grade bolts. Use steel of grade Fe 410.
3	Design a double angle discontinuous strut to carry a factored load of 175 kN. The length of the strut is 3.0 m between intersections. The two angles are placed back to back, consider the following cases:

5.2 Column Bases

Cognitive Level: Remembering	
1	Mention the types of column bases, and situations where they are used.

Cognitive Level: Understanding	
1	Differentiate between a slab base and a gusseted base.
2	State the purpose of providing anchor bolts in the column foundations.
3	What are the load transfer mechanisms considered in the design of slab base.

Cognitive Level: Application, Analysis & Evaluation	
1	Design a slab base for an ISHB 450 @92.5 Kg/m carrying an axial load of 1000 kN @ working conditions. Adopt Fe 410 grade steel and M25 concrete also design the welded connections.
2	Design a slab base for an ISHB 450 @92.5 Kg/m carrying an axial load of 1500 kN @ working conditions. Adopt Fe 410 grade steel and M25 concrete also design the bolted connections.
3	Design a slab base for a column ISHB 350 @ 710.2 N/m subjected to a factored compressive load of 1500 KN for the following conditions:

6.1 Masonry Dams

Cognitive Level: Remembering	
1	Mention the types of forces acting on the masonry dam.
2	Name the various types of dams commonly used in these days.
Cognitive Level: Understanding	
1	Name the various conditions for the stability of the dam. Describe any two of them.
2	Explain the middle third rule in a dam section.
3	What is the role of centre of gravity in the stability of the dam section?

Cognitive Level: Application, Analysis & Evaluation	
1	A Masonry dam of trapezoidal section having water on vertical face is 16 m high. The base of the dam is 8 m wide and top 3 m wide. Find a) Resultant thrust on the base per meter length of the dam b) Point, where the resultant thrust cuts the base and c) Intensities of maximum and minimum pressure at the base. Take weight of masonry as 24 kN/m^3 and water as 10 kN/m^3.
2	A masonry trapezoidal dam is 4 m high and 1 m wide at its top and 3 m wide at its bottom retains water on its vertical face. Determine the maximum and minimum stresses at the base i) when the reservoir is full ii) when the reservoir is empty. Take weight of water as 10 kN/m^3 and that of masonry as 24 kN/m^3.
3	A masonry dam, trapezoidal in section, 2 m wide at the top is 7 m in height. The face of the dam exposed to water is vertical and water level is likely to come up to the top. If the densities of concrete and water are 24 kN/m^3 and 10 kN/m^3 respectively, determine the minimum bottom width necessary so that no tension is induced at the base; also calculate the Maximum pressure intensity at the base.

6.2 Masonry Retaining Walls

Cognitive Level: Remembering	
1	Mention the types of forces acting on the retaining wall.
2	What is a retaining wall? Discuss its uses.
Cognitive Level: Understanding	
1	What are the assumptions made in Rankine's theory for calculating the earth pressure behind retaining walls?
2	Define i) Angle of repose ii) Surcharge due to back fill and surcharge due to live load
3	Differentiate between Active and Passive Earth Pressure.

Cognitive Level: Application, Analysis & Evaluation	
1	A masonry retaining wall, trapezoidal in section with vertical face exposed to earth is 1 m wide at top, 3 m wide at bottom and 6 m high. The surface of the earth is horizontal and level with the top of the wall. Determine the maximum and minimum pressure intensities at the base. Check the stability of the wall if the coefficient of friction is 0.60. Given the density of masonry 24 kN/m3 and that of earth is 16 kN/m3. The angle of repose of earth is 30°.Draw the normal stress intensity diagram below the section of the retaining wall.
2	A masonry retaining wall, trapezoidal in section with vertical face exposed to earth is 1 m wide at top, 4 m wide at bottom and 8 m high. The surface of the earth is horizontal and level with the top of the wall. Determine the maximum and minimum pressure intensities at the base. Check the stability of the wall if the coefficient of friction is 0.60. Given the density of masonry 24 kN/m^3 and that of earth is 16 kN/m^3. The angle of repose of earth is 30°.Draw the normal stress intensity diagram below the section of the retaining wall.

	Course Title: **PROJECT MANAGEMENT AND VALUATION**		
	Credits (L:T:P) **4:0:0**	Total Contact Hours: **52**	Course Code: 15CE62T
	Type of Course: **Lecture, Case study, Mini projects**	**Credit : 4**	Core/Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Pre-requisite: Knowledge of Construction Technology and Estimation and Costing.

Course Objectives:

1. Able to understand the organisation structure in construction industries.
2. Know the activities of the project and schedule it effectively considering the duration with resources available, organising efficiently for successful completion of the project.
3. Know the process of tendering in contracts and procedure followed in the project of a construction industry
4. Know the Quality control, Safety aspects and Store management of a construction project.
5. To know the qualities of an entrepreneur.
6. Perform the valuation of buildings.

Course outcomes

At the end of the course, students have the ability to;

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Describe the process and purpose of Management in construction organization teams.	**R/U**	2,4,5,10	**10**
CO2	Use scheduling technique for construction project for effective utilisation of resources.	**R/U/Ap/An**	2,3,4,10	**10**
CO3	Demonstrate the understanding of management fundamentals and traditions followed in construction industry.	**U/Ap**	2,4	**15**
CO4	Employ appropriate practices to organize and manage safety and quality assurance of a construction project	**R/U**	2,4,5,7,10	**10**
CO5	Evaluate the value of a building.	**R/U**	1,2,3,5,10	**05**
CO6	Develop insight to discover and create entrepreneurial opportunities and the expertise to successfully launch, manage, and grow their own venture.	**R/UAp/Ay/C**	2,5,10	**02**
CO7	Manage the suggested or identified constructional management problems, formulate and solve in teams, in order to improve future problem solving ability and able to present it.	**R/U/A/AP**	1,2,3,4,5,6,7, 8,9,10	*
		Total sessions		**52**

Mapping Course Outcomes with Program Outcomes

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
PM & VALUATION	1	3	2	3	3	-	1	1	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

s	CONTENTS	HOURS
1	**INTRODUCTION TO PROJECT MANAGEMENT**: Project Management, Professional Construction Management-Significance, objectives & functions of construction management, Classification, stages in construction. Interpersonal Behaviour in Project Organizations of construction team, Perception of- Owner, Engineer & Contractor, Job layouts, Organisation chart. Resources for construction-Men, Machine, Materials, Money & Time Management, Turnkey operation, Project Feasibility. BOT, BOOT, PPP.	10
2	**PLANNING & SCHEDULING** PLANNING-Objective, principles, advantages, analysis, limitation and stages of planning for construction projects. SCHEDULING - Necessity of scheduling, Preparation of construction schedule for labour, material, machine & finance. NETWORK ANALYSIS-Introduction to network techniques, Interrelationship of events, activities.-Bar chart, Analysis of CPM, PERT with simple problems, Indentifying critical activities and critical path. Scheduling software applications.	10
3	**CONSTRUCTION PROJECT PRACTICES** -Types of contract, contract agreement, Tender- Pre tender & Post tender planning.- Procedure for inviting tender-(Tender Notice & Tender documents, EMD, security deposit & Guaranties, Scrutiny of Tenders & e-Tendering). Conditions for failure of contract and its extension, Termination of contract, tender forms, comparative statements, administrative approval, technical sanction, nominal master roll, measurement book, method of recording bills, Pre measurements, check measurements, preparation of bills (Concept of RA bill- submission, scrutiny and payment.), ledger accounts, Imprest Account, Cashbook, Suspense classification -STORES-Classification of Stores. Issues, Indents & Bin cards, - maintenance and	15

	inspection- inventories – procedures adopted in P.W.D. and C.P.W.D, Site Order book, Hindrance Register, Drawing Register.	
4	**SAFETY AND QUALITY MANAGEMENT** ACCIDENTS-definition of accident terms: (Partial & total disablement, Injury frequency rate, injury severity rate). Accident- Causes, Precaution & Prevention. SAFETY- Importance of safety. Safety procedures and check list (excavation, scaffolding, form work.) Safety meetings, Safety measures for storage, handling of building material and execution. TQM-Introduction, Importance & Functions of total quality management in construction industry, Tools for quality control, Elements and requirements of quality management. Aims and ways of TQM. BIS certification of quality system,	10
5	**VALUATION OF BUILDINGS**-Definition, Methods of valuation, purpose and factors governing valuation. Scrap value, Salvage value, Market value, Book value and sinking fund. Calculation of depreciation by different methods. Rental value based on plinth area method & Rent fixation. Valuation of old buildings.	05
6	**ENTERPRENEURSHIP** Concept- Roles-Expectations of Entrepreneurship. Motivational needs, Characteristics and Requirements of an entrepreneur.- Licensed surveyor, valuer & Contractor.	02
	TOTAL	**52`**

COURSE DELIVERY: The course will be delivered through lectures and Power point presentations/ Video, demonstrations etc.

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Visit any nearby construction site & interact with the construction team regarding type of structure & its organisation structure.
2. Visit any contractor and interact about the present tendering process (e-tendering) and awarding of contract.
3. Collection of tender notices published in newspapers for various items of civil engineering works (at least 5) write salient features of them.
4. Prepare a planning schedule for the nearby on going construction activity with the help of available open source project management software.
5. Visit any nearby PWD/PERD /KIARDL/KHB office or any construction company, collect the documents (BOQ, M B, Tender, SR, lead statement) related to the project and prepare report on it.
6. Collect quality management standards pertaining to ISO 9001, ISO 14001 & OHSAS 18001 & prepare a report.
7. Drafting a tender notice for construction of a civil engineering work (W. B. M. Road, residential is building).

8. Preparation of tender document for the building.(detailed estimate prepared for R.C.C. building in estimating and costing shall be used)
9. Collection of various account forms from PWD & Prepare a report on it.
10. Prepare a report on store procedure and account producer of PWD. (For it a Guest lecture of PWD official to be arranged.)
11. Prepare detailed specifications for the following: a) Building construction system. b) Irrigation engineering system. C) Transportation engineering system. D) Environment engineering system.
12. Study the application of CPM & PERT technique in planning software.
13. Prepare a report on women entrepreneurship, rural entrepreneurship, agri-preneurship.
14. Collect the various entrepreneurship development programs.
15. Collect the details required for getting a contract license from corporation and prepare a report on it.
16. Make a case study on valuation of a existing building.
17. Collect safety procedures (Do's and Dont's) of each and every construction activities.
18. Collect or Prepare the various stages of inspection and quality control for construction activities

NOTE:

1. Guest lectures to be arranged by inviting engineers from PWD or from construction industry.
2. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5.
3. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students.
4. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5.**

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	3				
2.Fulfill team's roles & duties	2				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3
					Test 3			CO4, CO5,CO6
				Student Activities		05	Written Report	CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1,2 & 3 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3, 4,5, 6, 7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE				Marks Weightage	Weightage (%)	A*	B*
			Cognitive Levels							
			R	U	Ap	Ay				
1	Introduction to project management	**10**	33% **15**	67% **10**	0% **0**	0% **0**	25	18	3	1
2	Planning & scheduling	**10**	17% **05**	27% **10**	29% **10**	27% 10	35	25	1	3#
3	Construction project practices	**15**	25% **10**	50% **20**	25% **10**	0% **0**	40	27	2	3
4	Safety & quality management	**10**	20% **05**	40% **10**	40% **10**	0% **0**	25	17	1	2
5	Valuation of buildings	**05**	13% **02**	20 % **03**	67% **10**	0% **0**	15	10	1	1#
6	Entrepreneurship	**02**	0% **0**	100% **5**	0% **0**	0% **0**	05	3	1	0
Total		**52**	**25%** **37**	**40%** **58**	**27%** **40**	**8%** **10**	145	100	9	10

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

A*-SEE questions to be set for (05 marks) in Part – A

B*- SEE questions to be set for (10marks) in Part – B

 # One compulsory question must be given.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**65**
2	Applying the knowledge acquired from the course	**27**
3	Analysis	**8**
4	Synthesis (Creating new knowledge)	**0**
5	Evaluation	**0**

MODEL QUESTION PAPER FOR CIE

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/ 6 th week of sem 10-11 Am	VI SEM	PROJECT MANAGEMENT & VALUATION	20
	Year:	Course code: 15CE63T	

Name of Course coordinator : **Course Outcomes : 1 & 2**

Note: Answer all questions

	Questions	M	CL	CO	PO
1	List any five objectives of construction management (or) What is Job lay out? Mention the factors affecting Job layout.	05	R	1	2,4,5
2	What are the necessity of scheduling in construction project?	05	U	2	2,3,4
3	Explain Project Feasibility.	05	U	1	2,4,5,6
4	Draw a network diagram for the following , B follows A, C follows A, D and E follows B, F follows C and D, G follows E and F. Determine the critical path for the network diagram if the duration of activities A,B,C,D,E,F and G are 2,6,3,1,6,3 and 6 days respectively. Find the Critical path.	05	Ap	2	2,3,4

Note: Internal choice may be given in each CO at the same cognitive level (CL).

TEXT BOOKS & REFERENCES

1. Sanga Reddy. S, “Construction Management”,Kumaran Publications, Coimbatore.
2. Rangwala.S.C.,”Construction of Structures and Management of Works”, Charotar Publishing House,Anand-388001,3rd Edition,2000.
3. Construction management by NITTTR, Chennai.
4. Chitkara, “Construction Project Management”, Mc Graw Hill Publications,
5. Construction Management – Prof Dhir, Eastren Publications.
6. Estimating and costing By B. N. Datta.
7. Entrepreneurial development – Dr.S.S.Khanka by S.Chand publishers

Model Question Paper

Diploma in Civil Engineering

6TH semester

Course title: **PROJECT MANAGEMENT & VALUATION**

Time: 3Hrs. **Max. marks :100**

Part –A

Answer any six questions of the following, each question carries 5 marks

1. What is construction management? What is its significance?
2. What is Job Layout? Write the Job Layout for construction of a Multi storey building.
3. Explain BOT.
4. Prepare a Material schedule for any project.
5. List the requirements to be furnished in contract agreement.
6. What is Site order book? Write the specimen of a site order book.
7. Write the functions of Total Quality management in a Construction industry.
8. What are the purpose and factors governing valuation?
9. Write note on Entreprenual motivation.

Part –B

Answer any seven questions from the following. (Question no4 & no10 are compulsory)
Each question carries 10 marks.

1. What is Construction organisation? Write the Organisation chart for a Multi storey building project.
2. What is Construction Scheduling? Explain CPM & PERT with example.
3. Briefly explain the Stages of a construction project.
4. Draw a network diagram for the following , B follows A, C follows A, D and E follows B, F follows C and D, G follows E and F. Determine the critical path for the network diagram if the duration of activities A,B,C,D,E,F and G are 2,6,3,1,6,3 and 6 days respectively. Find the Critical path.
5. What is a contract? What are the types of contract? Explain Item rate contract.
6. List the steps involved in RA bill submission, scrutiny and payment.
7. Briefly explain the following,
   a. ledger accounts.
   b. Imprest Account.
   c. Cashbook.
   d. Suspense classification.
8. Write the precautions and Preventive measures for accident in construction industry.
9. Explain the various stages of inspection and quality control for RCC work and Excavation in Foundation.
10. A building costing Rs. 15lakhs has been constructed on a open land measuring 100sqm. The prevailing rate of land in the neighbourhood is Rs. 4500 per sqm. Determine the net rent of the property if the expenditure on outgoing expenses including sinking fund is Rs. 42000 per annum. Also work out the gross rent of the property per month.

MODEL QUESTION BANK

Unit-1 INTRODUCTION TO PROJECT MANAGEMENT

Cognitive level –Remember

1. What are the objects of construction management?
2. State the purpose of Job layout.
3. Write the organization chart for medium construction firm.
4. What is Construction organisation? Write the relationship between Owners, Engineer & Contractor.
5. Write a short note on the resources of a construction project.
6. Write a short note on Project feasibility.

Cognitive level -Understand

1. Define organization? Explain the different types of organization
2. Write the Organisation chart for a Multi storey building project.
3. List the principles of organization.
4. Explain the need of organization in construction.
5. Explain Line (or) military organization.
6. Compare line organization with staff organization.
7. Explain the various stages in construction of a project from concept to realization.
8. Describe the duties of Chief Engineer.
9. Write a short note on construction team.
10. What is Job layout? Write the Job layout for construction of a building.
11. What are the factors affecting Job layout.
12. Explain BOT, BOOT, PPP.

Unit-2-PLANNING & SCHEDULING

Cognitive level –Remember

1. What is Construction planning? What are its Objectives?
2. What is Construction planning? What are its Advantages?
3. What is Construction Scheduling? Explain CPM & PERT with example.
4. Mention advantages of construction scheduling?
5. What is Pre-tender planning & Post-tender planning?
6. What are the advantages of Scheduling?
7. List the types of schedules used in construction industry.
8. List the duties of contractor.
9.

Cognitive level –Understanding

1. Brief the Stages of a construction project.
2. Prepare a Labour schedule for any construction project.
3. What is construction planning? List the objectives of construction planning
4. What is construction schedule? Mention the details required for preparing schedule.

5. Explain i) Material Schedule ii) Labour schedule iii) Equipment schedule iv) expenditure scheduling
6. What are the features of network planning.
7. Define i) Event ii) Activity iii)float iv) Total float v) Duration vi)Successor vii) Predecessor
8. What is CPM? What is its importance?
9. Define i) EST ii) Early finish iii)Late start iv)Late finish v)Critical activity v) Critical path
10. Explain CPM & PERT.

Cognitive level –Application

1. Draw a network diagram for the following , B follows A, C follows A, D and E follows B, F follows C and D, G follows E and F. Determine the critical path for the network diagram if the duration of activities A,B,C,D,E,F and G are 2,6,3,1,6,3 and 6 days respectively. Find the Critical path.
2. Explain Network analysis for a project using any open source software.
3. Distinguish between CPM & PERT.
4. Draw a network diagram for the following logic
   B follows A, C follows A, D and E follows B, F follows C and D, G follows E and F
   Determine the critical path for the network diagram if the duration of activities A,B,C,D,E,F and G are 2,6,3,1,6,3 and 6 days respectively.
11. Draw the Network. Determine the critical path and critical time for the following activities.

Activity	Event No	Duration (days)
A	1-2	4
B	2-3	2
C	3-4	10
D	2-4	4
E	4-5	10
F	2-5	5
G	5-8	15
H	5-6	10
I	6-8	8
J	5-7	6
K	7-8	4
L	8-9	6
M	9-10	3

Unit-3- CONSTRUCTION PROJECT PRACTICES

Cognitive level –Remember

1. Define contract & Contractor.
2. List the types of contract.
3. What are the details to be contained in a contract agreement?
4. Mention the conditions of contract.

5. Explain i) Piece work contract ii) Labour contract iii) Item rate contract iv) Cost plus percentage contract v)Negotiated contract.
6. Explain briefly Lump sum contract.
7. List the steps involved in RA bill submission, scrutiny and payment.

Cognitive level –Understanding

1. How an Engineer can achieve economy in construction work.
2. What are the advantages of e-tendering?
3. What is tender document?
4. Explain the procedure of calling, opening & acceptance of a tender.
5. What is EMD? State the objectives of EMD.
6. Explain Scrutiny of tenders.
7. What is a contract? What are the types of contract?
8. Write short note on.
   a. Pre-tender & Post-tender.
   b. Contract agreement.
   c. E-Tendering
9. Write the procedure for inviting a tender for a construction project.
10. Explain the documents requirement for issuing a tender document.
11. Write a typical comparative statement format.
12. Briefly explain the following,
    a. ledger accounts.
    b. Imprest Account.
    c. Cashbook.
    d. Suspense classification
13. Write the Classification of Stores in a construction project
14. Define site order book, Hindrance register & Drawing register.
15. Write a short note on Termination of contract.

Cognitive level –Application

16. Distinguish between Engineer & Contractor.
17. Distinguish between Schedule rate contract & Percentage rate contract.
18. Explain departmental execution of work.
19. State the need for departmental execution of work. How it is executed.
20. List the information to be given in tender notice.
21. Explain term tender & tender notice.
22. Explain e- tendering.
23. Write short note on work order & site order book.
24. Distinguish between Earnest money deposit & Security deposit.
25. What are the conditions for failure of contract and on what condition contract can be extended.
26. Explain administrative approval, technical sanction and nominal master roll.
27. Explain Issues, Indents & Bin cards forms in Stores.
28. Explain the rules to be followed in recording measurement in M-book.
29. Explain Scrutiny of Tenders.
30. Discuss the importance of site order book, drawing register & Hindrance register in a construction work.

Unit-4- SAFETY & QUALITY MANAGEMENT

Cognitive level –Remember

1. Define Accident?
2. What are the effects of accidents in construction industry
3. What are the causes of Accidents in a construction Project?
4. List the important safety factors to be considered in construction industry.

Cognitive level –Understanding

1. Explain the causes & effects of accidents and mention the preventive steps to be taken to avoid the accidents
2. Write a short note on accidents in construction industry.
3. Write the precautions and Preventive measures for accident in construction industry.
4. Write the safety measures and check list for the following activities,
   a. Excavation
   b. Scaffolding
   c. Form work
5. Write the functions of Total Quality management in a Construction industry.
6. What are the benefits of BIS and ISO9000 certification?
7. State the need for Pre-measurements & Check measurements.
8. Write a short note on standard measurement book.
9. Write a short note on check measurements.
10. Write a short note on TQM.
11. What are the benefits of ISO9000 certification.

Cognitive level –Application

1. Brief the safety regulations provided in legislation through Acts and Code of practice.
2. Describe the safety measures to be undertaken in i)Excavation ii) Demolition
3. Write a short note occupational health hazards in construction industry.
4. Brief the safety measures for storage of materials in a construction site.
5. Explain the various stages of inspection and quality control for Excavation.
6. Describe safety measures to be adopted for i)Fabrication ii) Scaffolding iii)Formwork
7. Differentiate Pre-measurements & check Measurements.
8. "Measurement Book is an important account record," justify the statement.
9. What is measurement book? Explain the rules to be followed in recording measurements in measurement book.
10. Explain briefly the stages of inspection & Quality control for RCC work.
11. Explain briefly need for inspection of works.
12. Explain how quality of construction is maintained.
13. Explain in brief the various stages of inspection to control the quality of work.
14. Explain briefly the general principles of inspection in construction work.

Unit-5- VALUATION OF BUILDINGS

Cognitive level –Remember

1. What are the purpose and factors governing valuation?
2. Write the necessity of valuation.

3. Write the various methods of valuation

Cognitive level –Understanding

1. Write a short note on Mobilization advance.
2. Brief sinking fund.

Cognitive level –Application

1. Differentiate between Market value and Book value.
2. Differentiate between Scrap value and Salvage value.
3. A building costing Rs. 15lakhs has been constructed on a free hold land measuring 100sqm. Recently in big city prevailing rate of land is the neighbourhood of Rs. 4500 per sqm. Determine the net rent of the property if the expenditure on an outgoing including sinking fund is Rs. 42000 per annum. Work out also the gross rent of the property per month.
4. Differentiate between depreciation and Obsolescence.
5. A pumping set with a motor has been installed in a building at a cost Rs.2500.00.Assuming the life of the pump as 15 years, workout the amount of annual instalment of sinking fund to be deposited to accumulate the whole amount of 4% compound interest
6. Define the following terms (i) Value (ii) cost (iii) gross income (iv) Net income (v) obsolescence
7. Define the following terms (i) Scrap Value (ii) Salvage value (iii) Capitalized value
8. Define the following terms (i) Market value (ii) Book value
9. .The estimated value of a building is Rs.5,00,000. The carpet area of the building is 70 sq.m If the plinth area is 20% more than this, what is the plinth rate of the building?
10. Calculate the annual rent of a building with the following data. Cost of land = Rs.20000/- Cost of building = Rs.80000/- Ess expected to be 0.7% of the cost construction and other out goings will be 25% of the gross rent. There is no proposal to set up a sinking fund.

Unit-6- ENTERPRENEURSHIP

Cognitive level –Remember

1. Define Entrepreneur & Entrepreneurship.
2. List the advantages & disadvantages of an Entrepreneur.
3. State any six important qualities of entrepreneur.
4. What do you understand by the Entrepreneurial competency

Cognitive level –Understanding

1. Write note on Entreprenual motivation.
2. List the contents of a project report.
3. Write note on Entreprenual motivation.
4. Define Entrepreneurial culture.
5. What is the significance of promoting women Entrepreneurship in India?

Cognitive level –Application

1. Explain the concept of Entrepreneurship.
2. Explain the characteristics of an Entrepreneur.
3. Explain the characteristics of an Entrepreneur.
4. Explain the concept of Entrepreneurship.
5. Explain the characteristics of licensed surveyor, valuer and Contractor.
6. Explain Entrepreneurship Discuss its functions. Also explain the problems faced by them.
7. What is entrepreneurship Development .Explain Entrepreneur v/s Manager?
8. How important is the role of Government in promoting Entrepreneurship. Support your answer with example.
9. Explain the Women Entrepreneurship also explain the major role played by them in improving the economy of India.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: **COMPUTER APPLICATION LAB**		
Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE64P**
Type of Course: **Practical**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- 50 Marks

Pre-requisites: Knowledge of drafting software and RCC.

Course Objective: Students are expected to prepare RCC and Steel structural drawings as per IS standards using drafting software.

Course Outcomes:
At the end of the course, the students will be able to

Course Outcome		Experiments linked	CL	Linked PO	Teaching Hrs
CO1	Drawing and detailing of different RCC structural elements	1,2,3,4,5,6,7, 8,9,10	R/U/Ap/C	1,2,3,4,5, 6,7,8,9,10	36
CO2	Drawing and detailing of different Steel structures	11,12,13, 14,15	R/U/Ap/C	1,2,3,4,5, 7,8,9,10	18
CO3	Develop programs on M.S. EXCEL for quantity estimation of structures.	16,17,18,19	R/U/Ap/C	1,2,3,4,5, 8,9,10	21
CO4	Identify and know available open source software for civil engineering applications	20	R/U	1,2,9,10	03
CO5	Manage suggested activity in teams and able to correlate the concept of drafting with ready structures		R/U/Ap/C	1,2,3,4,5,6,7, 8,9,10	*
				Total sessions	**78**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

Programme Outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
COMPUTER APPLICATION LAB	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not addressed.

COURSE CONTENT

UNIT	EXERCISES	HOURS
1	Drawing and Detailing of RCC structural elements	36
2	Drawing and Detailing of structural steel elements	18
3	Quantity Surveying using spread sheet	21
4	Demonstration of Free open source software	03
5	Suggested Activities	-
Total		**78**

COURSE CONTENT:

UNIT	EXERCISES		HOURS
1	**RCC STRUCTURES**		
	Exercise 1	Introduction to detailing of RCC structural elements as per IS:456-2000 and SP-34. Detailing of steel structures as per IS:800-2007 and SP-6(1).	6
	Drawing and Detailing of structural elements for given design data using CAD		
	Exercise 3	Doubly reinforced beam	3
	Exercise 4	T-beam	3
	Exercise 5	Lintel with chejja	3
	Exercise 6	One way slab and Two way slab	6
	Exercise 7	One way continuous slab	3
	Exercise 8	RCC column with isolated footing (Rectangular only)	3
	Exercise 9	Dog-legged with waist slab and Folded plate staircase	6
	Exercise 10	Cantilever Retaining wall	3
	NOTE: Preparing bar bending schedule using MS-excel for any one of the above Exercise		
2	**STEEL STRUCTURES**		
	Drawing and Detailing of structural steel elements for given data using CAD		
	Exercise 11	Steel truss details with bolted/welded connection.	6
	Exercise 12	Beam to beam simple connection	3
	Exercise 13	Beam to column simple connection	3
	Exercise 14	Column with slab base	3
	Exercise 15	Column with gusseted base	3
3	**For given drawing prepare estimation using spread sheet (No drafting)**		
	Exercise 16	Manhole	6
	Exercise 17	Septic Tank	3
	Exercise 18	Slab culvert	6
	Exercise 19	Simple Weir	6
4	Exercise 20	Demo on any one of Building Information Module software like RIVET Architecture, ECHO SIM, STAAD PRO, ETAB and GIS (Free open source software)	3
5	**Suggested Activities**		-
Total			**78**

Course Delivery: The course will be delivered through lectures, Demonstration, Drafting and design software.

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill, lifelong learning, communication and modern tool usage.

1. Prepare spreadsheet of design of RCC elements
2. Analyse the elements of structures using available open source software
3. Draw and detail of RCC elements using available open source software
4. Drafting & Detailing of reinforcement for Truss using CAD
5. Drafting & Detailing of reinforcement for Slab bridge using CAD
6. Create a Solid Model of beam using CAD
7. Use of Structural Analysis software (Open source software), design a Simply supported beams with UDL and Cantilever beam with UDL.
8. Prepare a quantity surveying in estimation of Tank sluice using spread sheet
9. Prepare a quantity surveying in estimation of Septic Tank using spread sheet
10. Deflection and Stresses in beams using analysis software
11. Concrete mix design and mathematical calculations using CAD
12. Development of Excel sheet for design of Singly Reinforced Beam
13. Linking all the constructional activities using project management software
14. Digitization of existing topo sheet or any map using GIS.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good**4**, Exemplary**5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**,Exemplary5				
1.Organisation	1				
2.Fulfill team's roles	4				
3.Conclusion	3				
4.Convensions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Twice test (average of two tests)	Test 1	10	Blue books	CO1,CO2
					Test 2			CO3,CO4
				Record		10	Index sheets	All CO's
				Suggested Activity		05	Reports	CO5
	SEE	End Exam		End of the course		50	Answer scripts at BTE	CO1,CO2,CO3
Indirect Assessment	Student Feedback on course		Students	Middle of the course		---	Feedback forms	CO1 Delivery of course
	End of Course Survey			End of the course		---	Questionnaires	CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	**30**
2	Applying the knowledge acquired from the course	**60**
3	Analysis	**0**
4	Synthesis (Creating new knowledge)	**10**
5	Evaluation	**0**

Sl No	Scheme of evaluation for End Examination	Marks
1	Drawing and detailing of any one structural element.(RCC or Structural steel)	
	a) Prepare Drawing and detailing manually for the given data	10
	b) Draw the same using CAD	20
2	Estimation of any one given drawing in unit 3	10
3	Viva-voce	05
4	Record & Suggested activity report	05
	Total	**50**

Note : Record & Report on suggested activities are mandatory during SEE.

TEXT BOOKS

1. IS 456:2000 code of practice for plain & reinforced concrete.
2. SP 16 : Design Aid for reinforced concrete
3. SP 34: Hand book on Concrete Reinforcement and detailing (1987)
4. IS 13920: Ductile detailing of RC structures
5. IS 800 - 2007: Code of Practice for General construction in steel
6. SP(6) 1: Hand book for structural steel sections
7. Hand book on Concrete Reinforcement and Detailing by MG. SHAHA.
8. Detailing of RCC structures by SAWHNY.
9. Details of Steel Structure by SAWHNY.

E-links

1. https://www.youtube.com/watch?v=lW_cbyxHlSU
2. http://www.comp-engineering.com/ETABManE.htm

Equipment List:

1. Computers with Latest Configuration. (One Computer per student in practical session.)
2. Any latest licensed Computer Aided Drafting Software.
3. Plotter of size A2/A3
4. LCD Projector
5. UPS 5KVA

Course Title: **EXTENSIVE SURVEY CAMP/PROJECT**		
Credits (L:T:P) : 0**:2:4**	Total Contact Hours: **12 days+24hours**	Course Code: **15CE65P**
Type of Course: Lectures, field work and office work	Credit **:03**	Core/ Elective: **Core**

Prerequisites: Knowledge of Surveying, Irrigation and Bridge Drawing, Water Resource Engineering, Highway Engineering and Town Planning.

The most important pillar of learning is "DOING". Civil Engineer should be very conversant with the actual works of surveying, which this survey camp/project aims at the following course objectives

Course Objectives of the survey camp works are:

1. Apply knowledge of mathematics, science, and engineering to understand the measurement techniques
2. To train the students under difficult and realistic situation of the surveying project.
3. To acquire a sound practical knowledge and application of theory and in practical to overcome the difficulties that could arise in field during surveying.
4. The use of different survey instrument and to develop the team spirit at work
5. To impart training in the use of modern surveying instruments and to acquire a comprehensive idea of the project.
6. To impart confidence in the handling and management of the survey project.

Course Outcomes

On successful completion of this course, the student will be able to

Course Outcome		CL	PO	Teaching days
CO1	Experience hands on intensive training in the use of surveying instruments and performing various survey works in difficult terrain and to locate or identify sites necessary for conducting various surveys.	R U Ap Ay C	1 to 10	12 days + 2 hours / week*
CO2	Apply the knowledge of surveying in taking field observations pertaining to some of the realistic exposure to survey work such as concepts of reconnaissance survey, triangulation, contouring etc., gaining the ability to measure differences in elevation, draw and utilize contour plots.			
CO3	Appreciate the need for accurate and thorough note taking in field work to serve as a legal and produce the required maps and related calculations pertaining to survey work			
CO4	Develop the adaptability in conversant with the camp life, to communicate with the local population, to develop team spirit, community living and self-management.			
CO5	Adopt the working of Total station and Global Positioning System in the view of need for licensed surveyors.			

***Weekly 2 hours classes for quantity surveying of hydraulic structures, PHE structures, Cross drainage works (Culverts and bridge works) of drawings prepared in survey camp**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
EXTENSIVE SURVEY CAMP/PROJECT	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

ROADMAP FOR SURVEY CAMP

Introduction

1. Students must follow the instructions given by the camp director/staff-in-charge.
2. Students must adhere to the dress code for the survey camp (Shoe, uniform, hat/cap).
3. Students must handle the instruments with at most care as instructed.
4. Instruments, accessories must be properly disassembled and handed over to the lab assistant.
5. The readings are to be done by the batch as grouped by the camp director/HOD and report should be submitted by each student.
6. Attendance at camp (briefings, lectures, field work and field tours, etc.) is mandatory.
7. Students should reach camp site on time; late students may not be allowed to participate.
8. The camp record shall include all original field observations, calculations and plots.
9. Instruction classes explaining about camp before commencement of camp being prepared will help you to finish the field work early.
10. Students and coordinator have to stay in the camp arranged by the camp director.
11. You may require to perform calculations after regular camp hours. Anticipate and adapt to any unexpected bad weather etc.
12. All reading must be noted using pen. Pencil should not be used in the field book except drawing sketch or diagram if needed.
13. Unnecessary colouring in the drawing should be avoided. Coloured lines should be as per code- Proposed line in green existing in red
14. Each batch must preserve the field book/Level book and hand over to the camp director/Staff-in-charge from your batch with the report at the end of semester.
15. Students will be evaluated on your ability to correctly complete the field work, calculations and analysis, as well as your ability to clearly communicate your methodology, results, and ideas to others.
16. All plots and drawings should be original (e.g. created by you, based on your experimental data).

17. Students must participate in the camp for all days as scheduled. Camp will not be arranged for the students who miss it.

Batches

Each batch of student should be not more than 10

Field work schedule

1. The students must come prepared for their sessions to complete the field work as scheduled.
2. Survey Camp of 12 days duration will be held immediately after Vth semester at a Hilly Terrain.
3. The students are required to prepare the Topographical Map (Key plan) of the area by traditional method.
4. The purpose of the camp is to train students in using modern surveying techniques and equipment such as GPS, total stations, automatic levels, electronic theodolites, etc. to prepare a detailed digital map.

Safety

Safety is our prime concern at all times. If your conduct is deemed to compromise safety regulations, you may be asked to leave camp and disciplinary action will be taken. Do not perform unauthorized experiments by yourself. Never leave the survey equipments unattended in the field. There must be no fooling around in the camp site. The students are strictly advised to wear shoes during the entire hours of the camp as a measure of safety

Code of Conduct for Students

1. Instruments, ranging rods, pegs, arrow, staves etc have to be used only for field work purposes. Inappropriate use of the above such accessories will lead to disciplinary action/penalty.
2. Instruments must not be operated in a rough/violent manner.
3. Fire safety is extremely important.
4. Students causing damage will be required to pay for repairs.
5. No spray paints or other similar marking items are to be used unless as instructed by staff.
6. No personsare allowed to swim in the water. Do not leave bottles and cans in the field or by the lake. Do not litter; pick up any litter you may find
7. Canoes may only be used if equipment (safety devices, paddles, etc.) is signed in/out with a staff member.
8. If sufficiently serious, the breaking of a rule may also result in the person contravening them being evicted from the property Vehicles of students are not allowed within camp
9. Students should not leave the camp for any reason without the permission of coordinator
10. Keep camp neat and tidy. Return borrowed equipment's to their proper location
11. No one is permitted to cut or otherwise damage any living tree without the express permission of a course instructor.
12. Sleeping must be in the designated dorm arranged by program coordinator. Tents and other alternative sleeping arrangements are not permitted.
13. Any contravention of these rules may result in serious action

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COURSE CONTENT

Unit	Major Topics	Time schedule Allotted
1	Triangulation / Trilateration / Total Station (Determining area approximately 2 KM^2)	1 day
2	New tank project	5 days
3	Highway project	2 days
4	Preparation of map of an existing village / Town / Layout.	2 days
5	Public Health Engineering-Water supply scheme and sewerage project.	2 days
6	Quantity Surveying of survey camp project	2 hours/ week

DETAILED COURSE CONTENT

Unit	Major Topics	Time schedule Allotted
1	**TRIANGULATION WITH TOTAL STATION** (Determining area approximately 2 KM^2) 1. Preparing map of given area. 2. Calculation of area 3. Total station traverse to yield adjusted coordinates of control points. (determine the co-ordinates of few triangulation stations) Note: In case of non-availability of Total stations, Conventional methods can be adopted	1 day
2	**NEW TANK PROJECT** 1. Reconnaissance of the area to be mapped. setting benchmark using GPS 2. Fly levelling to establish T.B.M to the site& fly-back levelling 3. Fixing the alignment of **proposed bund**, 4. Conduct profile leveling and cross sectioning along the proposed centre line of the tank bund. 5. Capacity of reservoir by Radial contouring 6. Calculation of capacity 7. Block levelling at Sluice point of centre line of bund 8. Block levelling for weir 9. Canal Alignment Starting from sluice point with longitudinal sectioning and cross sectioning 10. To determine the azimuth of a line, latitude and longitude of the place by taking extra-meridian observation on a sun. Use of GPS to determine latitude and longitude	5 days

Unit	Major Topics	Time schedule Allotted
	(Graded activities) Drawings to be prepared 11. Index Map 12. Contour map of water spread area with Capacity of reservoir calculations 13. Longitudinal sectioning 14. Cross sectioning 15. Block levelling with contours showing weir details should consist of a. Half plan at top & half plan at foundation. b. Half sectional elevation, half front elevation. c. Cross section of tank weir across the body wall. 16. Block levelling with contours showing sluice details should consist of a. Half plan at top & half plan at foundation. b. Half sectional elevation, half front elevation. c. Cross section of tank weir across the body wall. 17. Canal cross-section of fully cutting, fully filled and Partial at different chainages 18. Longitudinal sectioning of Canal at different chainages 19. Plan of bund & canal alignment showing location of hydraulic structures and various reduced levels Quantity surveying 20. Earthwork calculation of bund. 21. Earthwork calculation of canal. 22. Estimation of weir positioned on block levelling. 23. Estimation of Sluice positioned on block levelling.	
4	**HIGHWAY PROJECT**(Terrain should be chosen such that it should include vertical & Horizontal curve) 1. Reconnaissance of the area 2. Align a new road between two obligatory points. 3. Conduct Longitudinal and cross-sectioning surveys 4. Projecting a road of given gradient. 5. Block leveling @ the lowest level or valley curve 6. Connecting to new road alignment, surveying existing road 90m and exploring possibility of widening. (Graded activities) Drawings to be prepared (Drawing should be preferably done using AutoCAD) 1. Index plan 2. Plan showing alignment of road 3. L.S & C.S of Road at different chainages as per IRC	2 days

Unit	Major Topics	Time schedule Allotted
	standards(Report should justify the selected alignment with details of all geometric designs for horizontal curve, traffic and design speed assumed.) 4. Block levelling @ the lowest level or valley curve placing Culvert/Bridge a. Half plan at top & half plan at foundation. b. Half sectional elevation, half front elevation. c. Half Cross section @centre half Cross section @ abutment <u>Quantity surveying</u> 1. Calculate the earthwork involved by determining the cross-section of the highway at various intervals. 2. Quantity surveying of Proposed culvert/Bridge	
5	**TOWN PLANNING PROJECT** 1. Town planning project new layout as per Zoning Regulations by using total station 2. Preparation of existing village map/layout	2 days
6	**WATER SUPPLY AND SANITARY PROJECT**(Public Health Engineering) 1. Examination of sources of water supply 2. Calculation of quantity of water required based on existing and future projected population for a village. 3. Preparation of village map and location of sites for ground level 4. Block leveling for overhead tanks 5. Underground drainage system surveys for laying the sewers. 6. Block leveling for Oxidation pond. <u>(Graded activities) Drawings to be prepared</u> 1. Plan of water supply line, sewer lines in village map 2. Block leveling placing overhead tanks 3. Block leveling Placing Oxidation pond. <u>Quantity surveying</u> Estimation of manhole Estimation of water supply line, Overhead tank	2 days

Note:

1. At least one of the above should be done by using TOTAL STATION
2. The survey camp Report should be attached with field book, calculation sheets, all plans/drawings, estimates of earth work and structure in spread sheet and should be submitted in the form of Hardcopy and softcopy (CD)

Course Delivery: The course will be delivered through tutorials and practical's.

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Survey camp drawings and report.	15	Survey camp drawings and report + Annexure 1 (Field book and level books)	CO1,CO2, CO4,CO5
				Quantity surveying	10		CO3
	SEE	End Exam		End of the course	50	Answer scripts at BTE	CO1,CO2, CO3,CO4,CO5
Indirect Assessment	Student Feedback on course(Camp)		Students	During Survey camp		Feedback forms	1 & 2 Delivery of course
	End of Course Survey camp.			End of the Survey camp		Questionnaires	1,2,3,4,5Effectiveness of Delivery of instructions & Assessment Methods

For IA verification each batch coordinator should submit Annexure1

Sl No	Scheme of End Examination	Marks
1	Survey camp Drawings & report including quantity surveying	20
2	Quantity Calculation for the given drawing	20
3	Viva-voce	10
	Total	**50**

REFERENCES

1 Punmia B C, Irrigation and water power engineering

2 Garg S K, Irrigation and water power engineering

3 Punmia B C, Ashok K Jain, Arun K Jain, Surveying Vol 1, 2,3, laxmi Publications(P) Ltd, New Delhi.

4 Justo C E G, A text book of highway engineering.

5 Kanetkar, A text book of surveying.

ANEXURE 1

The survey camp of 20__ – 20__was organized by……., for the fifth semester Diploma in civil engineering students, __ in number. The duration of the camp was ___days from __.__.20__ to __.__.20__ …….. The places in and around the _____ were chosen for surveying.

BATCH EVALUATION

(INDEX)

S.No	Date	Title	Rubrics rating out of 5	Staff Initial
E1.		Triangulations		
E2.		New tank project		
E3.		Highway project		
E4.		Town planning project		
E5.		Water supply and sanitary project		
E6.		Quantity Surveying of survey camp project		

Batch No :

S. No.	Register No	Student Name	Marks						
			E1	E2	E3	E4	E5	E6	Average
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									

	Course Title: **PROJECT WORK-II**		
	Credits (L:T:P) 0**:2:4**	Total Contact Hours: 78	Course Code: 15CE66P
	Type of Course: **Project**	**Credit : 03**	Core/ Elective: **Core**
CIE -25 MARKS	(5^{TH} SEMESTER)		SEE- NO
CIE -25 MARKS	(6THSEMESTER)		SEE-50 MARKS

Pre-requisite: All courses of Civil engineering Programme &Inter disciplinary courses.

COURSE DESCRIPTION

The project is offered to the students in order to inculcate innovation attitude and develop skills. A group of minimum four to maximum of 6students work as a team for major project work.

Course objectives

The objective of the project is to develop capabilities, among the students, for a comprehensive analysis of implementation of Good Hygienic Practices in conducting investigation and report writing in a systematic way and to expand students understanding on the subject.

1. Plan and work out an action plan in a team for completion of a civil engineering problem
2. Instil students with skills of curiosity, initiative, independence, reflection and knowledge transfer which will allow them to manage new knowledge in their professional careers.
3. Provide students with quantitative and qualitative tools to identify, analyze and develop opportunities as well as to solve Civil Engineering problems;
4. Develop students' ability to think strategically, and to lead, motivate and manage with teams.
5. Develop students' written and oral communication competencies to enhance Technical effectiveness;
6. Enhance students' appreciation of the values of social responsibility, legal and ethical principles, through the analysis and discussion of relevant articles and real time projects.

Course Outcome Upon successful completion of this course, students will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	To reflect upon and explore problems in depth, to develop informed technical decisions to tackle them, with skills of curiosity, initiative, independence, reflection and knowledge transfer and to demonstrate ability to pursue new knowledge necessary to share their expertise in civil engineering arena.	R/U/Ap/ Ay/C/E	1 to 10	30
CO2	Appreciate the values of social, legal and ethical responsibility principles, through the analysis and discussion of problem and real time projects & will become lifelong learners, of the skills and competences necessary to successfully contribute.	R/U/Ap/ Ay/E/C	1 to 10	28
CO3	Prepare documents in team and enhance his written and oral communication presentations.	R/U/C/E	1 to10	20
			Total sessions	**78**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communicati on	Life long learning
PROJECT WORK	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

ROAD MAP FOR THE PROJECT

1. Carry out a session or a seminar from the project committee / Programme coordinator with the help of Innovation club / Industry Institute Interaction (I I I) cell) for directing the students to identify project areas in any of their interested field, and even it may be of interdisciplinary. Power point presentation in seminar should include detail description of course, Project report formats, developing personnel writing skills.
2. The students shall form their own batch not less than 4 and maximum 6 and get registered with project coordinator through Project Proposal Proforma (Appendix 7).Students should take the approval from the project committee for the project.
3. After approval student should assign to the project guide in the beginning of 5th semester.
4. Project should be finalized within a month (before first CIE) in the 5th semester.
5. The types of project may include:
    a) Field study (empirical study).
    b) Statistical and case studies
    c) Experimental investigation,
    d) Computational work,
    e) Data collection and its analysis,
    f) Design oriented.
    g) Comprehensive case study (problem formulation, analysis and recommendations),
    h) Comparison of practices/ validation of theory/ method of testing, survey of quality Management practices

    The project should be challenging but manageable within the resources and time available.
6. Projects already conducted in Survey camp should not be repeated.
7. Projects of estimation of building should not be considered in as it appears in the student activities.
8. Students should undergo reviews for three times in 5thsemester **during the internal assessment** and three times in 6th semester **during the internal assessment**. Time table for

IA should include project review; each review should be evaluated for 25 marks and average of 3 should be taken for both 5th and 6th semester.

9. The IA marks will be evaluated based on oral presentation and assessment by the internal guide.
10. Real time problems, Industry related problems, should be chosen and it is a Responsibilities of the project committee / Programme coordinator/ Innovation club / I II cell to choose the appropriate project and to accept the Project Proposal through Proforma (Appendix 7).
11. **Identification of Topic:** The selection of topic is of crucial importance. It should be decided based on your understanding of the study, in the field and interest. The topic should be discussed with the Project Coordinator. It should be in harmony with your areas of interest and the specialization of the project supervisor. It is always better to identify a micro topic to remain focussed and complete the project on the time and with in the budget and resources. The topic should be clear, directional, focussed and feasible.
12. An outline of your project proposal from your end & synopsis will initiate a dialogue between you and your Project coordinator who will then help you to work on the chosen topic and report.
13. Student are advised to select project coordinator who are active professionals in the relevant area of the selected topic may be of any Programme/ Interdisciplinary/ other Institution/Industry approved by project committee/Innovation club/ I II cell.

Course Assessment and Evaluation Scheme for 5th semester

<table>
<tr><th></th><th colspan="2">What</th><th>To whom</th><th colspan="2">When/Where (Frequency in the course)</th><th>Max Marks</th><th>Evidence collected</th><th>Course outcomes</th></tr>
<tr><td rowspan="4">Direct Assessment meth</td><td rowspan="3">CIE</td><td rowspan="3">IA</td><td rowspan="4">Students</td><td rowspan="3">(Average of three reviews)</td><td>Review 1</td><td rowspan="3">25</td><td>1. Project Synopsis.
2. Plan & Schedule
3. Presentation hand outs</td><td rowspan="3">CO1, CO2, CO3</td></tr>
<tr><td>Review 2</td><td>1. Project progress file
2. Schedule
3. Presentation</td></tr>
<tr><td>Reviews 3</td><td>1. Project report
2. Presentation</td></tr>
<tr><td colspan="2">(All review should be conducted during the IA and should be reflected in IA time table)</td><td colspan="3"></td></tr>
<tr><td></td><td>SEE</td><td>End Exam</td><td colspan="2">End of the course</td><td colspan="3">No SEE for 5th semester only CIE</td></tr>
<tr><td rowspan="2">Indirect Assessment</td><td colspan="2">Student Feedback on course</td><td rowspan="2">Students</td><td colspan="2">Middle of the course</td><td colspan="2">Feedback forms</td><td>CO1Delivery of course</td></tr>
<tr><td colspan="2">End of Course Survey</td><td colspan="2">End of the course</td><td colspan="2">Questionnaires</td><td>CO1 to CO3 Effectiveness of Delivery of instructions & Assessment Methods</td></tr>
</table>

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Project Review Committee should consists of

1. Head of the Department
2. Staff members of the Department
3. Representative from Innovation Club of the Polytechnic/ Industry Institute Interaction Cell.

All students of 5^{th}/ 6^{th} Semester should compulsorily attend each Review
Proceedings of the meeting should be maintained in the department and shown during I.A. Verification.

Stages of Project Review in 5^{th} Semester

Review	Activity
I Review	Presentation of (a) Project Synopsis, (b) Methodology of work to be carried out
II Review	Literature survey/ Presentation on visit to study area/ Industry
III Review	Collection of Preliminary data related to Project work

Stages of Project Review in 6^{th} Semester

Review	Activity
I Review	Presentation on (a)data collected, (b) processing of Data (c) Experimental work conducted , (d) Finalisation of contents of the project
II Review	Presentation on (a) Results,(b) Discussion of Results (c) Conclusions Submission of Draft copy of Project Report
III Review	Final Project Presentation and submission of Project Report

List of Documents to be produced during All the three REVIEWs in V semester (During CIE)

Document 1. Project Proposal Proforma. (Appendix 7) All the items should be filled. The signatures of student, coordinator, III cell (Industry Institute Interaction cell) Coordinator/ Program coordinator should be present. Approval of I.I.I coordinator/Program coordinator through discussion is mandatory for choosing the **appropriate** project.

Document 2. Project Synopsis. (Appendix 6) The synopsis should clearly state the objectives and research methodology, sampling, instruments to be used, limitations if any, and future direction for further research. Both Guide and student should sign on the Project Synopsis. What are-

a) The methodology you intend to adopt to carry out your study – tools and techniques to be used, if any;

b) Project involves any field work

Document 3. Promising Certificate of Originality**(**Appendix 5) should be filled. The signatures of student

Document 4. Plan &Schedule- Planning &Schedule should be re-scheduled for every submission.

Document 5. Presentation hand outs on past present and future activities to be carried out in a project

Note:

a) All signatures should be accompanied by the date of signature.

b) **Re-submission of Project Proposal:** In case of non-approval of the proposal the comments/suggestions for reformulating the project will be communicated to the student. In such case the revised project synopsis should be submitted with revised project proposal proforma and a copy of the rejected synopsis and project proposal proforma bearing the comments of the evaluator.

List of Documents to be produced during All three REVIEWs in VI semester (During CIE)

1. **Literature survey**
2. Planning & Schedule should be re-scheduled
3. **Presentation of past, present & future progress of the project**

List of Documents to be produced during SEMESTER END EXAMINATION

Final REVIEW

1. **Project report**
2. **Presentation of project**
3. **Comments** of the project guide on the project work (not more than 1 page)

I.CIE ASSESSMENT FOR FINAL REVIEW(VI semester)

1. **Literature survey** **05 Mark**
2. Planning & Schedule 05 Mark
3. **Presentation of past, present & future progress of the project 15 Mark**

25 Marks

J.SEE ASSESSMENT:

1. **Project report** **10 Marks**
2. **Presentation of project** **25 Marks**
3. **Comments** of the project guide on the project work (not more than 1 page) 15 Marks

50 Marks

Course Assessment and Evaluation Scheme for 6th semester:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	(Average of three reviews)	Review 1	25	1. Literature survey 2. Plan & Schedule 3. Presentation hand outs	CO1, CO2 CO3
					Review 2			
					Reviews 3		Project report	
	SEE	End Exam		End of the course		50	Project report / Presentation / Project Model	CO1,CO2,CO3
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 to CO3Effectiveness of Delivery of instructions & Assessment Methods

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

GUIDELINES AND FORMAT FOR PREPARING PROJECT REPORT FOR V/VI SEMESTER DIPLOMA IN CIVIL ENGINEERING

1. ARRANGEMENT OF CONTENTS:

The sequence in which the project report material should be arranged as follows:

1. Cover Page (see Appendix 1)
2. Title Page (see Appendix 2)
3. Bonafide Certificate (see Appendix 3)
4. Certificate (see Appendix 4)
5. Abstract (see Appendix 4)
6. Table of Contents
7. List of Tables
8. List of Figures
9. List of Photographs
10. List of Graphs
11. List of Abbreviations and Nomenclature
12. List of Symbols,
13. Chapters
14. References
15. Appendices

Each project report must adequately explain the research methodology adopted and the directions for future research in chapters. The project report should also contain the following: Copy of the **Approved Project Proposal** Proforma and Synopsis. **Promising Certificate of originality** duly signed by the student.

2. PREPARATION FORMAT:

Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in **Appendix 1& 2**.

Bonafide Certificate – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14, as per the format in **Appendix 3.**

The certificate shall carry the PROJECT COORDINATOR signature and shall be followed by the name, academic designation (not any other responsibilities of administrative nature)department and full address of the institution where the coordinator has guided the student. The term **'PROGRAMME COORDINATOR'** must be typed in capital letters between the coordinator's name and academic designation. Project coordinator may be of same **Programme**, or **Interdisciplinary** or **other Institution** or from **Industry**.

Abstract – Abstract should be one page synopsis of the project report typed single line spacing, Font Style Times New Roman and Font Size 12.

Table of Contents – The table of contents should list all material following it as well as any material

which precedes it. The title page and Bonafide Certificate will be listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents of the project report is given in **Appendix 4**

List of Tables – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

List of Figures, graphs, Photographs – The list should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.

1. The figures, photographs and tables occurring in a chapter may be serially numbered as Fig. 1.1, 1.2 etc., where the first digit represents the chapter, the second digit represents Figure number.
2. The photographs may be represented as Photo 1.1, 1.2 etc., the first digit representing chapter and the second digit represents Photograph number.
3. The tables may be represented as Table 1.1, 1.2 etc., the first digit representing chapter and the second digit represents table number.
4. The graph should clearly indicate the points, which are used for drawing the curve or curves.
    a. All the letters in the graphs should be written with stencils.

List of Symbols, Abbreviations and Nomenclature –One and a half spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.

List of Equations-All the equations used in the thesis should be properly numbered chapter wise [eg. Eq.3.1 or eq.3.1 or 3.1 or (3.1)].The equations shown should be clearly referred and identified as Eq. or eq. followed by equation number. Repetition of the equations should be avoided. If needed, it may be referred by its number. Equations should never be mixed up with main text. It should be shown as separate object and Equation Editor can be used.

Chapters

The following is suggested format for arranging the project report matter into various chapters, each chapter may be further divided into several divisions and sub-divisions:

1. Introduction
2. Exhaustive Literature Survey/Review of Literature
3. Define the problem.
4. Body of project (Developing the main theme of the present investigation project work)
5. Results and Discussions
6. Conclusions
7. Future Enhancements / Recommendations
8. Summary

Body of the project may include-(Design/ Input Data/Structure/Questionnaire/Analysis/Solution/Sampling/Tools/Techniques/ Processing and Analysing Data)

Each chapter should be given an appropriate title. Tables and figures in a chapter should be placed in

the immediate vicinity of the reference where they are cited. Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

Arrangement of Paragraph in a Chapter:

1. Each paragraph in a chapter should be properly numbered for example, 2.1, 2.2 etc., where first digit represents the Chapter Number and second digit the paragraph number. There is no need to indicate the number for the first paragraph in a chapter.
2. Sub-paragraphs, if any indicated as 1.1.1, 1.1.2 etc. i.e. first digit representing the chapter, the second representing the paragraph and third representing the sub-paragraph.

Don't underline the headings or subheadings or side heading. Instead use the bold letters.

Appendices –Appendix showing the detailed data, design calculations, derivation etc, Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme. Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc. Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters. Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

Bibliography or List of References– References should be numbered from 1st chapter to the last chapter in ascending order and should be shown in square brackets. The bibliography list should be made strictly in alphabetical order of the name of the authors. The listing of references should be typed 4 spaces below the heading **REFERENCES** in alphabetical order in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details. A typical illustrative list given below relates to the citation example quoted above.

[Chapter]Author Name, 'Title of the book or paper', Publisher name, (year), Page No

REFERENCES

1. [1] Ariponnammal, S. and Natarajan, S. 'Transport Phenomena of SmSel – X Asx', Pramana(1994) – Journal of Physics Vol.42, No.1, pp.421-425.

Table and figures –In the references By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non-verbal materials used in the body of the project work and appendices such as charts, maps, photographs and diagrams may be considered as figures.

TYPING INSTRUCTIONS:

1. The impression on the typed copies should be black in colour.
2. The project report should be submitted in **A4** size(29 cm x 20 cm).
3. Bond paper should be used for the preparation of the project report.
4. Typing should be done on one side of the paper with character font in **size 12** of **Times New Roman.**

5. Single line spacing should be used for typing the general text.
6. Subheading should be typed in bold Font size 12 and heading bold Font size 14.
7. The layout should provide a margin of 1.50 Inches on the left, 1.00 Inches on the top, bottom and right.
8. The page numbers should be indicated at the top-middle or bottom-middle of the each page.
9. Heading s should be in bold should not underline the heading/subheadings and should not put colons (:) in headings or subheadings.

Header

When the header style is chosen, the header can have the Chapter number and Section number (e.g., Chapter 2, Section 3) on even numbered page headers and Chapter title or Section title on the odd numbered page header

Number of copies to be submitted by group:(3+1) Three (One for Library, One for department, One for Internal Guide.)&One copy for each batch member. The certificate should consists of names and roll numbers of all batch members for the above three copies. The certificate should consist of batch member name and his/her roll number for his personnel copy. Additional Soft copy of Project in the form of CD to the Library / Coordinator

Binding specifications

1. The project report should be hard bound Rexene of **Grey** colour **for Civil engineering** reports using transparent ors sheet cover should be **printed in black letters** and the text for printing should be identical. The dissertation shall be properly bound, using. The bound front cover should indicate in suitable embossed letter the following:(See the sample format of front cover Appendix 1)
2. **Two blank papers** should be provided at the beginning and at the end.

/*NOTE: do not number this page. Certificate and declaration pages are not numbered but by default they are roman i and roman ii pages. See the format in appendix***/**

APPENDIX 1 (Cover page)

(A typical Specimen of Cover Page)<Font Style Times New Roman – Bold>

TITLE OF PROJECT REPORT

<Font Size 18><1.5 line spacing>

A PROJECT REPORT

<Font Size 14>

Submitted by

<Font Size 14><Italic>

NAME OF THE CANDIDATE(S)

<Font Size 16>

in partial fulfilment for the award of the diploma of

<Font Size 14><1.5 line spacing><Italic>

DIPLOMA IN CIVIL ENGINEERING PROGRAMME

<Font Size 16>

IN

DEPARTMENT OF CIVIL ENGINEERING

<Font Size 14>

LOGO

NAME OF THE COLLEGE

<Font Size 14>

DEPARTMENT OF TECHNICAL EDUCATION

BENGALURU-560001

<Font Size 16><1.5 line spacing>

Year of submission: (MONTH & YEAR)

<Font Size 14>

APPENDIX 2 (Title page)

(A typical Specimen of Title Page) <Font Style Times New Roman – Bold>

A Project Report
on

<TITLE OF THE PROJECT WORK>

Submitted for partial fulfilment of the requirements for the award of the
of

DIPLOMA IN CIVIL ENGINEERING

IN

DIPLOMA IN CIVIL ENGINEERING PROGRAMME

BY
BATCH
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>

Under the guidance of

<Name of the Staff>
Professor
Department of CSE
CBIT, Hyderabad.

Department of Civil Engineering
<<**NAME OF INSTITUTE**>>
<<**ADDRESS OF INSTITUTE**>>

APPENDIX 3 (Certificate)

(A typical specimen of Certificate) <Font Style Times New Roman>

DEPARTMENT OF TECHNICAL EDUCATION BENGALURU-560001

<Font Style Times New Roman – size -18>

BONAFIDE CERTIFICATE

<Font Style Times New Roman – size -16>

<Font Style Times New Roman – size -14>

Certified that this project report **"…….TITLE OF THE PROJECT……..."** is the bonafide work of "**……..NAME OF THE CANDIDATE(S).……"** who carried out the project work under my supervision.

<<Signature of the Head of the Department>><<Signature of the Project coordinator>>

SIGNATURE	**SIGNATURE**
<<Name>>	<<Name>>
HEAD OF THE DEPARTMENT	**PROJECT CORDINATOR**
	<<Academic Designation>>
<<Department>>	Department of Civil Engineering
<<Full address of the Dept & College >>	<<Full address of the Dept & College >>

Examiners 1.....<<Signature, Name, Designation& Address>>.....

Examiners 2.....<<Signature, Name, Designation& Address>>.....

APPENDIX 4

(A typical specimen of table of contents) <Font Style Times New Roman>

TABLE OF CONTENTS

CERTIFICATES

1. Company certificate(if any) on Company letter head, College certificate on **COLLEGE LETTER HEAD** with Guide, HODs signatures. Declaration of students' signatures on A4 paper. Acknowledgements in the respective order.

CERTIFICATE

This is to certify that the project work entitled "<**Title Of The Project Work>"** is a bonafide work carried out by <**Mr. / Ms. Name of the Student (Roll No.)>, <Mr. / Ms. Name of the Student (Roll No.)**>in partial fulfilment of the requirements for the award of DIPLOMA **INCIVIL ENGINEERING PROGRAMME** by the **DEPARTMENT OF TECHNICAL EDUATION-BENGALURU-560001**, under our guidance and supervision.

The results embodied in this report have not been submitted to any other university or institute for the award of any degree or diploma.

Internal Guide	Head of the Department
<Name of the Staff>	**<Name>**
<Designation> Department of Civil engineering	Department of Civil engineering
<Institute Name>	<Institute Name>.

DECLARATION

This is to certify that the work reported in the present project entitled "<**Title Of The Project Work>"** is a record of work done by us in the Department of Civil engineering, <Name of institutions>. The reports are based on the project work done entirely by us and not copied from any other source. I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

<**Mr. / Ms. Name of the Student >**

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude and indebtedness to my project supervisor _____ for his/her valuable suggestions and interest throughout the course of this project

I am also thankful to Head of the department <Name> for providing excellent infrastructure and a nice atmosphere for completing this project successfully

I convey my heartfelt thanks to the lab staff for allowing me to use the required equipment whenever needed

Finally, I would like to take this opportunity to thank my family for their support through the work. I sincerely acknowledge and thank all those who gave directly or indirectly their support in completion of this work

(Name of the student)

LIST OF FIGURES

A list of figures with figure number, figure title and page number and a list of tables with table number, table name and page number should be listed after abstract in a separate page for each with roman numbers like ii, iii...etc.

FOR EXAMPLE:

LIST OF FIGURES

LIST OF TABLES

FOR EXAMPLE:

LIST OF TABLES

APPENDIX 5
PROMISING CERTIFICATE OF ORIGINALITY

This is to certify that the project report chosen entitled_____
Submitted to **DEPARTMENT OF TECHNICAL EDUCATION** in partial fulfilment of the requirement for the award of the degree of **DIPLOMA IN CIVIL ENGINEERING, will** be a original work carried out by Mr./ Ms._____
The matter embodied in this SYNOPSIS is a genuine and project chosen by me will not be copied by any other source requirement of any course of study.

Enrolment No: _____ under the guidance of
Mr/Ms_____

Name of the student

Signature of the Student

Enrolment No:

Appendix 6
Format of Synopsis

1. Title of the Project
2. Objectives of the study
3. Rationale for the study
4. Statement of the Problem
5. Detailed Methodology to be used for carrying out the study
6. The expected contribution from the study (to perform any laboratory experiments)
7. List of activities to be carried out to complete the project (with the help of a bar chart showing the time schedule)
8. Places/labs/equipment and tools required and planning of arrangements
9. Problems envisaged in carrying out the project, if any.
10. Brief description of project in 100 words

PROFORMA FOR PROJECT PROPOSAL (Appendix 7)

PROJECT PROPOSAL FORMAT

Name of the Organisation	
Programme	
Project title:	
Names of Project Proponent groups	
Area of the project	
Project location:	
Proposed starting date:	Project duration:
Target date of completion	
Sponsor	Self / Institute/Government / Industry/ Others
PROJECT DESCRIPTION	
BACKGROUND OF THE PROJECT/ SITUATION ANALYSIS 1. What prompted the project? 2. Is there an existing concern or potential problem that you want to address?	

Need and Justification of the project

OBJECTIVES OF THE PROJECT

OBJECTIVES	STRATEGIES
What does the project hope to achieve?	What are the strategies that must be done to meet the objectives?

METHODOLOGY

Expected results of the project	

DESIRED IMPACT AND OUTCOME OF THE PROJECT I. What are the long term effects of the project? (Economic, social, cultural, institutional, environmental, technological, etc.) II. What are the specific measures to sustain the project? III. What are the linkages with other initiatives or reforms in the sector and other development or governance concerns?	

Project implementation Plan (Follow up Plan)
(Project work Plan)

PHASES OF THE PROJECT (DATE)	ACTIVITIES	OUTPUT / TARGET	Project PERSON IN CHARGE	RESOURCES NEEDED	COST

***Note: Include Gantt chart if possible*

Project Beneficiaries :	Number of Beneficiaries from your project:
Location of Beneficiaries:	
Budget Requirement Prepared Y/N	Project budget:

RISK MANAGEMENT PLAN

I. What are the risks and factors that may hamper or hinder the successful implementation of project activities and achievement of project outputs? II. What are the measures that would mitigate the adverse effects resulting from such risks?	

PROJECT Coordinators Priority

Institution Staff / Industry person name	Organisation name	Designation	Contact Details

DETAILED BUDGET REQUIREMENT

Budget Line Item	Description	Amount

OTHER RELEVANT INFORMATION

May include any other information that will support the request for funding, such as:

1. Brief enumeration of other stakeholders who pledged support to the project
2. Other projects that is lined-up to complement the current initiative.

ATTACHMENTS

1. Profile/brochure of the organization
2. Endorsement and recommendation letters
3. Other documents to support the request

Approved **Not approved**

(a) Name and designation of the Programme In charge

(b) Name and designation of other members (s) involved

Signature of the Programme In charge Signature of the Head/Director/Chairperson
Date:-Date:-
Stamp

STYLISTIC AND GRAMMAR ADVICE

Apostrophes

One of the most common mistakes in student writing is incorrect use of the apostrophe (‘), as in PC’s to mean a number of PCs. It is used in English to form contractions such as didn’t (did not), can’t (cannot) and it’s (it is). These uses should be avoided in academic writing and the words written out in full. The apostrophe is also used to denote possessive case, as in the dog’s bone or the student’s assignment. The rule here is that of the intended noun is singular (one dog) the apostrophe is placed before the s. The examples above refer to a single dog and a single student respectively. If the intended noun is plural and regularly formed, the apostrophe is placed before the s as in dogs’ (of the dogs). However if the noun has an irregular plural, e.g. child – children, the apostrophe is placed before the s as in children’s.

Acronyms

Computing/engineering are fields in which acronyms are heavily used to avoid repetition of long technical terms, e.g. RAM, LAN, VDU. Terms like VDU are now so commonly used by the population at large that it is rapidly becoming admissible to use them without explanation. However, most acronyms are familiar only to specialists within sub-fields of computing/engineering. When using an acronym for the first time, always precede it with the expanded version.

Colloquialisms

These are chatty, idiomatic or slang expressions that are appropriate in informal conversion but have no place in your report. For example;

Once Pat pulled his finger out, the team started to come together better and eventually we managed to hand something in that is pretty reasonable considering we didn’t know each other much before this report.

A related point is that in academic and technical writing the use of the first person ‘I’ is avoided as much as possible. In similar way, avoid referring to the reader as ‘you’.

Grammar

Do be careful to write in full sentences and to proof read the document to ensure not only that the text is grammatically sound, but also that it means exactly what was intended.

Jargon

Try to strike a good balance between use of jargon and appropriate use of technical terms. There is no merit in using so much obscure terminology that the document is virtually unreadable, but on the other hand, failure to use key words properly can lead to unnecessary wordiness and tends to give an unprofessional impression. It is important to be consistent in the use of terms, to define them if necessary and to use the same term for the same concept throughout.

Spelling

There should be no excuse for spelling mistakes in a word processed document.

Spelling errors create a bad impression. Always use a spell checker; they are invaluable for picking up typographical errors as well as genuine spelling mistakes. Note, however, that spelling checkers cannot detect cases where the wrong word happens to be a real word e.g. from – form. So a careful proof read is necessary.

	Course Title: **IN-PLANT TRAINING**		
	Hours (L:T:P) 0**:0:4**	Total Contact Hours: 52	Course Code: 15CE67P
	Type of Course: **In-plant training/ Field training**	**Credit : 02**	Core/ Elective: **Core**
CIE – 25 Marks			

Pre-requisite: Knowledge of Civil Engineering.

Course objectives

1. To expose students to the working environment of the construction industry and make them familiar with construction activities undertaken in field.
2. To enable them to integrate theory with practice and develop as professional Civil engineers in the competitive construction field.
3. To give importance to practical aspects of the field and prepare engineers for future challenges.
4. To develop students' ability to think strategically, and to lead, motivate and work with teams.
5. To enhance written and oral communication competencies to technical effectiveness of relevant articles and real time projects.

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Visiting Hrs
CO1	Experience the industrial environment, recognize the requirement of the industry and cope up with the industrial circumstances.	**U/Ap/Ay**	1,2,3,4,5,6,7,8 ,9,10	4 hours per week
CO2	Recognize career paths taking into account their individual abilities and prepare a report about the work experience in the industry.	**U/Ap/Ay**	1,2,3,4,5,6,7,8 ,9,10	
CO3	Communicate effectively about the training through technical presentation.	**U/Ap/Ay**	1,2,3,4,5,6,7,8 ,9,10	
CO4	Develop their employability and start-up skills and to enhance the ability to engage in, life-long learning.	**U/Ap/Ay**	1,2,3,4,5,6,7,8 ,9,10	
C05	Develop individual confidence to handle various engineering assignments and ability to think strategically, and to lead, motivate and **work** with teams	**U/Ap/Ay**	1,2,3,4,5,6,7,8 ,9,10	

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
IN-PLANT TRAINING	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If >40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Guidelines

Civil engineering diploma students have to undergo in-plant training

1. In-plant training is a course of training in any industry or establishment undergone by the student of final year diploma in civil engineering in pursuance of the memorandum of understanding between industry and department of the concerned institute.
2. Industry means any construction industry including Government, Public or Private sector in the field of Civil engineering or technology in which any trade, occupation or subject may be specified as a designated trade. Establishment includes any place where any industrial work is carried out.
3. Students have to identify an establishment, firm or organisation (industry) involved in the field of civil engineering projects. The HOD and concerned faculty will guide and help students in identifying the project. Assistance from Industry Institute Interaction cell may also be taken.

Fifth semester civil engineering diploma students have to undergo in-plant training in any one of the following Departments/ industries/ Agencies /projects.

a. Public sector enterprises
b. State government undertaking
c. Public limited companies
d. Private limited companies
e. Individual ownership organisations
f. Karnataka Rural Infrastructure Development Limited
g. Rural Development and Panchayath raj Department
h. Water Treatment Plants
i. Sewage treatment plants
j. Minor Irrigation department
k. Irrigation department
l. Public works department
m. Land Army

n. Karnataka Housing board
o. Town planning department
p. Urban Development authorities
q. Zilla Nirmiti Kendra
r. Department of Surveys
s. Water supply boards
t. Municipal/City/Town corporations
u. Minor irrigation department
v. Irrigation Department
w. Karnataka Industrial Area Development board
x. Karnataka State Highway Improvement Project
y. RMC plants
z. Local Concrete block preparation units
aa. Cement industries
bb. Precast yards
cc. Road/ Bridge Projects
dd. Local cement industries
ee. Brick Manufacturing industries
ff. Tile Manufacturing industries
gg. Quarries and crushers
hh. M-sand plants
ii. Steel structure fabrication workshop
jj. Solid waste management unit
kk. Local contractors
ll. Solar manufacturers
mm. Private Consultants
nn. Construction Companies
oo. Material Testing Labs
pp. Wood Industries
qq. Laterite block manufacturing units.
rr. Panchayatraj Engineering department

1. This activity may be taken up immediately after V Semester examinations and continued in VI semester .How ever Training can be scheduled as per the mutual co-ordination agreed by the course co-ordinator & officer In charge -Industry.
2. To follow the Rules and Regulations of the Industry/Establishment in all matters of conduct and discipline.
3. The students are required to enrol with the industry.
4. The student will take instructions from the agencies involved in the identified project. It is suggested that a training schedule be drawn for each student before starting of the training in consultation with the training providers.
5. The student has to keep the concerned faculty about the progress of the training. The progress of the student is to be assessed by the concerned faculty by conducting three reviews, one each during or after the theory tests. The faculty should visit the field or site at least two times during the in-plant training.
6. The students should submit the in-plant training evaluation form as per Annexure-1 duly signed by the officer in-charge of training from the industry before each review. The evaluation form is shown at the end of this course curriculum.

D. Monitoring of Implant Training

1. At the end of the course each student has to submit a report which will be consisting of a certificate from the Officer in-charge of training from the industry highlighting the topics to which the student is exposed to in the field. The student is required to make a presentation of the skills that he has acquired during the in plant training.

E. Internal practical examination

1. . The assessment of the internal shall consist of

A. Seminar Performance
B. An oral on the work done.
C. Assessment of the term work.(Annexure1)

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Review 1	25	Presentation & Report (Annexure1&2)	CO1 to CO5
				Review 2			
				Review 3			
	SEE			End of the course	No end Exam		
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	CO1 to CO5 Delivery of course
	End of Course Survey			End of the course		Questionnaires	CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods

Note to IA verifier:

The following documents to be verified by CIE verifier at the end of semester

1. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

ANNEXURE 1

IN-PLANT TRAINING EVALUATION FORM *

FOR THE STUDENTS OF FINAL YEAR DIPLOMA IN CIVIL ENGINEERING

*** The Evaluation form is only a sample. Alternate evaluation form by the concerned industry where the student has undergone training may also be considered.**

Date:

Name of the Student and Reg. No. :

Branch :

Implant training Offered : From To

Evaluation of the Student may be done with the following letter grades. The grade point for the letter grades is given below.

Grades	A	B	C	D	E (Low)
Points	5	4	3	2	1

S.No	**Parameters**	**Grade Awarded**
1.	Knowledge Acquired During Internship	
2.	Ability to use Techniques and Methods Appropriate for Assignments	
3.	Ability to Display the Technical Skills required	
4.	Ability to Organize, Classify and Deliver the job	
5.	Perseverance to Complete the job	
6.	Takes Initiative and Works with Minimal Supervision	
7.	Attendance and Punctuality	
8.	Ability to Establish Positive Relationships with the Managers and Peers	
9.	Personal Conduct and Behaviour	
10.	Ability to Cope Up with the Stressful Situations	

11. Department (s) / Section (s) where the intern was accommodated:

SL. No.	Department (s) / Section (s)	Type of Work	Period	
			From	To
01				
02				
03				
04				
05				

12. Areas where student excels:

13. Areas where student needs to improve:

14. Areas where student gained new skills, insights, values, confidence, etc.:

15. Did student demonstrate continued progress throughout the internship term?:

16. Was student's academic preparation sufficient for this internship?

17 Additional comments or suggestions for the student?

18	Overall Evaluation of the Intern's Performance	Grade Awarded

Name **Name**

Signature of Officer In-charge (Industry) **Signature of course Co-ordinator**

Note:

- Every student undergoing implant training in the respective branch of Engineering in any Establishment shall be treated as a trainee. The provision of any law with respect to labour will not apply to such a trainee
- It shall not be obligatory on the part of the Employer / Industry to offer any stipend and other welfare amenities available, if any, to the students undergoing implant training. However, if the industry is desirous to do so, it will be a privilege for the students

ANNEXURE 2

FORMAT FOR PREPARATION OF REPORT ON IN-PLANT TRAINING

ORGANISATION OF THE REPORT:

The sequence in which the CONTENTS of the training report should be arranged and bound is as follows:

1. Cover Page
2. Inner Title Page (Same as cover page)
3. Certificate by Company/Industry/Institute
4. Acknowledgement
5. About Company/industry/institute
6. Table of Contents
7. List of Tables
8. List of Figures
9. Abbreviations and Nomenclature(If any)
10. Chapters
11. References
12. Data Sheet(If any)
13. Appendices (If any)

Students should submit Two Copies of the In-plant training report (one for department and one for the library) duly signed by the HOD. Students should also submit a CD containing the soft copy of the report in pdf format to the department library.

The tables and figures shall be introduced in the appropriate places.

TYPING INSTRUCTIONS:

1. The In-plant training report shall be typed in English- India, Font -Times Roman, Size-12 point and printed on A4 size paper.
2. The training report shall be typed with 1.5 line spacing with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom. Every page in the report must be numbered. The page numbering, starting from acknowledgements and till the beginning of the introductory chapter, should be printed in small Roman numbers, i.e, i, ii, iii, iv..... The page number of the first page of each chapter should

not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 2,3,4,5... All printed page numbers should be located at the bottom centre of the page.

3. In the training report, the title page [Refer sample sheet (inner title pager)] should be given first and printed in black letters.
4. **The table of contents** should list all headings and sub-headings. The title page and certificates will not find a place among the items listed in the Table of Contents. One and a half line spacing should be adopted for typing the matter under this head.
5. **The list of tables** should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.
6. **The list of figures** should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.
7. The list of symbols, abbreviation & nomenclature should be typed with one and a half line spacing. Standard symbols, abbreviation etc should be used.
8. Training report should consist of following chapters.

   Chapter 1- Introduction

   Chapter 2- Details of area of study in which the student has undergone in-plant training.

   (This chapter will be divided into several sections. Each section should be numbered separately. A section may be further divided into several divisions and sub-divisions depending on the content).

   Chapter 3- PO/Skills attained in the training.

   Chapter 4- Conclusion by the student.

9. The In-plant training report may consist of about 40 to 50 pages. The training report shall be hard bound with cover page in Maroon color. The name of the students, degree, duration of training period, institute name shall be printed in **Bold Black** letters on the cover page

	Course Title: **TOWN PLANNING**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: 15CE63A
	Type of Course: **Lectures, Self Study**	Credit **:04**	Core/ Elective: **Elective**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites: Basic knowledge of Building Drawing and Building Bye - laws, Highway and Engineering.

Course Objectives:

1. To understand the concept of balanced town by ensuring that new and existing facilities are complimentary to each other.
2. To provide sustainable buildings by considering the environmental, social and economic conditions.
3. To provide diversity of accommodation.
4. To provide leisure and cultural facilities for the town.
5. To create awareness about the traffic management within the town.

At the end of the course the students should be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Analyse the data collected and apply suitable methods of planning.	R/U	1,2,5,7	06
CO2	Assess the infrastructure requirements of towns and to distinguish between rural and urban planning methods.	R/U/Ap/Ay	1,2,4,5,6,7	12
CO3	Solve the real time problems by keeping in view of social, environmental and health issues in a sustainable way.	R/U/Ap/Ay/	1,2,4,5,6, 7,9	09
CO4	Focus on the various recreational requirements of the town and preparation of master plan.	R/U/Ap/Ay	1,2,4,5,6,7	09
CO5	Predict the difficulties and obstacles in re-planning of towns and select suitable urban renewal schemes.	R/U/Ap/Ay	1,2,3,4,5,6, 7,	07
CO6	Plan safe and rapid road transit system by proper design of roadways and effective traffic management.	R/U/Ap/ Ay	1,2,3,4,5, 6,7	09
CO7	Manage the suggested or identified problems in the field of town planning and solve in teams, in order to improve future problem solving ability and able to present it.	R/U/Ap/ Ay	1,2,3,4,5, 6,7,8,9,10	*
			Total sessions	**52**

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation
*** Related to Student activity beyond classroom hours.**

§ Mapping Course Outcomes with Program Outcomes

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Lifelong learning
Town Planning	3	3	2	2	3	3	3	1	2	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered not-addressed.

UNIT	CONTENTS	HOURS	MARKS
1	Introduction	06	15
2	2.1 Surveys & Planning	12	35
	2.2 Zoning		
3	3.1 Housing	09	25
	3.2 Slums		
	3.3 Public buildings & Industries		
4	4.1 Recreation measures	09	25
	4.2 Master Plan		
5	Re-planning Existing Towns	07	20
6	6.1 Urban Roads	09	25
	6.2 Traffic Management		
	Total Hours	52	145

Detailed Course Contents

UNIT	CONTENTS	HOURS
1	**Introduction:** Objects of town planning, principles of town planning, Origin and growth of towns – development of towns, Modern town planning in India**,** Socio – Economic aspects of town planning. Selection of site for an ideal town.	06
2	**2.1 Surveys & Planning:** Various types of surveys to be conducted for town planning project. Data's to be collected in different types of town planning survey. Types of planning, -a brief note on urban, rural and regional planning	12
	2.2 Zoning: Definition – objects and principles of zoning. Advantages of zoning, Special Economic Zone (SEZ), Maps for zoning.	
3	**3.1 Housing:** Classification of residential building as per HUDCO norms, Housing in villages, Low Cost Housing, Housing policy, different types of housing agencies involved in housing, investment in Housing, Housing Problems in India	09
	3.2 Slums: Causes, growth, characteristics, effects, slum clearance and re-housing, prevention of slum formation, financial assistance for slum clearance.	
	3.3 Public buildings & Industries: Classification – location, Design Principles of public building, Grouping of public buildings. Effects of Industries on towns and cities, classification of industries, regulation of their location.	
4	**4.1 Recreation measures:** Parks- park ways, Playgrounds, Theme parks, boulevards and their space standards, knowledge of Landscape sketches for a) Residential Building, b) Public Buildings and c) Industrial Buildings.	09
	4.2 Master Plan: Meaning – Definition – objects and necessity of master plan, Data and Drawings required for master planning. Building bye laws, Preparation of a layout plan for a residential area showing LIG, MIG and HIG houses and other amenities (not to scale).	
5	**Re-planning Existing Towns:** General - Objects of re-planning – Analyzing the defects of existing towns -–difficulties in Master Planning of existing towns / cities - Urban renewal projects, merging of suburban areas – Decentralization - Satellite Towns – Smart cities- definition and features.	07
6	**6.1 Urban Roads:** objects, requirements, classification, types of street systems, through and bypass roads, outer and inner ring roads, expressways, freeways.	09
	6.2 Traffic Management: objects, traffic surveys, traffic congestion, traffic control, road junctions and intersections, parking, road accidents, traffic capacity of roads, traffic islands, roundabouts, traffic signals, road signs, road markings, street lighting in a town.	
	TOTAL	**52**

NOTE: Seminar/Model/Case study should be submitted by individual student at the end of every two units

COURSE DELIVERY: The course will be delivered through lectures and quizzes.

SUGGESTED STUDENT ACTIVITY:

1. Collect the town planning map of the nearby layout and study the land distribution as per zoning regulations.
2. Prepare a village map suitable for a 2000 population.
3. Collect the data of the existing industrial layout.
4. Prepare a master plan for a new residential layout keeping in view of the future growth for another century.
5. Collect the data regarding various housing schemes and their importance and utility.
6. Visit the nearby slum clearance board, study the various schemes and prepare a report.
7. Prepare a map consisting of various public buildings such as schools, banks court etc.
8. Prepare a report on various urban renewal projects.
9. Collect the data regarding the passive and active recreation facilities available in your locality.
10. Prepare a detailed chart of various building bye laws and zoning regulations.
11. Study the various administrative approval processes for buildings and prepare a report.
12. Prepare a detailed report about activities of HUDCO or any other housing/ urban development schemes or missions like Pradhan Mantri awas Yojana, Rajiv awas yojana, JN-NURM.
13. Prepare a report on various agencies for housing schemes in Karnataka like RGRHCL, KHB, and KSDB.
14. List out the functions of Karnataka Slum Clearance board.
15. List out the important benefits of Real estate control act-2016.
16. Study the road network pattern of your city/town/ locality and identify the problems and suggest suitable solutions.
17. Prepare a report on the use of Intelligent Transport System (ITS) for the traffic management.
18. Prepare a report on the Smart City Concept.
19. Prepare a case study on various SEZ's of India.
20. Study the different modern slum improvement techniques and prepare a report.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**.

Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Literature	3				
2.Fulfill team's roles & duties	2				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfil team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

What			To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Three Tests	20	Blue Books	CO1 to CO6
		Class room assignments		Assignments/ Seminars	05	Maintaining Log Book of activity	CO1 to CO7
		Seminars					
		Case Studies					
		Mini Project					
	SEE	End Exam		End of the course	100	Answer scripts at BTE	CO1 to CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	CO1, CO2, CO3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	CO1 to CO7 Effectiveness of Delivery & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE				Marks weightage	weightage (%)	A*	B*
			Cognitive Levels							
			R	U	Ap	Ay				
1	Introduction	6	50%	50%	0%	0%	15	10	1	1
			7	**8**	**0**	**0**				
2	2.1Surveys & Planning 2.2 Zoning	12	30%	30%	30%	10%	35	25	1	3
			10	**10**	**10**	**05**				
3	3.1 Housing. 3.2 Slums 3.3 Public buildings	9	20%	20%	40%	20%	25	17	1	2
			5	**5**	**10**	**5**				
4	4.1 Recreation Measures 4.2 Master Plan	9	20%	20%	20%	40%	25	17	1	2
			5	**5**	**5**	**10**				
5	Re- planning of existing towns	7	22%	22%	44%	12%	20	14	2	1
			5	**5**	**10**	**3**				
6	6.1 Urban Roads, 6.2 Traffic Management	9	12%	22%	22%	44%	25	17	3	1
			3	**5**	**5**	**10**				
Total		52	**26%**	**27%**	**26%**	**21%**	145	100	9	10
			36	**38**	**40**	**31**				

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A
B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	53%
2	Applying the knowledge acquired from the course	26%
3	Analysis	21%
4	Synthesis (Creating new knowledge)	0%
5	Evaluation	0%

MODEL QUESTION PAPER FOR CIE (TESTS)

Test/Date and Time	Semester/year		Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	VI SEM		Town Planning	20
	Year: 2015-16		Course code:15CE63A	

Name of Course coordinator :
Course outcome :CO1, CO2
Note: Answer all questions

	Question	M	CL	CO	PO
1	What are the objects of town planning? OR Distinguish between horizontal and vertical growth.	5	R/U	1	1,2,5,7
2	What is ribbon development? What are its disadvantages?	5	Ap	1	1,2,5,7
3	Differentiate between urban and rural planning.	5	An	2	1,2,4,5, 6,7
4	How the vital survey is conducted before planning of the town? OR What is the necessity of drawings? What are the usual drawings prepared?	5	An/ Ap	2	1,2,4,5, 6,7

Model Question Paper

Diploma in Civil Engineering

6th semester

Course title: **TOWN PLANNING**

Time: 3Hrs. **Max. marks: 100**

Part – A

Answer any six questions of the following. Each question carries five marks:

1. What are the guiding principles of town planning?
2. How the town planning surveys are useful for a town planner?
3. Give a brief outline and functions of HUDCO.
4. Define master plan. What are the objects of master plan?
5. What are the objects of re-planning?
6. Write a short note on satellite town.
7. Mention the requirements of a good city road.
8. Differentiate between freeways and expressways.
9. What are the disadvantages of traffic congestion?

Part – B

Answer any seven questions of the following. Each question carries ten marks:

1. Explain the features of a satellite town with a neat sketch.
2. What are the topics to be covered in a civic survey?
3. Write a short note on i) regional planning ii) national planning
4. Explain the methods adopted to collect the data before planning a town. And also mention the drawings and maps to be prepared.

5. Explain briefly the causes and characteristics of slum.
6. Explain the broad principles which are to be observed while designing site and size of public buildings.
7. Define the parkway. And mention important factors to be remembered in connection with it.
8. List out the data to be collected while preparing the master plan of a town.
9. What are the usual defects of modern unplanned cities?
10. Enumerate the general principles to be observed in the design of road junctions to minimize the accidents.

Model Question Bank:

Introduction
Remembering
1. What is meant by the term town planning? 2. What are the objects of town planning? 3. What are the guiding principles of town planning?
Application
1. Discuss the growth of towns according to origin. 2. What is ribbon development? What are its disadvantages? 3. Mention the features of the satellite town. 4. Explain the concentric spread concept of development.
Analysis
1. Distinguish between horizontal and vertical growth. 2. Mention the various stages of town development according to Lewis Mumford. 3. Mention the various stages of town according to Griffit Taylor. 4. Explain how the Indian villages are grouped. 5. How the cities are classified on the basis of population. 6. How the town is divided according to distribution of land use. 7. What are the ways of mobilizing the fund for the development of the town? 8. What are the factors to be considered while selecting an ideal site for a town?

Surveys & Planning
Remembering
1. List out the various surveys to be conducted for the collection of data 2. What is the type of information collected in functional survey 3. Mention the information collected in the social survey 4. Enlist the information's to be collected in territorial survey
Application
1. What is the necessity of drawings? What are the usual drawings prepared 2. Why is national survey necessary? Mention the topics which are usually covered in it? 3. What are the methods adopted to collect the data? 4. How the town planning surveys are useful for a town planner?
Analysis

1. How the vital survey is conducted before planning of the town?
2. How the national resources are studied?
3. Distinguish between national and preliminary survey
4. Differentiate between functional survey and territorial survey
5. Differentiate between regional survey and civic survey.
6. Differentiate between urban and rural planning.
7. Differentiate between regional and urban planning.

Zoning
Remembering
1. What you meant by the term zoning? What are the objects of zoning? 2. Mention the main principles of zoning. 3. What are the advantages and objects of height zoning?
Application
1. Explain the importance of zoning with illustrations. 2. Write a short note on the aspects of zoning. 3. What is the usual percentage of each zone in a normal town? 4. Describe transition zone? 5. Explain zoning powers. 6. What is the meaning of SEZ? What is its importance?
Analysis
1. Distinguish between density zoning and height zoning 2. Distinguish between zoning regulations and structural regulations 3. Distinguish between profit making and nonprofit making uses of the land.

Housing
Remembering
1. What are the factors to be considered while selecting the building site? 2. How are residential buildings classified? 3. Describe briefly a typical rural house. 4. Describe the agencies involved in the housing.
Application
1. Write short notes on i) flats, ii) Importance of housing iii) Rural housing iv) Investment in housing v) LIC housing boards vi) rural housing boards 2. Explain the function of GRUH 3. What are the important aspects of rural housing? 4. Give a brief outline and functions of HUDCO.
Analysis
1. What are skyscrapers? Are they desirable? 2. Mention the aspects to be considered in the design of residential areas. 3. Write a critical note on HDFC. 4. Why was CIDCO formed? Give an idea about its functions and achievements. 5. Discuss the national housing policy announced by the government in 1988. 6. Differentiate between the following:

- Detached houses and semi detached houses
- Apartments and skyscrapers
- Rural planning and city planning
- EWS, LIG, MIG and HIG

Slums
Remembering
1. Define and explain what is meant by slums. 2. What are the characteristics of slums?
Application
1. What are the objects of slum clearance programs? 2. State the legal aspects to be considered in any slum clearance project. 3. Explain rent restriction act
Analysis
1. Mention the points to be considered in any slum clearance project. 2. What are the resources for slum clearance and rehousing? 3. Discuss the open plot scheme for removal of slums. 4. How can formation of slum be prevented? 5. Describe the two methods of slum clearance. 6. Differentiate between the following: • Slum clearance and slum improvement • Transit camps and rehousing

Public Buildings and Industries
Remembering
1. How are public buildings classified? 2. What are the principles of design of public buildings? 3. What is town centre? What are its different forms? 4. How are industries classified according to the nature of dependence on circumstances? 5. What are the advantages and disadvantages of concentration of industries? 6. What are the measures to be adopted to control the location of industries? 7. Write short notes on : i) industrial survey ii) foot loose industries iii) special industries iv) Layout of an industrial township
Application
1. Mention the categories in which the public buildings are generally grouped. 2. Give some illustrations to indicate the importance of site selection with respect to the purpose of public buildings. 3. Mention the reasons for concentration of industries. 4. State the requirements of normal typical industry.
Analysis
1. Discuss the factors to be examined at the time of site selection for the public buildings?

2. What are the different measures adopted for developing civic aesthetics?
3. Differentiate between the following:
   - Dependant buildings and institutional buildings.
   - Business centers and civic centers
   - Public buildings and business buildings
   - Educational center and health center
   - Departmental stores and market
4. Discuss the types of industries classified on the basis of nature of industry.
5. Explain what is meant by sitting of an industry.
6. Differentiate between the following:
   - Fixed industries and linked industries
   - Heavy industries and light industries
   - Primary industries and secondary industries
   - Linked industries and foot loose industries

Recreation measures
Remembering
1. What are the two types of recreation? 2. How are parks classified according to character? 3. How are parks classified according to size? 4. What is ideal park system? Describe important types of park systems. 5. Write a short note on i) theme parks ii) boulevards
Application
1. Give sketches of the following • Combined belt and wedge park system • Layout of a typical park • Typical play ground of fully developed school
Analysis
1. What are the space standards for parks and play grounds? 2. Prepare landscape sketches for a) Residential Building, b) Public Building and c) Industrial Building.

Master Plan
Remembering
1. Define master plan. What are the objects of master plan? 2. What is the necessity of master plan? 3. Mention the various stages of preparation of a master plan for a town. 4. Explain building Bye-laws
Application
1. What are the data to be collected to prepare a master plan? 2. What are the drawings to be prepared to prepare a master plan?
Analysis
1. What are the features of a master plan? 2. What is meant by the term planning standards?

Re-planning of existing towns
Remembering
1. What are the objects of re-planning? 2. What are the data to be collected for re-planning of a town?
Application
1. What is an urban renewal project? Mention the important aspects of urban renewal projects. 2. Define smart city. What are its features? 3. Define a garden city and explain in detail how Ebenezer Howard Conceived it. 4. Write a short note on- i) satellite town ii) sub urban areas
Analysis
1. What are the defects of existing towns? 2. What are the arrangements adopted for decentralization and recentralization?

Urban Roads
Remembering
1. What are the importance and objects of urban roads? 2. Mention the requirements of a good city road. 3. How are the urban roads classified? 4. Define a freeway and mention its essential features. 5. Define an expressway and mention its essential features.
Application
1. Discuss the various categories of street systems. 2. Explain with sketches i) through and bypass road ii) outer and inner ring road
Analysis
1. Differentiate between ring road and expressways. 2. Differentiate between freeways and expressways.

Traffic Management
Remembering
1. What are the main objects of traffic management? 2. What are the chief uses of traffic surveys? 3. What are the disadvantages of traffic congestion? 4. What is traffic control? What are its objectives and how is it achieved? 5. What is roundabout? State its advantages and disadvantages.
Application
1. What is the procedure adopted for a traffic survey? Discuss the information collected in such a survey. 2. State the measures adopted to avoid traffic congestion. 3. What are the factors to be considered while selecting a particular type of road junction? 4. Draw sketches of the following i) traffic island ii) elliptical roundabout iii) clover leaf crossing iv) diamond crossing v) tangent type roundabout vi) turbine type round about vii) rotary interchange viii) T – intersection ix) Y- intersection.

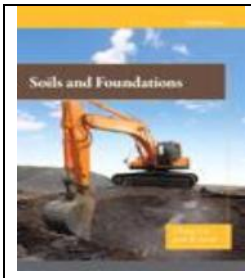
5. Write a note on traffic capacity of roads.
6. What are the advantages and disadvantages of traffic signals?
7. What are the usual forms of road markings?
8. Why are street lights necessary? Mention the usual types of street lights.

Analysis

1. What is traffic congestion? What are the causes responsible for developing traffic congestion?
2. Discuss the arrangements made at important road junctions.
3. Mention the general principles to be observed in the design of road junctions.
4. What are the effects of improper parking on urban environment?
5. Explain the methods adopted to grant parking facilities.
6. What are the causes of road accidents?
7. Why are road signs necessary? Mention their negative functions.
8. What are the limitations of road signs?
9. Discuss the various types of road signs as per the provisions of the Indian motor vehicle act and IRC code.
10. Explain with the help of sketches, various arrangements of street lights.
11. Differentiate between the following:
    - On street parking and off street parking
    - Guiding road signs and regulatory road signs
    - Clover leaf crossings and diamond crossings
    - Traffic island and roundabout
    - Mandatory road signs and regulatory road signs

TEXT BOOKS/WEB LINKS

- Town Planning by Rangwala.
- Fundamentals of Town Planning by G.K Hiraskar.
- Town Planning by Abir Bandyopadhyay.
- www.moud.gov.in/
- www.uddkar.gov.in
- https://www.karnatakahousing.com/
- www.hudco.org
- www.ksdb.kar.nic.in
- http://www.uddkar.gov.in
- http://www.urbantransport.kar.gov.in/

	Course Title: GEO TECHNICAL ENGINEERING		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE63B**
	Type of Course Delivery: **Lecture and Student activity**	**Credit :4**	Core/ Elective: **Elective**
CIE- 25 Marks			SEE- 100 Marks

Pre-requisites: Knowledge of Materials of Construction and Construction and concrete Technology.

Course Objective:

1. To provide basic knowledge about soil as a medium in civil engineering discipline.
2. To provide the description and classification of soil, Compaction soil and shear strength
3. To get familiarized about field tests conducted on soil, sampling of soil and exploration of soil for conducting tests.
4. To disseminate the idea of ground improvement techniques and stabilization of soils.
5. To understand the concept of foundation in expansive soils.

At the end of the course the students should be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Summarize the concept of soil mechanics and properties of soil & their application.	**R/U**	1,2,3	06
CO2	Explain classification of soils , discuss compaction process and shear strength of soil	**R/U**	1,2,3,5,6,10	10
CO3	Conduct the field tests on soil, sampling of soil & knowledge about soil exploration	**R/U**	1,2,3,5,6,7,10	10
CO4	Select various ground improvement techniques & soil stabilization methods	**R/U**	1,2,3,5,6,7,10	10
C05	Discuss the concept of well foundations & pile foundations	**R/U**	1,2,3,6,7,10	10
C06	Indicate the problems faced during laying of foundation in expansive soils	**R/U**	1,2,3,5,6,7,10	06
C07	Manage the suggested or identified problems and solve in teams, in order to improve future problem solving ability and able to present it.	**R/U/Ap/An**	1,2,3,4,5,6,7,8, 9,10	*
		Total sessions		**52**

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Course Delivery: The course will be delivered through lectures and Power point presentations/Videos

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Geotechnical Engineering	3	3	3	-	3	3	3	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNIT	CONTENT	HOURS
1	**Introduction to Soil Mechanics and Properties of Soils:** **Introduction** – Development of soil Mechanics – Fields of application of Soil Mechanics – Formation of soil, Three phase system of soil. • **Soil properties** – Definitions of Index properties (Water content, Specific gravity, porosity, Degree of saturation, Void ratio, Particle size distribution, Bulk Unit weight of soil, Consistency Limits and relative density) and Engineering properties(Cohesion, Angle of internal friction, Capillarity, Permeability, Elasticity. Compressibility) & Atterberg's limits (shrinkage limit, plastic limit, and liquid limit).	6
2	**Classification, Compaction, shear Strength** **Classification:** Purpose of soil classification, Particle size classification ,IS classification, Highway Research Board classification system, field identification of soils **Compaction of soils**: Definition, Mechanism of compaction, procedures of Standard proctor & Modified proctor tests, factors affecting compaction, Methods of compaction, field compaction equipments. **Shear strength** - concept of Shear strength- List the Methods of determination of Shear strength of soils -concept of sensitivity of soils.	10
3	**Field tests on soil, Soil Exploration & Sampling of soil** **Field tests on soil**- Static Cone Penetration Test, Electrical Resistivity method and Permeability Test. **Soil exploration** - Needs & objectives, guidelines for deciding Number & disposition of trail pits & borings ,depth of exploration, List of methods of soil exploration,	9

UNIT	CONTENT	HOURS
	Sampling of soil – Types of samples -undisturbed, disturbed and representative samples, typical Bore log, format of Soil investigation report.	
4	**Ground Engineering** **Ground improvement techniques** – introduction – commonly used methods – pre loading, use of sand drains, densification of soils by vibro floatation, Sand compaction piles, simple stone columns, blasting, heating **Stabilization of soil** – Introduction- Objects of stabilization- Methods of stabilization- grouting methods (Compaction grouting, slurry injection grouting only), soil reinforcement- geogrid and geotextiles.	**11**
5	**Foundations** **Deep foundations**- Introduction – Pile foundation – Uses of piles – Types of piles –selection of piles – Pile driving – Capacity of piles – Pile load test – Floating foundation– pile groups – Settlement of Pile **Well foundation**-Caissons(box & pneumatic caissons), shapes of well foundation, components of well foundation, forces acting on well foundation	**10**
6	**Foundation in expansive soil** Introduction – Identification of expansive soil – Free swell Index Test – Differential free swell test –Swell potential and Swelling pressure- Methods of foundation in expansive soils- replacement of Expansive soils and "CNS(Cohesive Non Swelling)" concept- Under reamed pile foundation.	**6**
	Total	**52**

SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Collect samples of soil & make a mini project report on their properties.
2. List the various earthwork excavating machines & their usage as per their suitability.
3. Prepare a case study on advanced ground improvement techniques.
4. Collect the soil investigation report for any nearby construction project & prepare a report on it.
5. Visit any nearby site & interact with the engineer how the soil investigation is conducted & make a report on it.
6. Conduct field tests on soil sample of your college & make a report on the tests.
7. Prepare a report on collection of samples of soil.
8. Visit nearby PWD office & collect details of soils of your zone & make a report on it.
9. Conduct seminars on i)Stress distribution of soil ii) Consolidation of soil iii)Reinforcement of soil iv) Stability of slopes v) Soil formation & soil structure vi) Seepage analysis of soil.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should

not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary 5.

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary5				
1.Literature	3				
2.Fulfill team's roles & duties	2				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct	CIE	IA	Students	Thrice	test	Test 1	20	Blue books	CO1,CO2

				(Average of three tests)	Test 2			CO3,CO4
					Test 3			CO5,CO6
				Student Activities		05	Written Report	CO1 to CO7
	SEE	End Exam		End of the course		100	Answer scripts at BTE	CO1,CO2,CO3,CO4,CO5,CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1,CO2 &CO 3 Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 to CO7 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels R	U	Ap	Marks weightage	weightage (%)	A*	B*
1	Introduction to Soil Mechanics and Properties of Soils	06	16.66% **5**	33.33% **10**	0.00% **0**	15	10.34	1	1
2	Classification, Compaction & shear strength	10	16.66% **10**	16.66% **20**	0.00% **0**	30	20.68	2	2
3	Field tests on soil, Soil Exploration & Sampling of soil	10	13.00% **05**	28.57% **25**	0.00% **0**	30	20.68	2	2
4	Ground Engineering	10	25.00% **05**	25.00% **20**	0.00% **0**	25	17.25	1	2
5	Earth work, Earth moving equipment & Deep foundations	10	25.00% **10**	25.00% **20**	0.00% **0**	30	20.68	2	2
6	Foundation in expansive soil	06	50.00% **5**	50.00% **10**	0.00% **0**	15	10.37	1	1
	Total	52	**27.60%** **40**	**72.4%** **105**	**0%** **0**	145	100	9	10

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

A*-SEE questions to be set for (05 marks) in Part – A
B*- SEE questions to be set for (10 marks) in Part – B
Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1	Remembering and Understanding	70%
2	Applying the knowledge acquired from the course	20%
3	Analysis	10%
4	Evaluation	0%
5	Creating new knowledge	0%

Model Question Paper for CIE :

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	VI	**GEO-TECH ENGINEERING**	**20**
	Year: 2015-16	**Course code:15CE63B**	

Name of Course coordinator : **Course Outcome : 1,2**
Note: Answer all questions

	Question	**M**	**CL**	**CO**	**PO**
1	Discuss briefly the various applications of soil mechanics. Or With sketch Explain three phase system of soil.	**05**	**U**	**1,2**	**1,2,3 ,5,6, 10**
2	Define i) Specific gravity ii)Particle size distribution iii) Bulk Unit weight of soil, iv)Consistency Limits v)relative density	**05**	**R**	**1,2**	**1,2,3 ,5,6, 10**
3	Explain Highway Research Board classification of soil. Or Write a short note on field identification of soils.	**05**	**R**	**1,2**	**1,2,3 ,5,6, 10**
4	Discuss the effect of compaction on soil properties (or) Differentiate between Standard & modified proctor test.	**05**	**U**	**1,2**	**1,2,3 ,5,6, 10**

Note: Internal Choice may be given in each CO at the same cognitive level (CL).

TEXT BOOKS

1 **References:**

1. A text book of Soil Mechanics & Foundation Engineering – VNS Murthy, Dhanpat Rai & Sons 1682,, Nai sark, Delhi.
2. A text book of Soil Mechanics & Foundation Engineering – B.N.D Narasimha Rao
3. Construction and Foundation Engineering – Dr. Janardhana Jha and S. K. Sinha.
4. Geo technical Engineering by Prof.T.N.Ramamurthy , Prof.T.G.SITHARAM
5. Problems in soil mechanics – B. C. Punmia.
6. A Text book of soil mechanics- Dr. B. C. Punmia.
7. Problems in soil mechanics – Shamsher Prakash.
8. Foundation Design in Engg. Practice – Nayak.

9. Soil Mechanics in Engineering practice – Tenzagi & Peck.
10. Soil Mechanics by K R Arora.
11. Soil Mechanics and foundation Engineering -- Joseph. E. Bowles
12. Basic Soil Mechanics & Foundations Paperback – January 1, 2011 by Alam Singh (Author)
13. Foundation Engineering- P C Varghese, PHI learning, 2009.
14. Geotechnical Engineering- Dr C Venkataramaiha, New Age Publications,2009
15. Soil Mechanics and foundation Engineering- S K Garga, Khanna publications, 2003.

Websites:

16. http://nptel.ac.in/courses/105104034/
17. http://nptel.ac.in/courses/105104131/
18. http://nptel.ac.in/courses/105104135/
19. https://www.youtube.com/watch?v=cRAEZTOCBm0
20. https://www.youtube.com/watch?v=C42m52LKgX8
21. https://www.youtube.com/watch?v=o0Kyihefy2A&list=PLWbF2j_Smxk1VgPtPsQwQDlLLDnzA5moT
22. https://www.youtube.com/watch?v=vjGNwhvODGk
23. https://www.youtube.com/watch?v=BQ2w6A23ElQ
24. https://www.youtube.com/watch?v=4h8vqN6nOa4
25. https://www.youtube.com/watch?v=bh7TieIxrWE
26. https://www.youtube.com/watch?v=IPGAJCdVjUQ&list=PLFH132nBHpEZP-eTIcAcK0_A1qXKhCKxV
27. https://www.youtube.com/watch?v=kNllvz-0oF4
28. https://www.youtube.com/watch?v=e2aEEUvmLIM

Model Question Paper
Diploma in Civil Engineering
6TH semester
Course title: **GEO TECHNICAL ENGINEERING**

Time: 3Hrs. **Max. marks: 100**

Part –A

Answer any six questions each carries 5 marks

1. Define the following
   i) Cohesion ii) Angle of internal friction iii) Capillarity iv) Permeability v)Elasticity
2. Explain classification of soil.
3. Discuss the effect of compaction on soil properties.
4. What are the needs of soil exploration program?
5. Distinguish between disturbed sample & undisturbed sample.
6. Explain sand compaction piles used for ground improvement.
7. Write a short note on types of piles.
8. What are the forces acting on well foundation.
9. Explain i) Swell potential ii) Swell pressure

Part –B

Answer any seven each question carries 10 marks

1. a) Explain three phase system of soil with a neat sketch.
   b) Write a short note on Atterberg limits of soil.
2. Explain Standard proctor test.
3. a) Explain the mechanism of compaction
   b) Explain sensitivity of soils.
4. Explain Static Cone Penetration Test soil.
5. a) Explain depth of exploration..
   b) Distinguish between disturbed sample & undisturbed sample.
6. a) Explain the need of ground improvement techniques
   b) Explain how pre-loading technique is useful in improving the properties of the soil.
7. a) Discuss the objects of soil stabilization.
   b) Write a short note on soil reinforcement.
8. Explain pile load test.
9. Describe the various components of a pneumatic caisson with a neat sketch
10. Explain the test procedure to determine free swell Index for expansive soil.

MODEL QUESTION BANK

CO I : Understand concept of soil mechanics & different properties of soil & their application.

Cognitive level –Remember

1. Define Soil mechanics?
2. Discuss briefly the various applications of soil mechanics.
3. With the help of three phase diagram define the following
   i) Voids ratio (ii) Porosity (iii) Degree of saturation (iv) Water content
4. Define i) Specific gravity ii)Particle size distribution iii) Bulk Unit weight of soil, iv)Consistency Limits v) relative density
5. Define i) Cohesion ii) Angle of internal friction iii) Capillarity iv) Permeability v) Elasticity vi) Compressibility

Cognitive level -Understand

1. Explain briefly the formation of soil.
2. Explain three phase system of soil.
3. Explain Engineering properties of soil.
4. Write a short note on Atterberg's limits of soil.

CO II : Apply understand the classification of soils ,compaction of soil & shear strength of soil.

Cognitive level –Remember

1. Explain classification of soil.

2. Explain IS classification of soil.
3. Explain Highway Research Board classification of soil.
4. Explain the mechanism of compaction.
5. Explain Standard proctor test.
6. Write a short note Modified proctor test.
7. Differentiate between Standard & modified proctor test.
8. Explain sensitivity of soils.

Cognitive level -Understand

1. What is the purpose of soil classification?
2. List the different types of classification of soil.
3. Write a short note on field identification of soils.
4. Define compaction?
5. Discuss the effect of compaction on soil properties.
6. What are the factors affecting Compaction.
7. Write short note field compaction equipments.
8. What is shear strength of soil?
9. List the different methods of determination of shear strength of soils.

CO III : Conduct the field tests on soil, sampling of soil & knowledge about soil exploration

Cognitive level –Remember

1. What are the needs of soil exploration program?
2. Explain the guidelines for deciding Number & disposition of trail pits & borings .
3. List the methods of soil exploration
4. Discuss the different types soil samples.
5. Sketch a typical bore log and describe its features.

Cognitive level -Understand

1. Explain Static Cone Penetration Test soil.
2. Discuss Electrical Resistivity method.
3. Explain the conduction of Permeability Test of soil.
4. Explain depth of exploration.
5. Distinguish between disturbed sample & undisturbed sample.
6. What are the salient features of a good soil investigation report.
7. Discuss the objectives of Soil exploration.

CO IV : Apply the knowledge of ground improvement techniques & stabilization of soils

Cognitive level - Remember

1. Explain the need of ground improvement techniques.
2. Discuss the objects of soil stabilization.
3. Explain briefly Compaction & slurry injection method of grouting.
4. Write a short note on soil reinforcement.

Cognitive level -Understand

1. Explain how pre-loading technique is useful in improving the properties of the soil.
2. Explain sand drains for improving properties of the soil.
3. Explain Vibro flotation technique for insitu densification of soil.
4. Explain stone columns used for improving the properties of soil.
5. Explain sand compaction piles used for ground improvement.
6. Explain blasting method of improving the properties of soil.
7. Explain heating method of improving the properties of soil.
8. Explain geo grids & geo textiles used in soil reinforcement.

CO V : Understand the different earth well foundation & pile foundations

1. Write a short note on types of piles.
2. Discuss briefly the capacity of piles.
3. Write a short note on pile groups.
4. What do you understand about settlement of pile?
5. Describe the various components of a pneumatic caisson with a neat sketch
6. Sketch & list out the components of well foundation.
7. What are the different shapes of well foundation?
8. What are the forces acting on well foundation?

Cognitive level -Understand

1. Explain pile foundation
2. Explain pile driving.
3. Explain pile load test.
4. Explain briefly the floating foundation
5. Describe the construction procedure of Box caisson.
6. Describe the forces acting on a well foundation.
7. Discuss the uses of piles.

CO VI : Understand the foundation in expansive soils

Cognitive level –Remember

1. Define i) Swell potential ii) Swell pressure
2. Discuss CNS Concept in expansive soils.

Cognitive level -Understand

1. Explain the test procedure to determine free swell Index for expansive soil.
2. Explain the differential test.
3. Explain the method of foundation of replacement of Expansive soils
4. Write a short note under reamed pile foundation.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: SOLID WASTE MANAGEMENT		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE63C**
	Type of Course: **Lectures, Self Study & Student activities**	Credit **:04**	Core/ Elective: **Elective**
CIE-25			SEE-100

Prerequisites: This course requires the student to know about Environmental Engineering

Course Objectives:

1. To characterize the waste and apply the knowledge of laws for municipal solid waste management, for handling of biomedical wastes and for handling of plastic wastes.
2. To apply the knowledge of mathematics, science, and engineering for effective solid waste collection systems, for waste collection route optimization and for processing of solid waste.
3. To design composting systems, maintain and operate the aerobic and anaerobic composting process for effective organic waste recycling.
4. To manage construction and operations of landfill facilities, energy recovery systems and management of leachate systems.

On successful completion of this course, the student will be able to

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Describe the components of solid waste management and the laws governing it.	***U/Ap***	1,2,5,6,7,8, 10	06
CO2	Discuss the solid waste collection systems, route optimization techniques and processing of solid wastes.	***U/Ap/Ay /E***	2,3,5,6,7,8, 9,10	10
CO3	Outline the design, operation, and maintenance of different methods of treatment.	***U/Ap/Ay***	2, 3,4,5,6,7,8, 9, 10	12
CO4	Explain the operation, and maintenance of sanitary landfill	***U/Ap/Ay***	2,4,5,6,7,8, 10	10
C05	Examine the operation, and maintenance of Incineration	***U/Ap***	2,4,5,6,7,8, 10	08
C06	Conclude the recent trends in reuse of solid waste	***U/Ap***	2,4,5,6,7,8, 9, 10	06
		Total sessions		**52**

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

Mapping of COs with POs	PROGRAMME OUTCOME (PO)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic Knowledge	Discipline Knowledge	Experiments & practic	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Lifelong learning
SOLID WASTE MANAGEMENT	1	3	3	3	3	3	3	3	3	3

DETAILED COURSE CONTENT

UNIT	COURSE CONTENT	HOURS
1	**INTRODUCTION TO SOLID WASTES:** Definition of solid wastes, Sources, classification and characteristics of solid wastes, Municipal Solid Waste (Management and Handling) Rules,	06
2	**COLLECTION OF SOLID WASTE:** Systems of collection of solid wastes, transfer stations, collection equipments, route optimization techniques and numerical problems on route optimization. Processing techniques of solid wastes (principle of operation and function only).	10
3	**TREATMENT METHODS:** Various methods of refuge processing, recovery, recycle and reuse.- Mechanical volume reduction, Chemical volume reduction, Mechanical size reduction and component separation **COMPOSTING:** Composting, factors affecting composting process, aerobic and anaerobic composting, Indore and Bangalore method of composting, mechanical composting process, vermin-composting.	12
4	**LANDFILLS:** Sanitary land filling – trench method and area method Factors considered for a landfill site selection, leachate collection systems, control of gas movement and gas recovery systems.	10
5	**INCINERATION:** Incineration process, factors affecting incineration process, and air pollution prevention in incinerators, pyrolysis process. Biomedical Waste, Biomedical Waste Handling Rules and its Impact on Human Health.	08
6	**RECENT DEVELOPMENT IN SOLID WASTE REUSE AND DISPOSAL:** Power generation, Building with construction materials and Best Management Practices (BMP)	06

Course Delivery: The course will be delivered through lectures and Power point presentations/Videos

SUGGESTED LIST OF STUDENT ACTIVITES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1	Prepare a report on Quantity of solid waste generated from village or town
2	Identify the different sources and types of solid waste generated for a village or town.
3	Write a report on visit to Sanitary landfill site nearby to your place.
4	Write a report on visit to Mechanical process of Composting plant nearby to your place.
5	Identify the different types of biomedical waste generated in hospital and then visit nearby Incineration unit.
6	Prepare a report on Best Management Practices (BMP) for disposal of solid waste generated in your places.
7	Prepare a report on treatment methods adopted in sanitary landfill area to reduce solid waste quantity.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should minatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary 5.

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1, Developing 2, Satisfactory 3, Good 4, Exemplary5				
1.Literature	3				
2.Fulfill team's roles & duties	2				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	Test 1	20	Blue books	CO1,CO2
					Test 2			CO3,CO4
					Test 3			CO5,CO6
				Student activities		05	Report	CO1 TO CO6
	SEE	End Exam		End of the course		100	Answer scripts at BTE	CO1 TO CO6
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1,CO2 &CO3Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 TO CO6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit No	Unit Name	Hour	Questions to be set for (5marks) PART - A				Questions to be set for (10marks) PART - B				Marks weightage
			R	U	A	Ap	A	U/Ap	C	E	
1	**Introduction to Solid waste**	06	-	**01**	-	-	-	**01**	-	-	**15**
2	**Collection of Solid waste**	10	-	**01**	**01**	-	-	**01**	-	**01**	**30**
3	**Treatment methods: Composting**	12	-	**02**	**01**	-	**01**	**01**	-		**35**
4	**Landfill**	10	-	**01**	**01**		-	**02**	-	-	**30**
5	**Incineration**	08	-	-	-		-	**02**	-		**20**
6	**Recent development in solid waste reuse and disposal**	06	-	**01**	-		-	**01**	-		**15**
	Total	**52**	**09(45marks)**				**10(100 marks)**				**145**

Legend: R; Remember, U: Understand A: Analysis Ap: Application, C:Creation, E:Evaluation

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1	Remembering and Understanding	70%
2	Applying the knowledge acquired from the course	20%
3	Analysis	10%
4	Evaluation	0%
5	Creating new knowledge	0%

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	VI SEM	**SOLID WASTE MANAGEMENT**	20
	Year: 2015-16	Course code:15CE63C	

Name of Course coordinator CO1,CO2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Define solid waste. Explain the composition of Municipal Solid waste. 5 MARKS	U	1	1,2, 5,6, 10
2	Differentiate between the Municipal, Industrial, Bio-medical & Hazardous wastes 5 MARKS	U	1	1,2, 5,6, 10
3	Explain with a neat sketch hauled container system and stationary container system of collection of solid waste. OR Enumerate the guidelines that must be taken into consideration when laying out the routes for collection of solid waste. . 10 MARKS	U	2	1,2, 6,10

Text Books:

1. George Tchobanoglous et.al., "Integrated Solid Waste Management", Mc-Graw-Hill, Inc. New York, 1993.
2. Howard S.Peavy et.al., "Environmental Engineering", Mc-Graw-Hill Book Company, New York, 1985.

Reference Books

1. A.D. Bhide and B.B.Sudareshan, "Solid Waste management in Developing Countries", NEERI, Nagpur 1983.
2. "Environmental Engineering (Vol II)"- S.K Garg Khanna Publishres, New Delhi 2009.
3. Robert A. Corbit, "Standard Handbook of Environmental Engineering", Mcgraw Hill Inc, New Delhi,1990.
4. P. Aarne Vesilind, William Worrel and Reinhart, Solid Waste Engineering, Thomson Brooks, Cole.
5. Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Urban Development, Govt. of India, 2000.
6. Management and Handling Rules for Municipal Solid Waste and Biomedical Waste and Plastic Waste, MOEF publications.

MODEL QUESTION PAPER (SEE)

Code: 15CE63C

Diploma in Environmental Engg.

VI Semester

Course Title: SOLID WASTE MANAGEMENT

Time: 3 Hours] **[Max Marks: 100]**

***Note*:** i) Answer any SIX questions from PART - A. Each question caries 05 marks.
ii) Answer any SEVEN Questions from PART - B. Each question caries 10 marks.

PART – A

1. Define solid waste. Explain the composition of Municipal Solid waste.
2. Explain the functional elements of Transfer and Transport of Solid waste.
3. List the factors that must be considered for location of transfer station.
4. Explain the Day to day SWM
5. Write a note on Mechanical Volume Reduction
6. Describe the Materials flow in society
7. List advantages and disadvantages of sanitary land fill
8. Explain the constituents of landfill gases.
9. List recent trends in reuse of solid waste

PART – B

1. a) Write a short note on Hazards Waste.
   b) What are the properties of Solid Waste?
2. Explain Collection routes- layout of routes & schedules
3. Distinguish between hauled container system and stationary container system of collection of solid waste.
4. Explain Indore method of composting.
5. Describe the Materials recovery in solid wastes
6. Write a note on Lecheat movement and control of Lecheat movement.
7. With a neat sketch explain the land fill operational plan.
8. a) Define Incineration and list factors affecting incineration process
   b) List the various types of equipments used to control air pollution in Incinerators with objective.
9. With a neat sketch explain the process of incineration of MSW.
10. Explain with flow diagram power generation using gas turbines.

MODEL QUESTION BANK

Code: 15CE63C

Diploma in Environmental Engineering

VI Semester

Course title: SOLID WASTE MANAGEMENT

CO 1: Understand the components of solid waste management and the laws governing it.

UNDERSTANDING LEVEL QUESTION

1. Define solid waste. Explain the composition of Municipal Solid waste.
2. Explain the Types of solid wastes
3. List the different sources of Municipal Solid Waste.
4. List the Physical composition of solid wastes.

APLLICATION LEVEL QUESTIONS

5. Explain the methods used to estimate the Solid waste quantities
6. Explain the Properties of Solid Waste
7. Explain the Chemical composition of solid waste - Individual components, particle size, density.
8. Differentiate between the Municipal, Industrial, Bio-medical & Hazardous wastes
9. Explain the sampling procedures for solid wastes.

CO 2 : Understand the solid waste collection systems, route optimization techniques and processing of solid wastes.

UNDERSTANDING QUESTIONS

1. Explain the On-site storage- factors to be considered for MSW
2. Explain Types & sizes of containers, container locations
3. List and explain various means of transports used to transport solid waste and their suitability.
4. Explain the functional elements of Transfer and Transport of Solid waste.
5. Explain equipment & accessory requirement in MSWM.
6. Explain Transfer stations - Factors to be considered.
7. List the factors that must be considered for location of transfer station.
8. Explain Collection routes- layout of routes & schedules
9. Explain the Factors affecting generation rates

APLLICATION LEVEL QUESTIONS

1. Explain the objectives of separation & processing
2. Describe terms curb, alley, set out, backyard carrying

3. Distinguish between hauled container system and stationary container system of collection of solid waste.
4. Enumerate the guidelines that must be taken into consideration when laying out the routes.
5. Explain the sampling procedures for solid wastes.
6. Explain the functional elements of Collection of solid waste.
7. Explain Collection services, collection systems- outline of operational tasks
8. Describe about Collection routes- layout of routes & schedules

ANALYSIS LEVEL QUESTIONS

1. Determination of total number of residences from which wastes are generated.

EVALUATION LEVEL QUESTIONS

1. Evaluate the optimised route for collection of solid waste in given area.

CO 3: Understand the design, operation, and maintenance of different methods of treatment.

UNDERSTANDING QUESTIONS.

1. Explain the Day to day SWM
2. Explain the objectives of separation & processing
3. What is Composting? Explain in brief aerobic and anaerobic composting of MSW
4. List the factors affecting the composting operations.

ANALYSIS LEVEL QUESTIONS

1. Explain separation and types of processing
2. Categorize different types of Mechanical Volume Reduction
3. Categorize different types of Thermal Volume Reduction

APPLICATION LEVEL QUESTIONS

1. Describe the Materials flow in society.
2. Explain the Reduction in raw material usage.
3. Explain the Reduction in solid waste quantities.
4. Describe how the Segregation of waste done.
5. Explain the Reuse of solid waste materials.
6. Describe the Materials recovery in solid wastes
7. Distinguish between Indore and Bangalore method of composting
8. Explain Mechanical process of composting.
9. Describe Vermi-composting.

CO 4: Know the operation, and maintenance of sanitary landfill

UNDERSTANDING QUESTIONS

1. List different types of disposal of solid waste by sanitary landfill.

2. List the factors to be considered in evaluating landfill sites
3. Explain in brief physical, chemical and biological reactions takes place in sanitary landfill site.
4. List advantages and disadvantages of sanitary land fill
5. Define the term Lecheat and explain composition of Lecheat.
6. Write a note on Lecheat movement and control of Lecheat movement.
7. List the various Biological, Physical and Chemical treatment processes are used for treatment of Lecheat.

ANALYSIS LEVEL QUESTIONS

1. Explain the constituents of landfill gases.

APPLICATION / EVALUATION LEVEL QUESTIONS

1. Explain with neat sketch in brief (1) Trench method (2) Area ramp method.
2. With a neat sketch explain the control of gas movement by vent and barrier method.
3. Explain Well systems used for recovery of gases from landfill.

CO 5: Know the operation, and maintenance of Incineration

UNDERSTANDING LEVEL QUESTION

1. Define Incineration and list factors affecting incineration process.
2. List types of Biomedical wastes.

APPLICATION / EVALUATION LEVEL QUESTIONS

1. With a neat sketch explain the process of incineration of MSW.
2. Explain in brief various types of equipments used to control air pollution in Incinerators.
3. With a neat sketch explain the process of Pyrolysis of MSW.
4. Explain biomedical waste handling rules.

CO 6: Know the recent trends in reuse of solid waste

UNDERSTANDING LEVEL QUESTION

1. List recent trends in reuse of solid waste
2. List Best Management Practices for safe disposal of solid waste.

APPLICATION/ EVALUATION LEVEL QUESTIONS

1. Explain with flow diagram power generation using gas turbines.
2. Explain building dismantled material can be disposed off safely.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: **ENVIRONMENTAL IMPACT ASSESSMENT**		
	Credits (L:T:P) **4:0:0**	Total Contact Hours: **52**	Course Code: 15CE63F
	Type of Course: **Lectures/ Self study**	**Credit : 4:0:0**	Core/ Elective:Elective
CIE- 25 Marks			SEE – 100 Marks

Pre – requisite: Knowledge of basic environmental aspects

Course Objectives:

- To study the importance of EIA
- To know the role of public in EIA studies
- Understand phenomena of impacts in the environment
- Know the impact quantification of various projects on the environment

Course Outcome:

On successful completion of the course, the students will be able to attain CO:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Explicate the concept of EIA	R, U	1, 2, 5, 6, 7, 10	**08**
CO2	Identify the objectives and scope of EIA	R, U	1, 2, 5, 6, 7, 10	**06**
CO3	Illustrate the necessity of public participation in EIA studies	R, U	1, 2, 5, 6, 7, 10	**06**
CO4	Summarize the importance of Environmental Attributes	R, U, A	1, 2, 5, 6, 7, 10	**10**
C05	Explain the phenomena of Impacts on environment	R, U	1, 2, 5, 6, 7, 10	**12**
C06	Quantify impacts for various developmental projects	R, U, A	1, 2, 5, 6, 7, 10	**10**
Total Sessions				**52**

Legends: R – Remember, U – Understand, A - Apply

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
ENVIRONMENTAL IMPACT ASSESSMENT	3	3	-	-	3	3	3	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

Unit No	Unit Name	Hour	Questions to be set for (5marks) PART - A			Questions to be set for (10marks) PART - B			TOTAL marks for SEE	Marks weightage (%)
			R	U	A	R	U	A		
1	**Introduction to EIA**	**08**	1	1	-	1	-	-	**20**	13.79
2	**Objectives and Scope of EIA**	**06**	2	1	-	-	-	-	**15**	10.34
3	**Public Participation in EIA**	**06**	1	-	-	-	1	-	**15**	10.34
4	**Environmental Attributes**	**10**	1	-	1	-	1	1	**30**	20.68
5	**Environmental Impact case studies**	**12**	1	-	-	1	1	1	**35**	24.13
6	**Impact quantification**	**10**	-	-	-	1	1	1	**30**	20.68
	Total	**52**	**09(45marks)**			**10(100 marks)**			**145**	**100.00**
	Percentage (%)		**67**	**23**	**10**	**30**	**50**	**20**		

Legend - R: Remember, U: Understand, A: Apply, A_n: Analysis

DETAILED CONTENT:

UNITI:INTRODUCTION TO EIA 08Hrs

Definition, Evaluation of EIA in INDIA, Rapid and Comprehensive EIA, EIA, EIS, FONSI and NDS. Need for EIA studies, Baseline data, Step-by-step procedure for conducting EIA, Advantages and Limitations of EIA, Hierarchy in EIA, Statutory requirements in EIA, MoEF guidelines in siting Developmental Projects.

UNITII: OBJECTIVES AND SCOPE OF EIA 06Hrs

Contents of EIA, Methodologies and Evaluation Techniques of EIA, Selection for specific projects

UNTIII: PUBLIC PARTICIPATION IN EIA 06Hrs

Elements of Effective Public Participation, Benefits and Procedures, EMP and DMP, Environmental Information System, Environmental Monitoring Systems, Public information network.

UNIT IV:ENVIRONMENTAL ATTRIBUTES 10Hrs

Value functions, Environmental attributes - Construction project, Industrial project, Developmental projects - Construction and Operational Phase, Mitigation measures – On Air, Water, Land, Ecology and Socio-economic Environment.

UNIT V: ENVIRONMENTAL IMPACT CASE STUDIES 12Hrs

Case studies on Human impact on Himalayan Ecosystem, Urban solid waste management with reference to Hyderabad City, Irrigation impacts of Upper Thunga Project (UTP) at Shimoga, Impact on air quality due to cement making – A case study of ACC limited, Madhukkarai, Coimbatore,Bhopal Gas tragedy.

UNIT VI: IMPACT QUANTIFICATION 10Hrs

Impact quantification study on - Water resource Developmental projects, Hazardous waste disposal sites, Sanitary land filling, Mining projects, Thermal/Nuclear power plant and Pharmaceutical industries

TEXT BOOKS

- Environmental Impact Analysis, Urban & Stacey, Jain R.K.
- Environmental Impact Assessment, Mc Graw Hill Inc, L.W. Canter (1996)
- Environmental Impact Assessment and Management, Daya Publishing house, Hosetti B.B., Kumar A. (2014)

REFERENCES

- Guidelines for EIA of Developmental Projects, MoEF, GOI
- Environmental Quality management, south asian publishers pvt ltd., Bindu N. Lohani

LIST OF SOFTWARE/LEARNING WEBSITES

- download.nos.org/333courseE/24pdf
- www.fao.org/3/a-i2802e.pdf
- www-wds.worldbank.org
- www.euroasiapub.org

SUGGESTED LIST OF STUDENT ACTIVITIES

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1	Visit a near by industry and submit a report on screening process conducted.
2	Visit a construction site and submit a report on the possible constriction phase impacts on different attributes
3	Conduct a survey to a nearby residential complex/apartment and submit a report on green belt facility procedure followed (w.r.t. air and Noise attributes)
4	Visit nearby pollution control board(PCB) and submit a report on procedure followed to conduct public participation
5	Suggest suitable mitigation measures for urban solid waste management problems

6	Suggest suitable mitigation measures for human impact on natural ecosystem

Course Delivery:

- The course will be delivered through lectures and Power point presentations/ Video
- Lecturers can prepare or download PPT's on different topicsof EIA.

Model of RUBRICS for assessing student activity

Dimension	*Scale*					*Students Score*				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5Exemplary	1	2	3	4	5
1	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor					
2	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor					
3	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor					
4	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor					
Grand Average/Total										

Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks

One activity orany one CO (course outcome) may be given to a group of FIVE students

Example: MODEL OF RUBRICS / CRITERIA FOR ASSESSING STUDENT ACTIVITY-
Task given- Industrial visit and report writing

Dimension	Scale					Students score (Five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1.Organisation	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed	3				
2.Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles	2				
3.Conclusion	Poor	Less Effective	Partially effective	Summarizes but not exact.	Most Effective	5				
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error	4				
					Total marks	14/4=3.5 ≈4				

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1,2,3,4,5,6
				Student activities	05	Report	1,2,4,6
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books(20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	I/II SEM		20
	Year:		
Name of Course coordinator :			Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	III SEM	Environmental Impact Assessment	20
	Year: 2015-16	Course code:15WT63F	

Name of Course coordinator : Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Define EIA, explain the importance of same	R	1	1,2
2	Brief out the procedure of Screening in EIA procedure	R, U	1	1,2
3	Bring out the merits and demerits of ADHOC Procedure OR Explain the OVERLAYS procedure for conducting EIA studies	U	2	1,2
4	Explain the BEES procedure for conducting EIA studies OR Bring out the criteria for Selection of specific projects in EIA studies	R, U	2	1,2

MODEL QUESTION PAPER (SEE)

Diploma in Civil engineering

VI Semester

Course title: ENVIRONMENTAL IMPACT ASSESSMENT

(Answer Any 6 questions from part A and Any 7 from Part B)

PART-A(Each questions carries 5 marks)

1. Define EIA, explain the importance of same
2. What are the advantages of conducting EIA
3. List out the methodologies adopted for conducting EIA studies
4. Bring out the merits and demerits of CHECKLISTS method
5. Explain the process evaluation techniques for conducting EIA studies
6. What are the objectives of Environmental monitoring systems
7. Name the various environmental attributes affected during the operational phase of a construction project
8. Suggest the various mitigation measures to control the effects on the environmental attributes due to a developmental project.
9. Brief out the effects on ecosystem due to Bhopal gas tragedy

PART-B(Each questions carries 10 marks)

1. **(a)** With a neat sketch explain the EIA process 06
   (b) What are the limitations of conducting EIA studies 04
2. **(a)**Describe the procedure to be followed in conducting Public Participation program for an EIA study 06
   (b) Distinguish between EMP and DMP 04.

3. Explain the various environmental attributes affected during the operational phase of a Industrial project 10
4. Suggest the various mitigation measures to control the effects on the environmental attributes due to a Industrial project 10
5. Brief out the case study of urbanization impact due to urban solid waste management with reference to Hyderabad City
6. Explain the mitigation measures taken to reduce human impact on Himalayan ecosystem
7. Discuss the mitigation measures taken to prevent irrigational impact due to UTP at Shimoga
8. Brief out the streams upon which impact quantification studies are carried out
9. Briefly quantify impacts due to hazardous waste disposal sites
10. Briefly quantify impacts due to nuclear power plant

MODEL QUESTION BANK

Diploma in Civil engineering

VI Semester

Course title:ENVIRONMENTAL IMPACT ASSESSMENT

UNITI: INTRODUCTION TO EIA

CO1: Understand the concept of EIA

Remember	Understand	Application

11. Define EIA, explain the importance of same
12. Explain the relationship between EIA and EIS
13. Explain the concept of EIS
14. Explain the procedure adopted for evaluation of EIA in India
15. Brief out the procedure of Screening in EIA procedure
16. Explain the Scoping technique in EIA procedure
17. With a neat sketch explain the EIA process
18. Differentiate between rapid and comprehensive EIA
19. Abbreviate the following:
    a. EIA
    b. EIS
    c. FONSI
    d. NDS
    e. MoEF
20. With a neat flow sheet bring out the relationship between EIA, EIS, FONSI and NDS
21. Explain the need for EIA studies
22. Write a brief note on Baseline data in EIA studies
23. Explain the step-by-step procedure for conducting EIA
24. With an example of construction project bring out the step by step procedure for conducting EIA for same
25. What are the advantages of conducting EIA
26. What are the limitations of conducting EIA studies
27. Explain the Hierarchy in EIA studies
28. What are the statutory requirements for conducting EIA studies
29. Bring out the MoEF guidelines suggested in siting Developmental Projects

UNIT II: OBJECTIVES AND SCOPE OF EIA

CO2: To know the objectives and scope of EIA

Remember	Understand	Application

1. Explain the main objectives of conducting EIA studies
2. Briefly explain the scope of EIA studies
3. List out the methodologies adopted for conducting EIA studies
4. Explain the ADHOC procedure for conducting EIA studies
5. Bring out the merits and demerits of ADHOC Procedure
6. Explain the CHECKLISTS method for conducting EIA studies
7. Bring out the merits and demerits of CHECKLISTS method
8. Explain the OVERLAYS procedure for conducting EIA studies

9. Bring out the merits and demerits of OVERLAYS Procedure
10. Explain the MATRICES procedure for conducting EIA studies
11. Bring out the merits and demerits of MATRICES Procedure
12. Explain the NETWORKS procedure for conducting EIA studies
13. Bring out the merits and demerits of NETWORKS Procedure
14. Explain the BEES procedure for conducting EIA studies
15. Bring out the merits and demerits of BEES Procedure
16. Distinguish between CHECKLISTS and MATRICES
17. Distinguish between ADHOC and OVERLAYS
18. Explain the process evaluation techniques for conducting EIA studies
19. Bring out the criteria for Selection of specific projects in EIA studies

UNT III: PUBLIC PARTICIPATION IN EIA

CO3: Necessity of public participation in EIA studies

Remember	Understand	Application

30. Describe the importance of PPP in EIA studies
31. Brief out the elements of Effective Public Participation Programme
32. Describe the procedure to be followed in conducting Public Participation program for an EIA study
33. What are the objectives of Environmental monitoring systems
34. Explain the importance of Environmental monitoring systems
35. List out the various elements that an Environmental monitoring systems include
36. Describe Environmental Management Plan
37. Explain briefly Disaster Management Plan
38. Distinguish between EMP and DMP
39. List out the Environmental Information system available for EIA studies
40. Explain Effects Module of Environmental Information system
41. Explain Documentary centre Module of Environmental Information system
42. Explain Public Module of Environmental Information system
43. Explain GIS Module of Environmental Information system

UNIT IV:ENVIRONMENTAL ATTRIBUTES

CO4: To know the importance of Environmental Attributes

Remember	Understand	Application

44. Explain the importance of value function in EIA studies
45. Explain the various environmental attributes affected during the construction phase of a construction project
46. Explain the various environmental attributes affected during the operational phase of a construction project
47. Explain the various environmental attributes affected during the construction phase of a Industrial project
48. Explain the various environmental attributes affected during the operational phase of a Industrial project
49. Explain the various environmental attributes affected during the construction phase of a developmental project
50. Explain the various environmental attributes affected during the operational phase of a developmental project

51. Suggest the various mitigation measures to control the effects on the environmental attributes due to a construction project
52. Suggest the various mitigation measures to control the effects on the environmental attributes due to a Industrial project
53. Suggest the various mitigation measures to control the effects on the environmental attributes due to a developmental project

UNIT V: ENVIRONMENTAL IMPACT CASE STUDIES

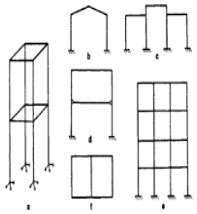
CO5: To understand the phenomena of Impacts on environment		
Remember	**Application**	**Understand**

1. Brief out the case study of human impact on Himalayan ecosystems
2. Brief out the case study of urbanization impact due to urban solid waste management with reference to Hyderabad City
3. Brief out the case study of Irrigation impacts due to Upper Thunga Project (UTP) at Shimoga
4. Brief out the Impact on air quality due to cement making – A case study of ACC limited
5. Brief out the effects on ecosystem due to Bhopal gas tragedy
6. Explain the mitigation measures taken to reduce human impact on Himalayan ecosystem
7. Briefly describe the mitigation measures to prevent urbanization impact due to solid waste management
8. Discuss the mitigation measures taken to prevent irrigational impact due to UTP at Shimoga
9. Discuss the mitigation measures taken to prevent the industrial impact on air due to ACC limited
10. Brief out the mitigation measures taken to prevent impacts in future due to incidents similar to Bhopal gas tragedy.

UNIT VI: IMPACT QUANTIFICATION

CO6: Quantify impacts for various developmental projects		
Remember	**Understand**	**Application**

1. Explain the importance of impact quantification in EIA studies
2. Brief out the streams upon which impact quantification studies are carried out
3. Explain the importance of water resource developmental projects
4. Briefly quantify impacts due to water resource developmental project
5. Briefly quantify impacts due to hazardous waste disposal sites
6. Briefly quantify impacts due to sanitary land filling sites
7. Briefly quantify impacts due to Mining projects
8. Briefly quantify impacts due to Thermal power plant
9. Briefly quantify impacts due to nuclear power plant
10. Briefly quantify impacts due to Pharmaceutical industries

	Course Title: **THEORY OF STRUCTURES**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE63G**
	Type of Course: **Lectures, Student activity**	Credit **:04**	Core/ Elective: **Elective**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites: Knowledge of basic Mathematics, Strength of Materials.

Course Objectives:

1. To analyse the structures with the help of free body diagram by different methods.

On successful completion of this course, the student will be able to:

Course Outcome		**CL**	**Linked PO**	**Teaching Hrs**
CO1	Identify statically determinate and indeterminate structures	**R/U/Ap/An**	1,2,3,5,6,10	13
CO2	Analyse beams by slope deflection method	**U/Ap/An**	2,3,5,10	13
CO3	Analyse continuous beams and portal frames by moment area method.	**U/Ap/An**	2,3,5,8,10	13
CO4	Analyse the trusses	**U/Ap/An**	2,3,4,5,9,10	13
CO5	Suggested activity	**R/U/Ap/An/E**	1 to 10	*
TOTAL				52

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	**Programme Outcome**									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
THEORY OF STRUCTURES	1	3	3	1	3	2	-	2	1	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

UNIT	COURSE CONTENTS	HOURS
1	**INTRODUCTION STATIC AND KINEMATIC INDETERMINACY.** Introduction to Structural Systems- Classification of structures, Structural forms, Loads, Conditions of equilibrium, Compatibility conditions, Statically determinate and indeterminate structures, degree of Static and Kinematic indeterminacy, free body movement diagram. Different methods to analyse Statically indeterminate & Kinematically Indeterminate Structures.	13
2	**SLOPE DEFLECTION METHOD-**Introduction, Sign conventions, Development of slope deflection equations, Analysis of beams-fixed beams, Proped Cantilever beams, Continuous beams (2 spans).	13
3	**MOMENT DISTRIBUTION METHOD-**(Without Sway): Introduction, Definition of terms- Distribution factor, Carry over factor, Analysis of Continuous beams (2 spans), Problems on portal frame. (Single column & single bay, Two column & single bays)	13
4	**ANALYSIS OF PIN JOINTED DETERMINATE PLANE TRUSSES-** Introduction and types of Trusses, Assumptions, Analysis by Method of joints.	13
	Total	52

COURSE DELIVERY: The course will be delivered through lectures and Practices

STUDENT SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Solve the solved problems in the class rooms by kanis method, prepare a spread sheet make a report and present it

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1,** Developing **2,** Satisfactory **3,** Good **4,** Exemplary **5.**

2. Reports should be made available along with bluebooks to IA verification officer.

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary5				
1.Organisation	2				
2.Team's roles & duties	3				
3.Conclusion	4				
4.Convensions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Thrice test (Average of three tests)	Test 1	20	Blue books	CO1, CO2
					Test 2			CO3
					Test 3			CO4
				Activities		05	Written Report	CO1 to CO5
	SEE	End Exam		End of the course		100	Answer scripts at BTE	CO1,CO2,CO3, CO4
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	CO1 CO2 & CO3 Delivery of course
	End of Course Survey			End of the course			Questionnaires	CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE – Cognitive Levels R	U	Ap	Ay	Marks weightage	weightage (%)	A*
1	Introduction	8	50% **10**	25% **5**	25% **5**	0% **0**	40	25	2
2	Slope deflection method	12	0% **0**	20% **10**	40% **15**	40% **15**	40	25	2
3	Moment distribution method	12	0% **0**	20% **10**	40% **15**	40% **15**	40	25	2
4	Analysis of trusses	12	0% **0**	0% **0**	50% **20**	50% **20**	40	25	2
	Total	52	**10%** **10**	**13%** **25**	**41%** **65**	**36%** **60**	160	100	8

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

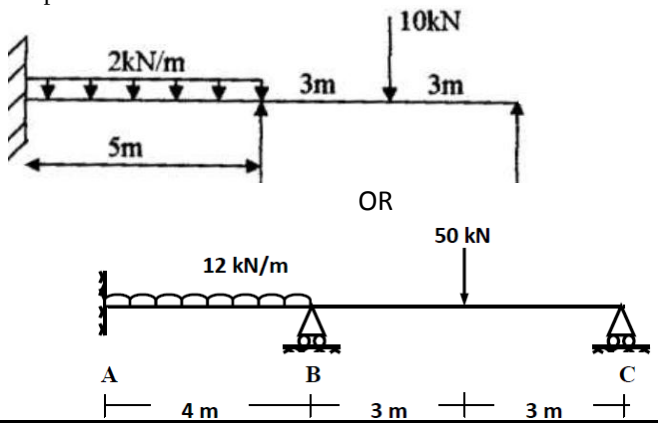
Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	23%
2	Applying the knowledge acquired from the course	41%
3	Analysis	36%
4	Synthesis (Creating new knowledge)	0%
5	Evaluation	0%

MODEL Q.P FOR -CIE (TESTS)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/ 6 th week of sem 10-11 Am	**V sem**	**THEORY OF STRUCTURES**	**20**
	Year: 2015-16	**Course code: 15CE63G**	

Name of Course coordinator : **Course Outcomes : 1 & 2**

Note: Answer all questions

	Questions	M	CL	CO	PO
1	Define degree of indeterminacy	**2**	**R**	**1**	**1,2,5**
2	Mention the difference between Static and Kinematic indeterminacy with exmples	**4**	**U**	**1**	**2,5**
3	Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method. 	**14**	**R/U Ap/An**	**2**	**1,2,3,4, 5**

REFERENCE TEXT BOOKS

1. R.C.Hibbeler, Structural Analysis, Pearson.
2. K.M.Leet,C.Ming UanG&A.M.Gilbert, Fundamentals of Structural Analysis, TATA McGraw Hill Education.
3. Devdas Menon, Structural Analysis, Narsoa
4. G.S.Pandit,S.P.Gupta&R.Gupta, Theory of Structures Vol-I&II, TATA McGraw Hill Education.
5. L.S.Negi&R.S.Jangid, Structural Analysis, TATA McGraw Hill education.
6. S.Ramamrutham &R.Narayan, Theory of Structures, Dhanpat Rai & Son.
7. C.S.Reddy, Basic Structural Analysis, TATA McGraw Hill education.
8. B.C.Punmia.Ashok Kumar Jain& Arun Kumar Jain, Theory of Structures, LAXMI.
9. S.S.Bhavikatti, Structural Analysis I&II, VIKAS
10. Theory of Structures Vol-1 by Pandit and Gupta, Tata McGraw Hill, New Delhi.
11. Basic Structural Analysis by C S Reddy, Tata McGraw Hill, New Delhi.

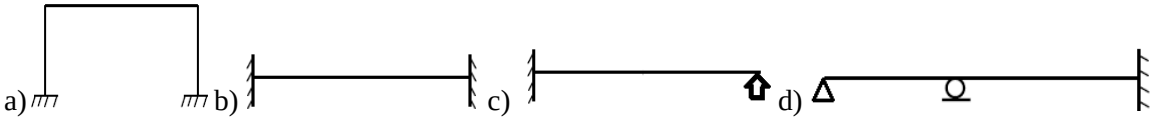
12. Elementary Structural analysis, Norris and Wilbur, International student edition, Tata McGraw Hill book Co, New York.
13. Structural Analysis by R C Hibler, 5th edition, Pearson Education Inc.
14. J. Sterling Kinney, "Indeterminate Structural Analysis", Oxford and Publishing Co.
15. Noris C.H., Wilbur J.B., "Elementary Structural Analysis", Mc Graw Hill International Book Edition.
16. C.K. Wang, "Intermediate Structural Analysis", Mc Graw Hill Publications.
17. Ashok K. Jain, "Advanced Structural Analysis", Nem Chand & Bros., Roorkee, India.

MODEL QUESTION PAPER

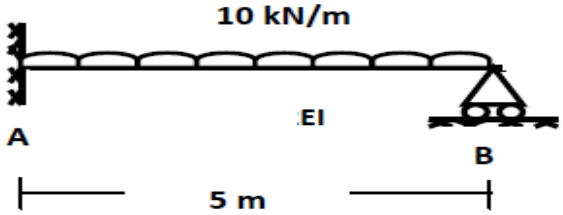
Time: 3hours **THEORY OF STRUCTURES** Max.marks:100

Answer any five full question 20 x 5= 100

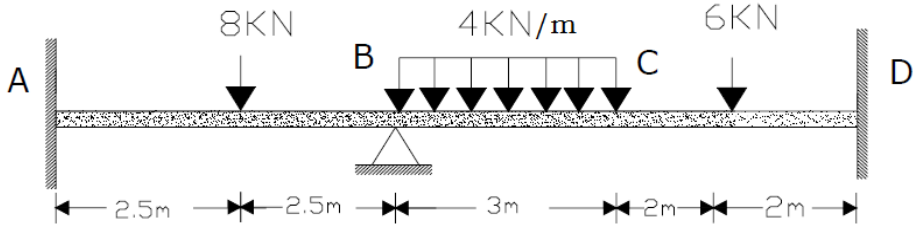
1. a)State Conditions of equilibrium b)Define redundant force
   c)Mention the difference between Static and Kinematic indeterminacy with exmples
2. Find degree of indeterminacy of structures as given below



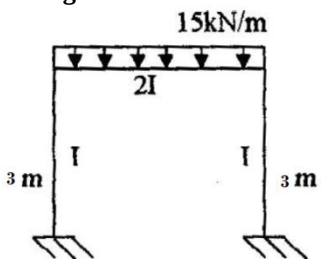
3. a) Give the fixed end moment for the beam below 1) full UDL 2)centre point load
   b) Analyse the proped beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



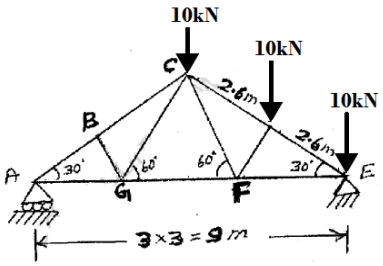
4. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



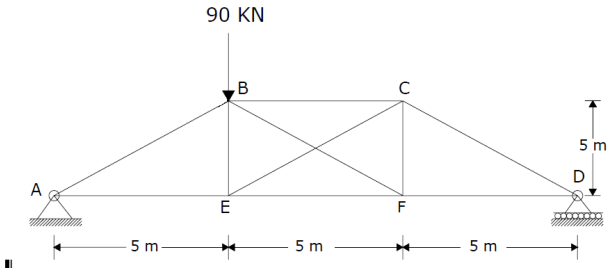
5. Analyse the beam as shown in **Figure** above (same of Q4) and draw BMD. Use Moment distrubution Method
6. Analyse the Portal frame as shown in **Figure below a**nd draw BMD. Use Moment distrubution Method



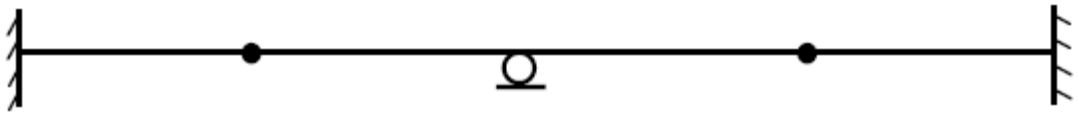
7. Analyse the truss by method of joints and indicate the member of forces with neat sketch

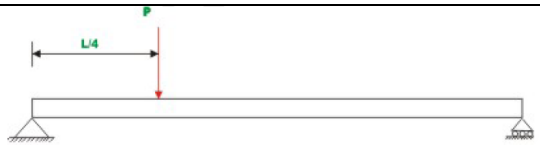


8. Analyse the truss by method of joints and indicate the member of forces with neat sketch



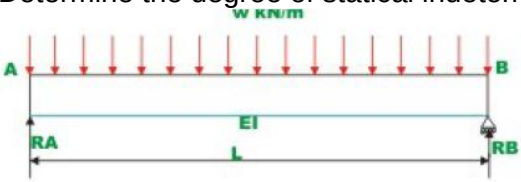
Model Questions Bank

Unit 1- INTRODUCTION STATIC AND KINEMATIC INDETERMINACY.
Cognitive level –Remember 2. State Conditions of equilibrium 3. Define redundancy 4. Define redundant force 5. What are all type of frames 6. Define degree of indeterminacy 7. What is equilibrium condition 8. What are the methods of structure to determining the degree of indeterminacy
Cognitive level –Understand 1. Mention the difference between Static indeterminacy and Kinematic indeterminacy 2. Differentiate determinate and indeterminate of structure 3. Differentiate static and kinematic indeterminacy of structure 4. Differentiate external and internal indeterminacy of structures
Cognitive level –Application 1. To find degree of indeterminacy of structures as given below  2. To find degree of indeterminacy of structures as given below  3. Check whether the following beam is statically determinate or not.

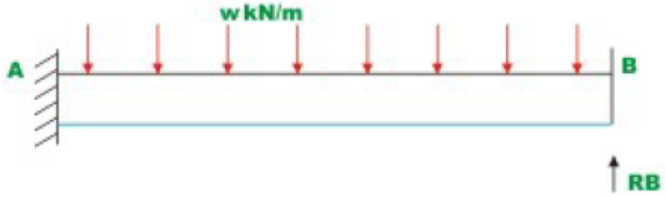


4. Check whether the following beam is statically determinate or not.

5. Determine the degree of statical indeterminacy



6. Determine the degree of statical indeterminacy



7. A four span continous beam has all simple supports.What is the static indeterminancy of the beam?

Unit 2-Slope deflection method

Cognitive level –Remember

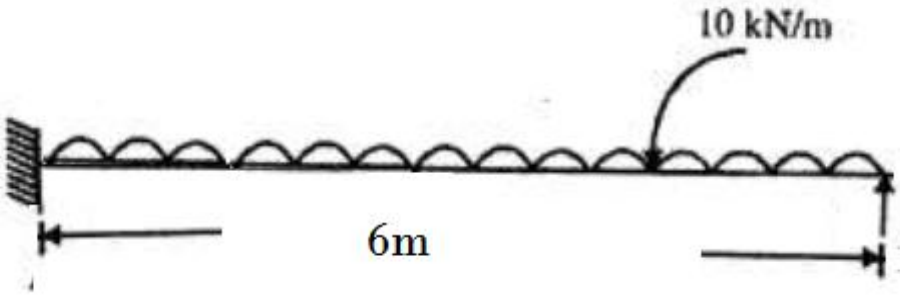
State the limitations of slope deflection method?
Write down the equilibrium equations used in slope deflection method?
What is the basic assumption made in slope deflection method?
Give the fixed end moment for the beam below a) full UDL b)centre point load c) 2 point load both l/3 distance from support
What is the moment at a hinged end of a simple beam?
Write down the slope deflection equation for fixed end support?
Write the general equations for finding out the moment in a beam AB by using slope deflection equation?
What are the quantities in terms of which the unknown moments are expressed in slope deflection method?
What is meant by distribution factor?
Who introduced slope-deflection method of analysis?
Define degree of freedom

Cognitive level –Understand

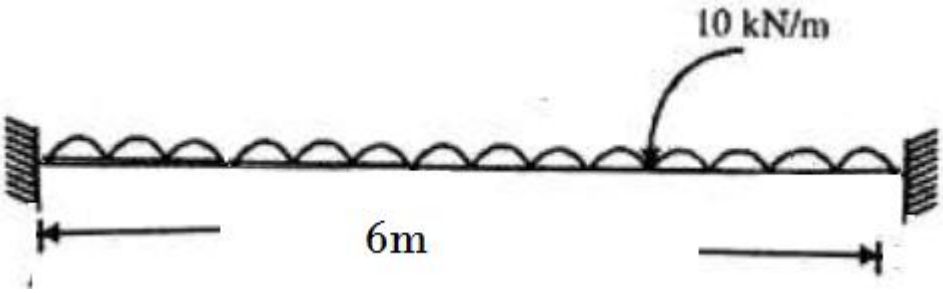
Say true or false and if false, justify your answer “slope deflection method is a force method”?
What are the reasons for sway in portal frames?
What are the sign conventions used in slope deflection method?
Why slope-deflection method is called a displacement method?
Mention any three reasons due to which sway may occur in portal frames?
Write the fixed end moments for a beam carrying a central clockwise moment?
What is the basis on which the sway equation is formed for a structure?
How many slope-deflection equations are available for each span?
What is the moment at a hinged end of a simple beam?
.

Cognitive level –Application

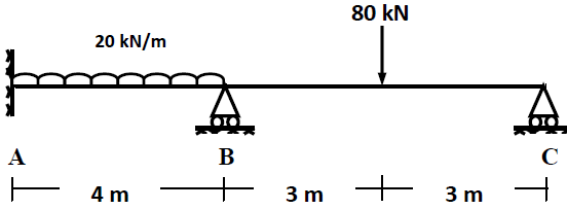
4. Analyse the Proped beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



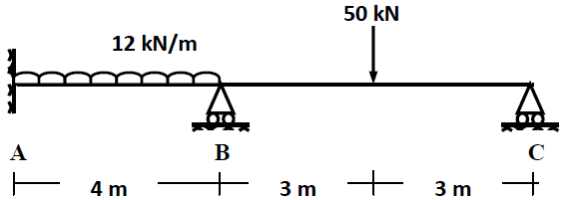
5. Analyse the Fixed beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



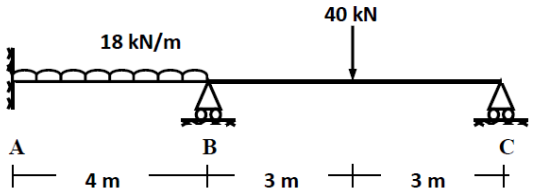
6. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



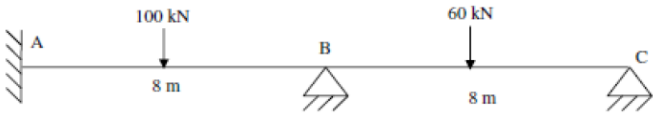
7. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



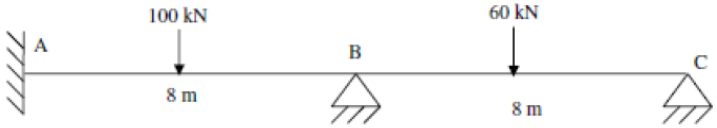
8. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



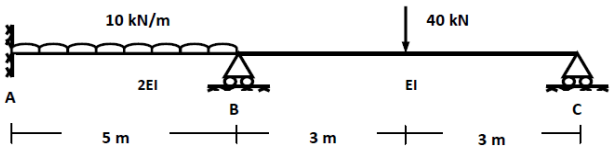
9. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



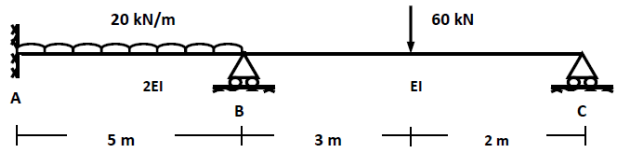
10. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



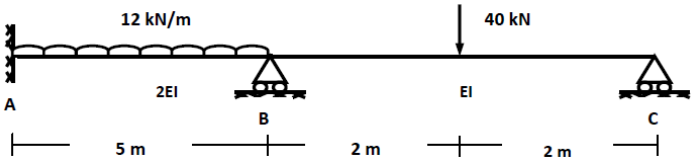
11. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



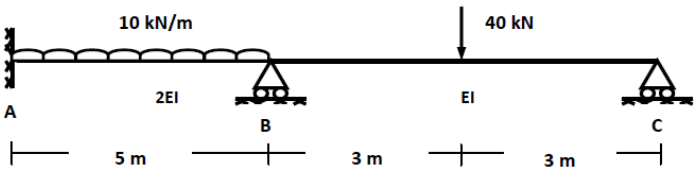
12. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



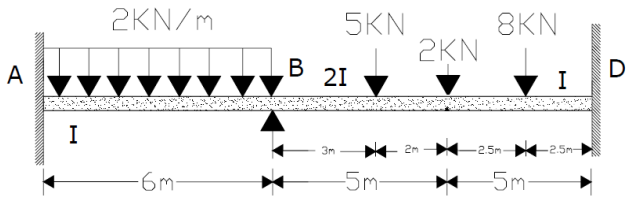
13. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



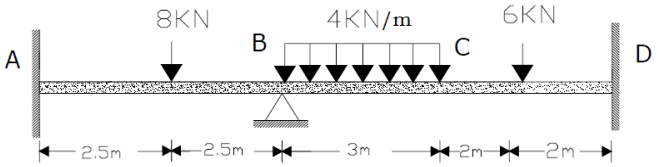
14. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



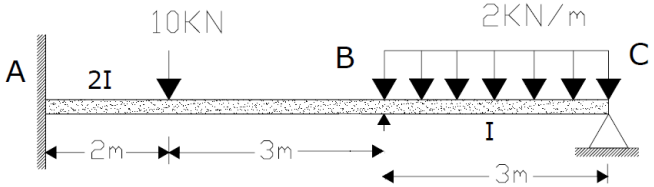
15. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



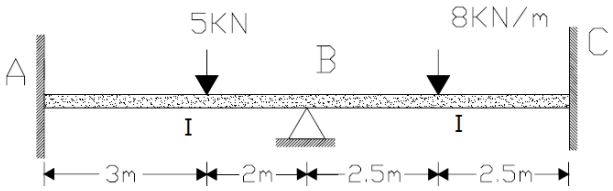
16. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



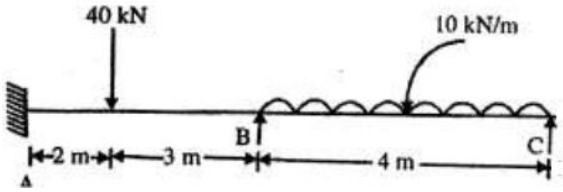
17. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



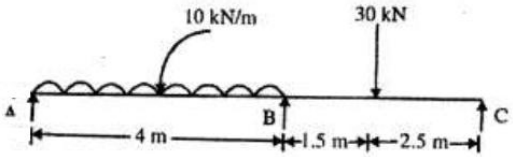
18. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



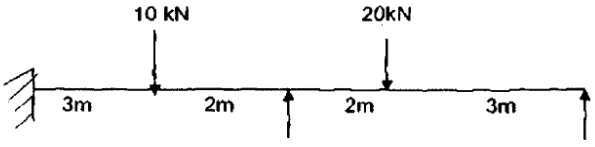
19. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



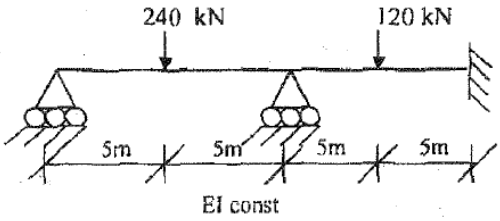
20. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



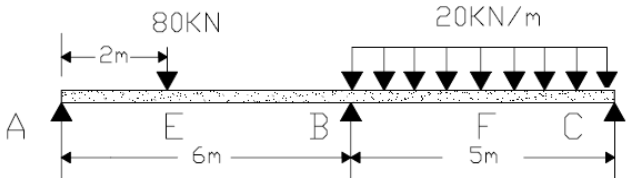
21. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



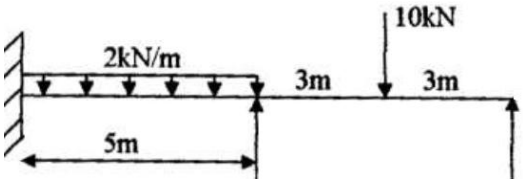
22. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



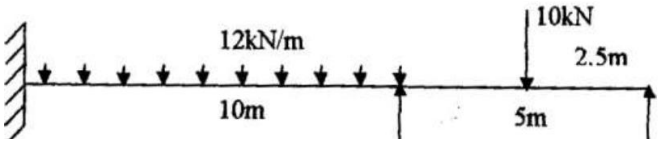
23. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



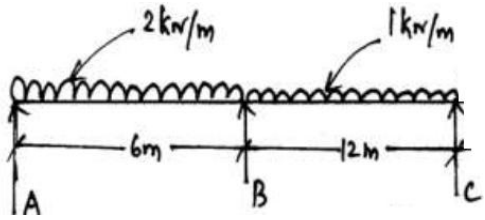
24. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



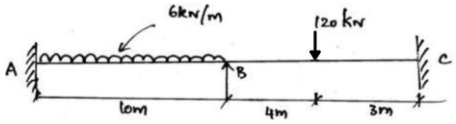
25. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



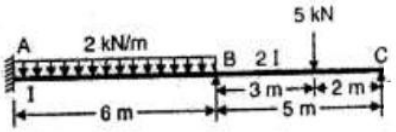
26. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



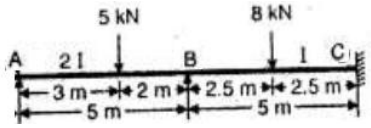
27. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



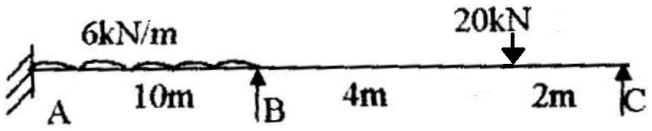
28. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



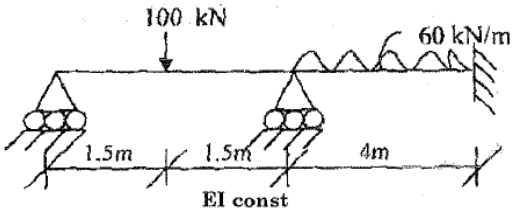
29. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



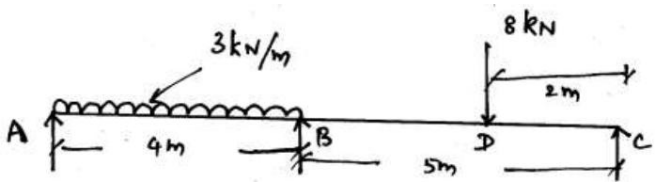
30. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



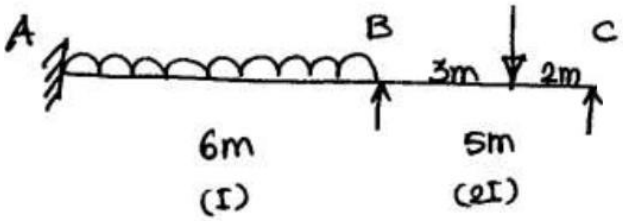
31. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



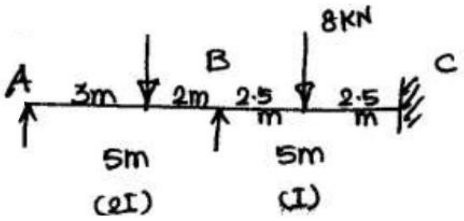
32. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



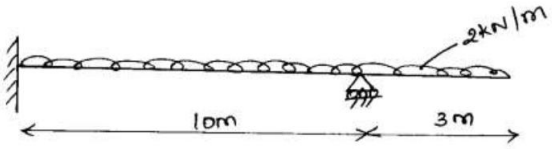
33. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



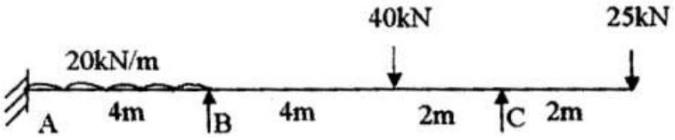
34. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



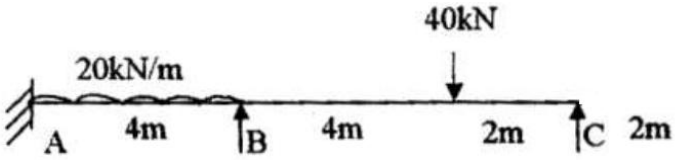
35. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



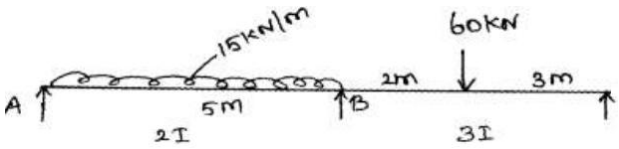
36. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



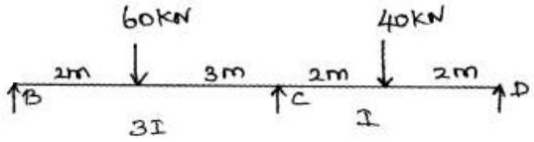
37. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



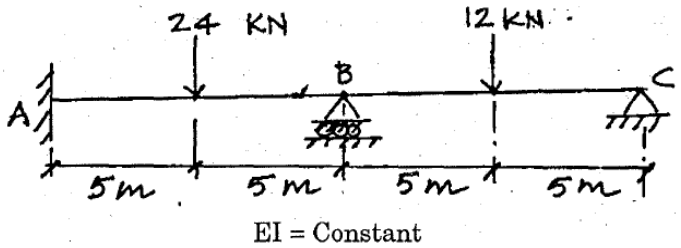
38. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



39. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

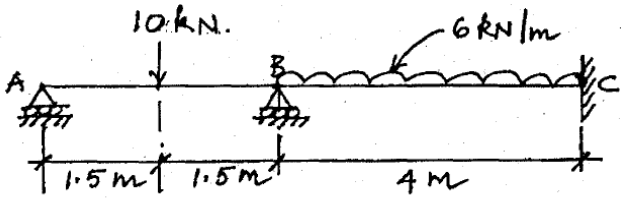


40. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



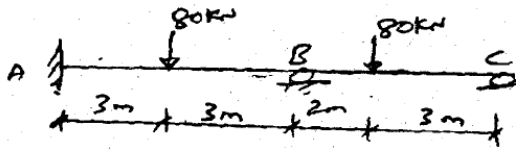
EI = Constant

41. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

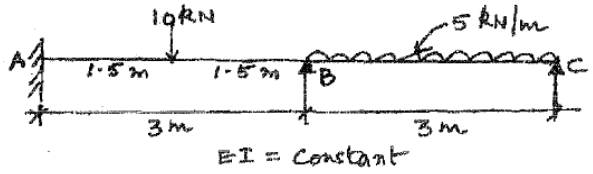


EI = Constant

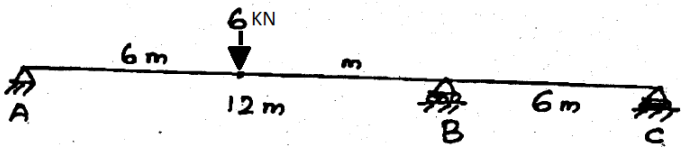
42. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



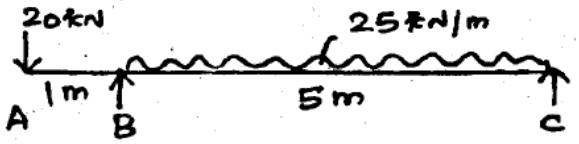
43. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



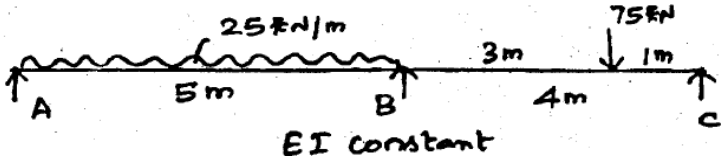
44. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



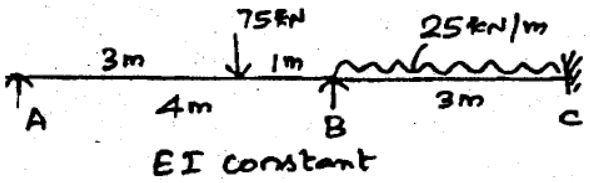
45. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



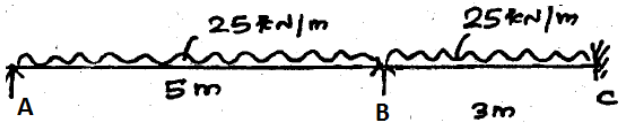
46. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



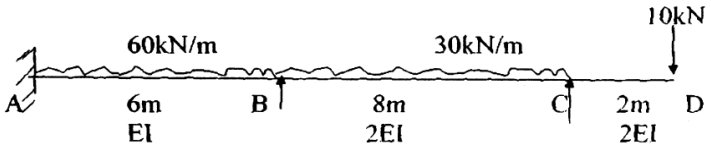
47. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



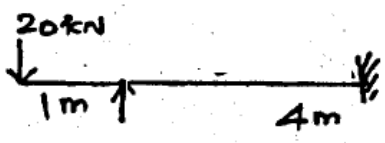
48. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



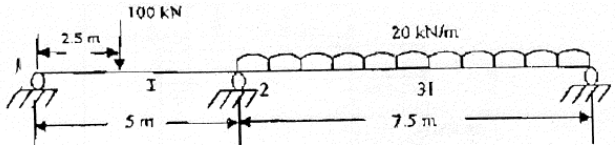
49. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



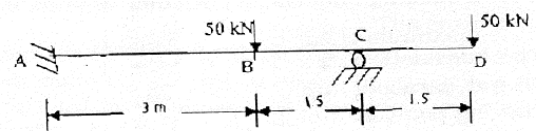
50. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



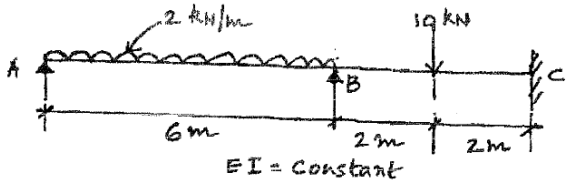
51. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



52. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

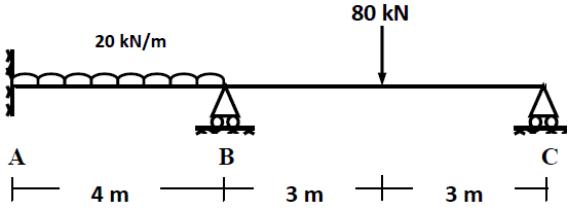


53. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

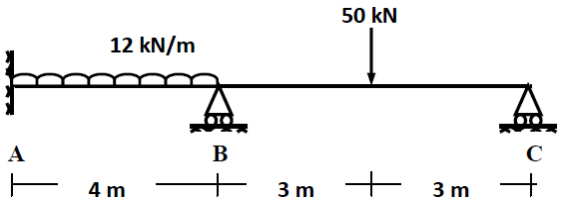


Unit 3- Moment Distribution Method.
Cognitive level –Remember 1. Explain carry over factor and distribution factor. 2. Define: Continuous beam? 3. Define Stiffness? 4. Define: Moment distribution method (Hardy Cross method) 5. Define: Distribution factor 6. Define: Stiffness factor 7. Define: Flexural Rigidity of Beams 8. Define sway 9. What is carry over moment?
Cognitive level –Understand 1. What are the advantages of continuous beams over simply supported beams? 2. State how the redundancy of a rigid frame is calculated? 3. Explain carry over factor and distribution factor? 4. Give the relative stiffness when the far end is (a) Simply supported and (b) Fixed. 5. What are the situations where in sway will occur in portal frames? 6. Find the distribution factor for the given beam? 7. What is the sum of distribution factors at a joint? **8.** Write the distribution factor for a given beam?
Cognitive level –Application

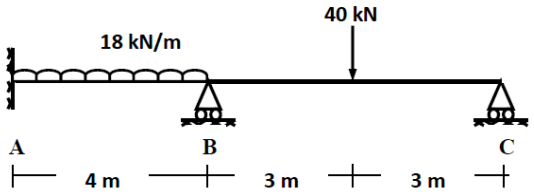
1. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



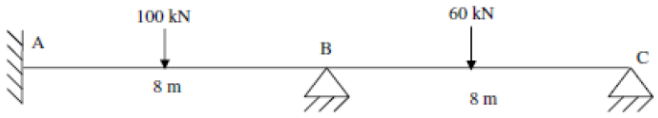
2. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



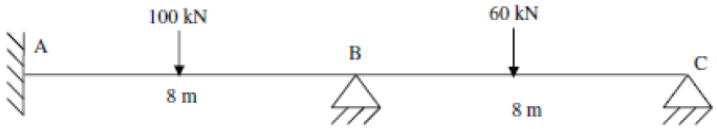
3. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



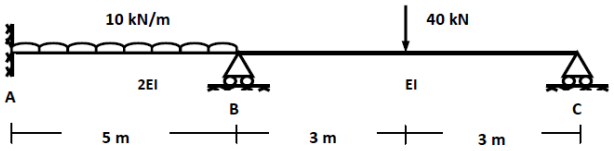
4. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



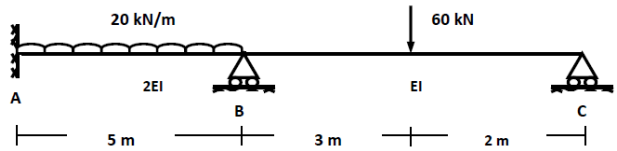
5. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



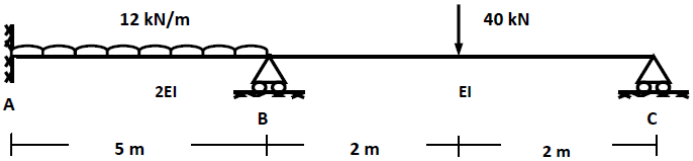
6. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



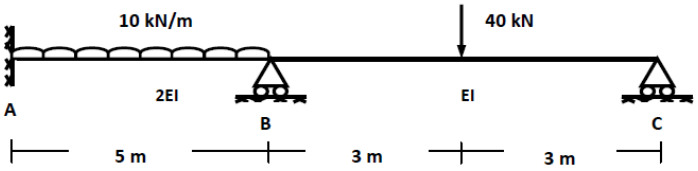
7. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



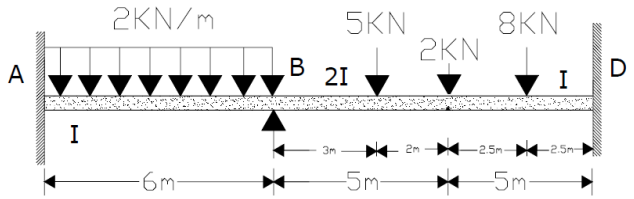
8. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



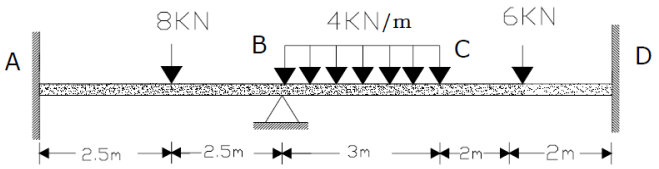
9. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



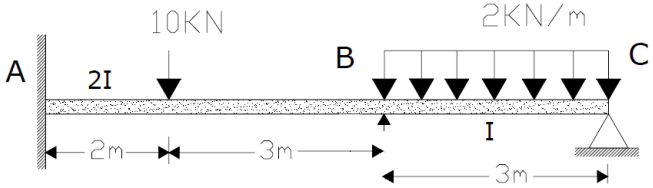
10. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



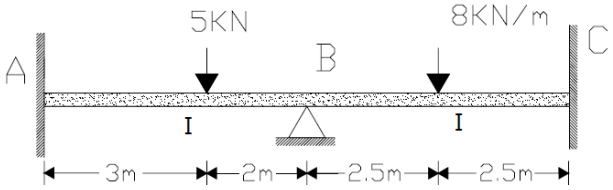
11. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



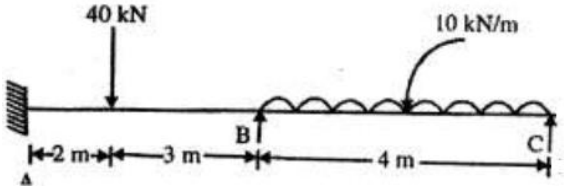
12. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



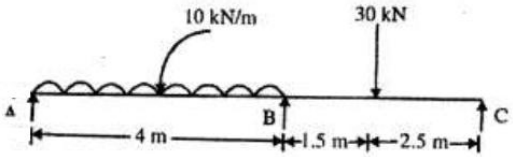
13. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



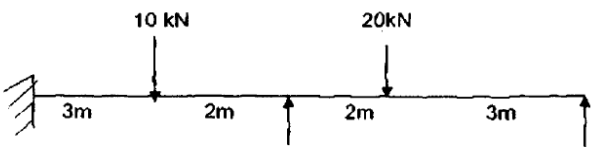
14. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



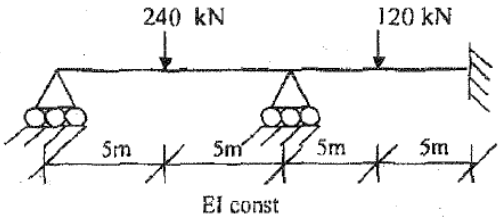
15. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



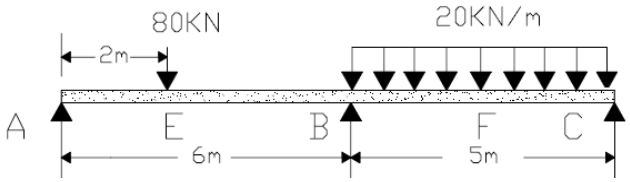
16. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



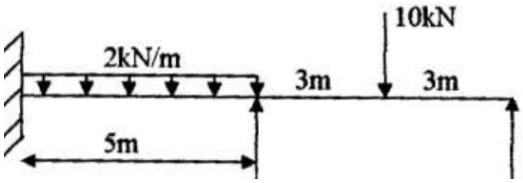
17. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



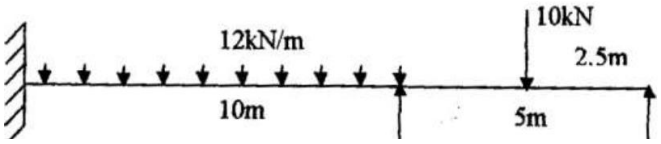
18. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



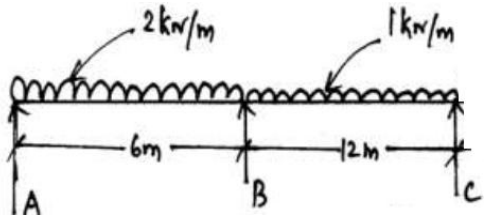
19. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



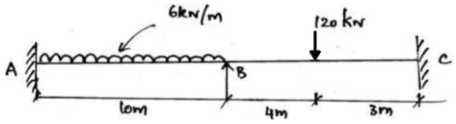
20. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



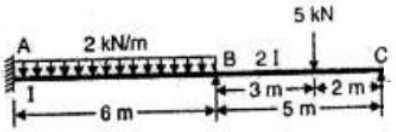
21. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



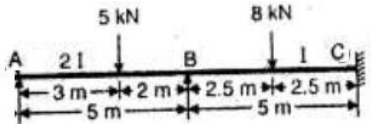
22. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



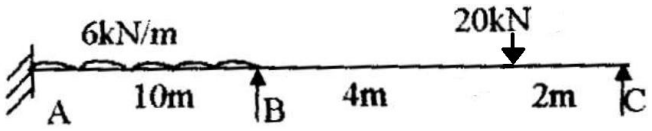
23. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



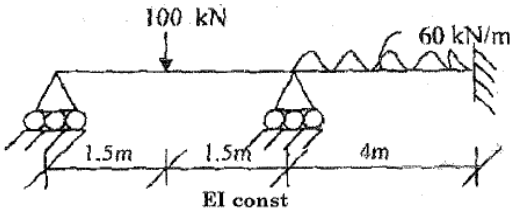
24. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



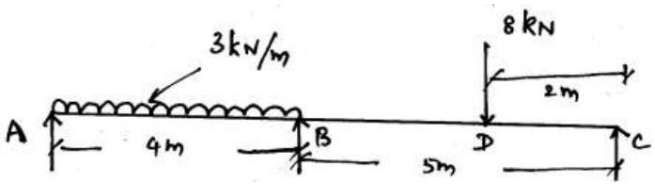
25. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



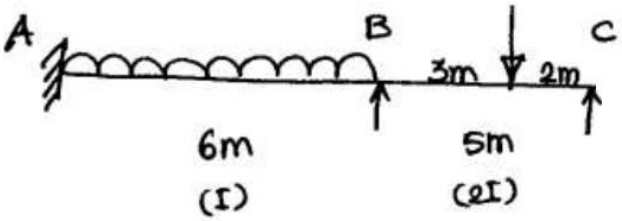
26. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



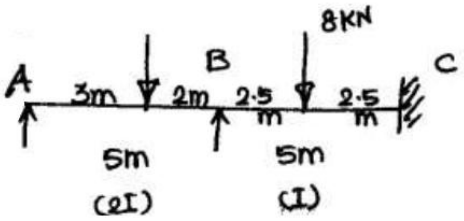
27. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



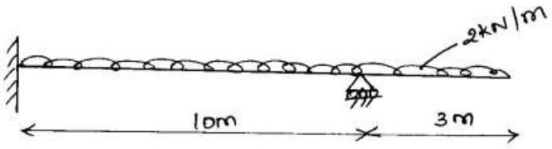
28. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



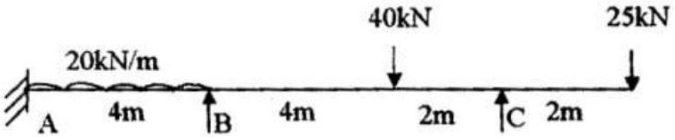
29. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



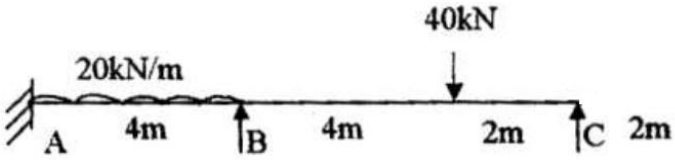
30. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



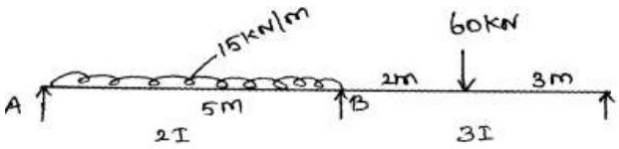
31. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



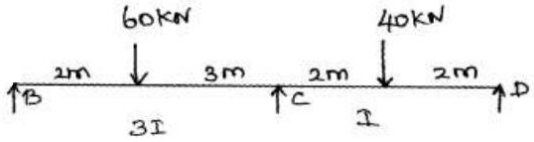
32. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



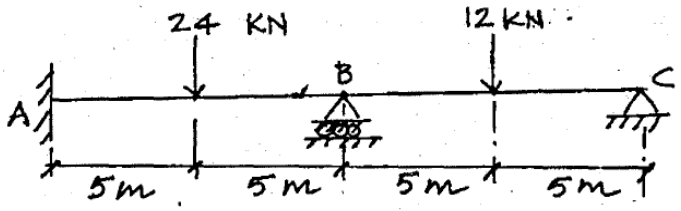
33. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



34. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.

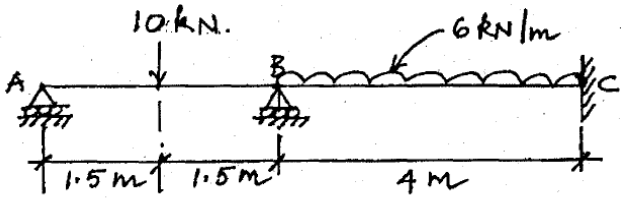


35. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



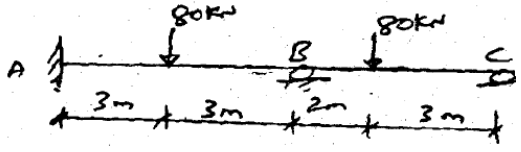
EI = Constant

36. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.

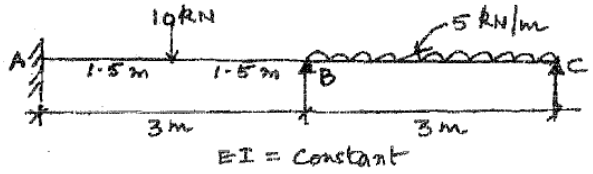


EI = Constant

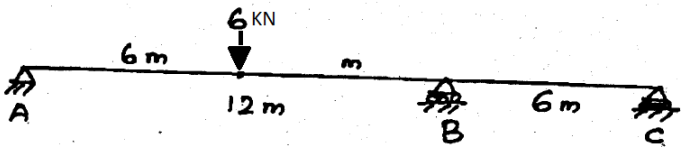
37. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



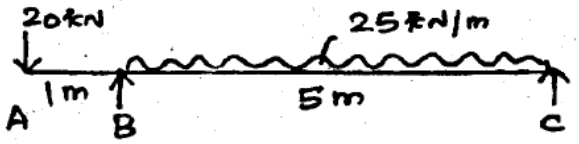
38. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



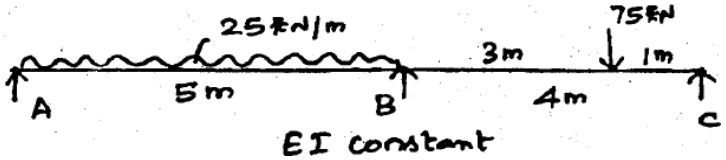
39. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



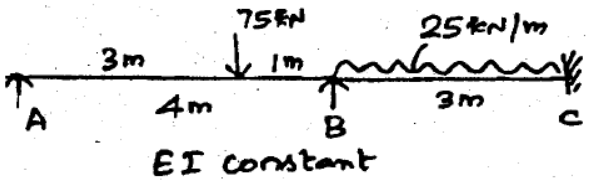
40. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



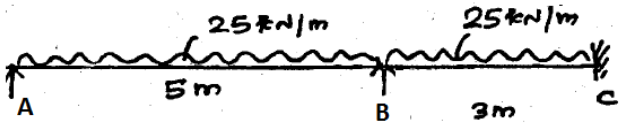
41. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



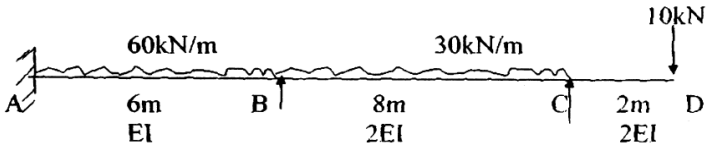
42. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



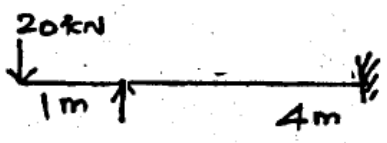
43. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



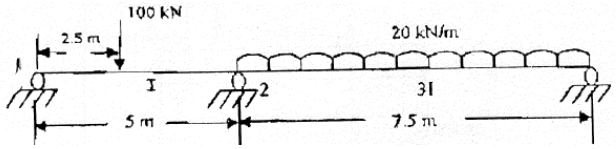
44. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



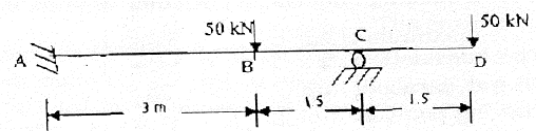
45. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



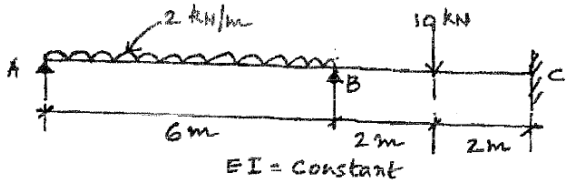
46. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



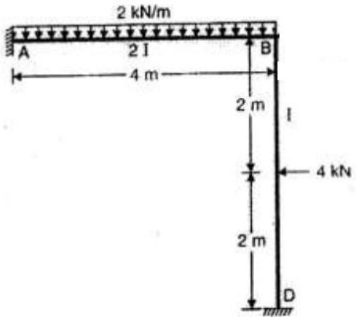
47. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



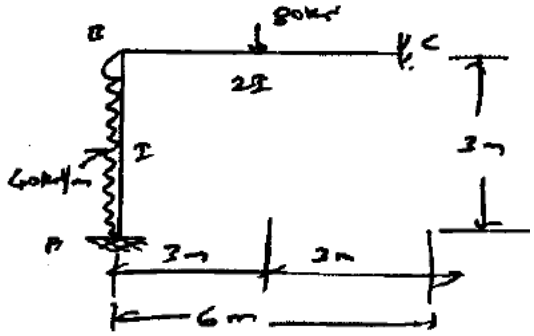
48. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



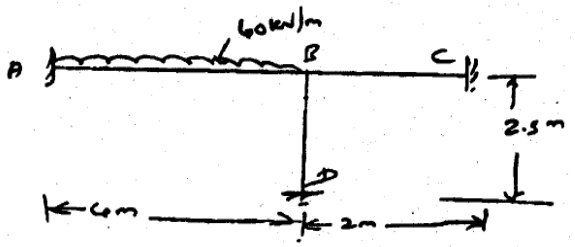
1. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



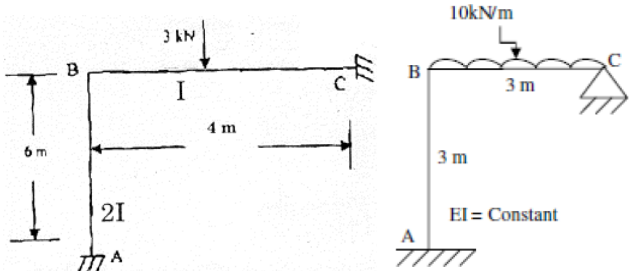
2. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



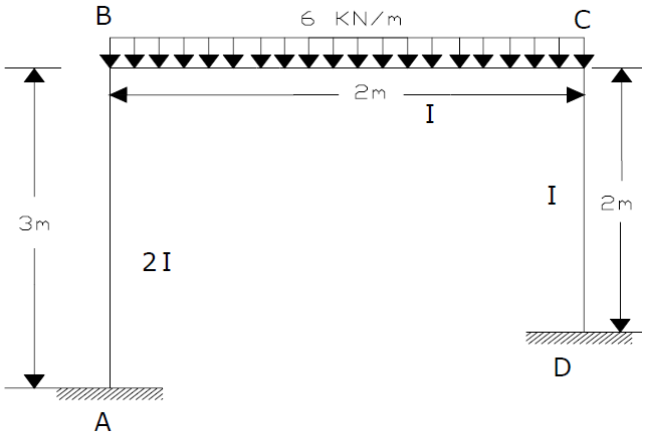
3. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



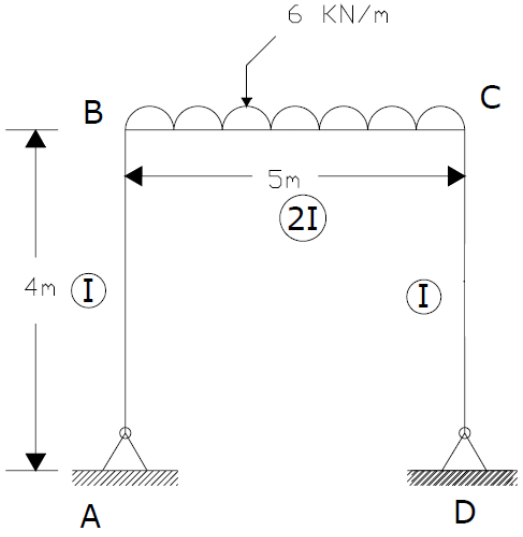
4. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



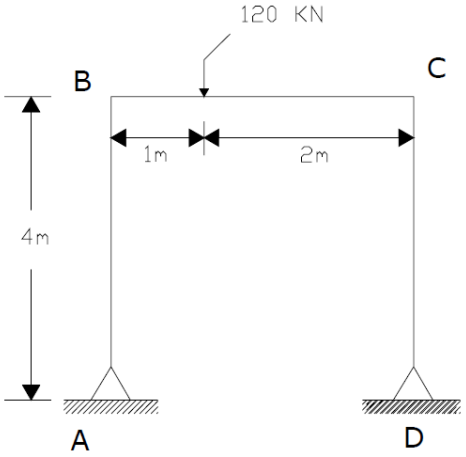
5. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



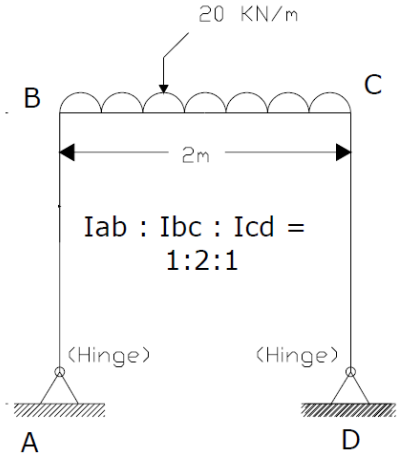
6. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



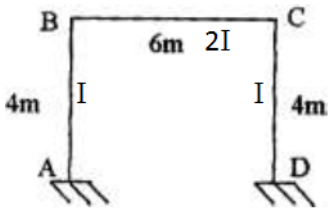
7. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



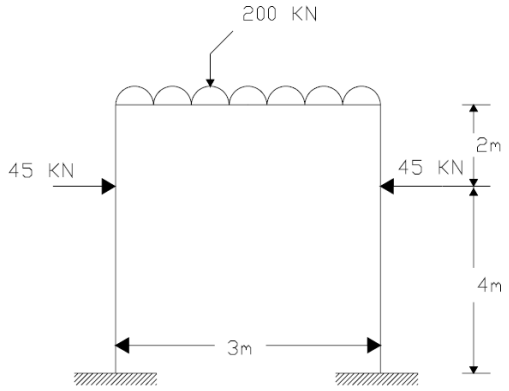
8. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



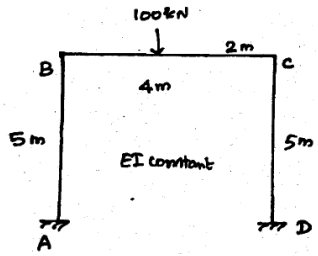
9. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



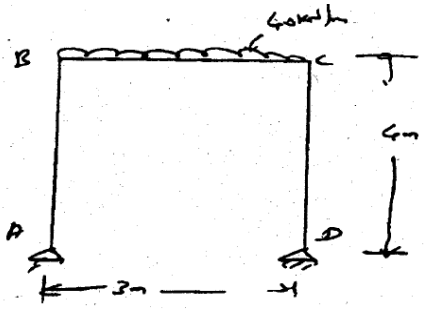
10. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



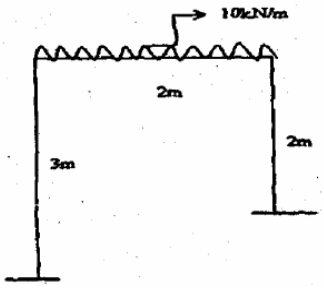
11. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



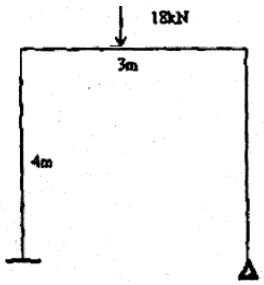
12. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



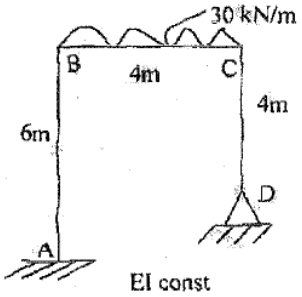
13. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



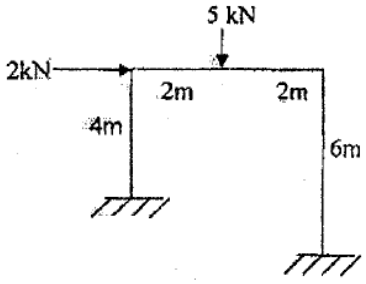
14. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



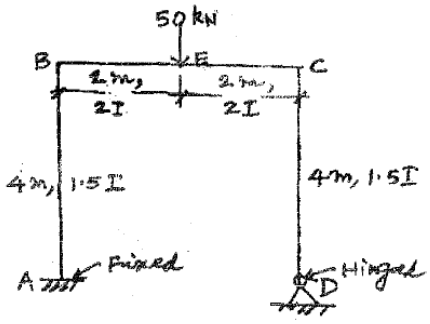
15. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



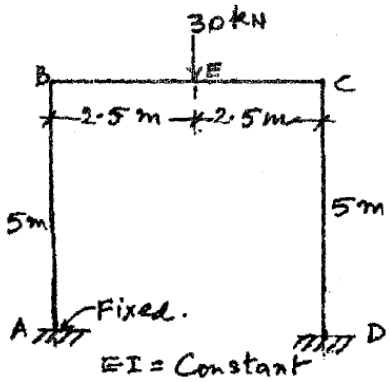
16. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



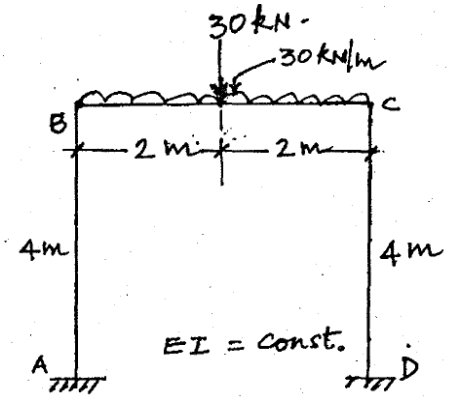
17. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



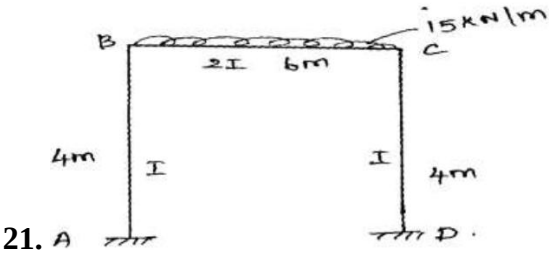
18. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



19. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

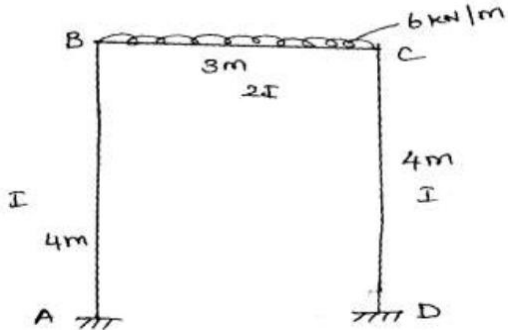


20. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

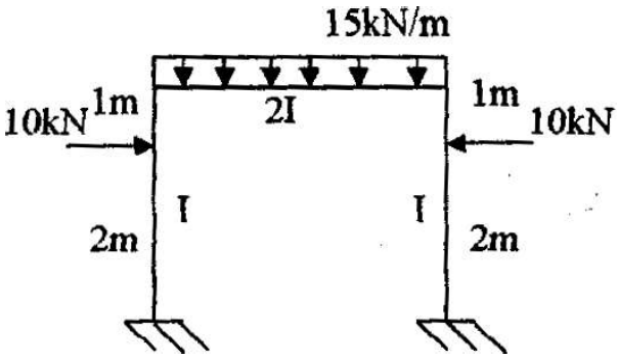


21.

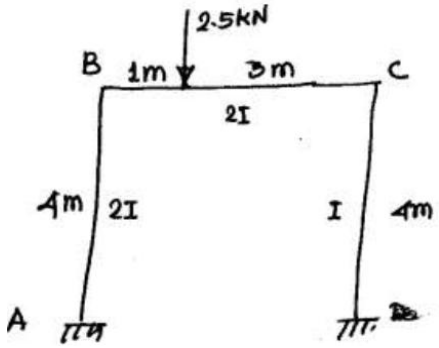
22. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



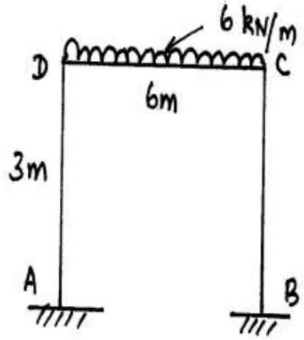
23. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



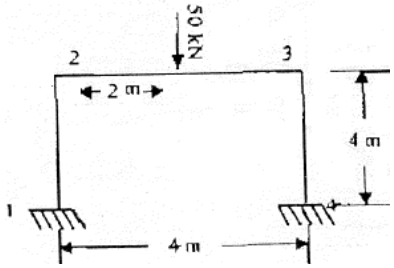
24. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



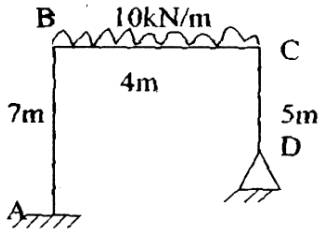
25. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

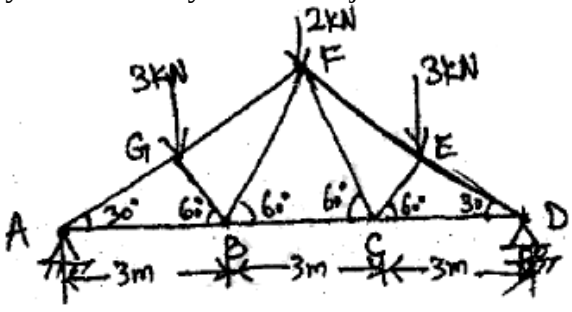
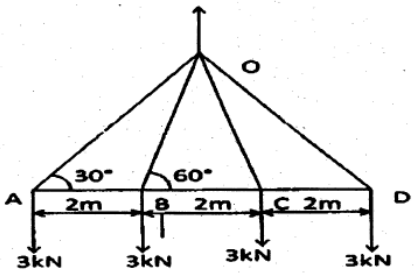
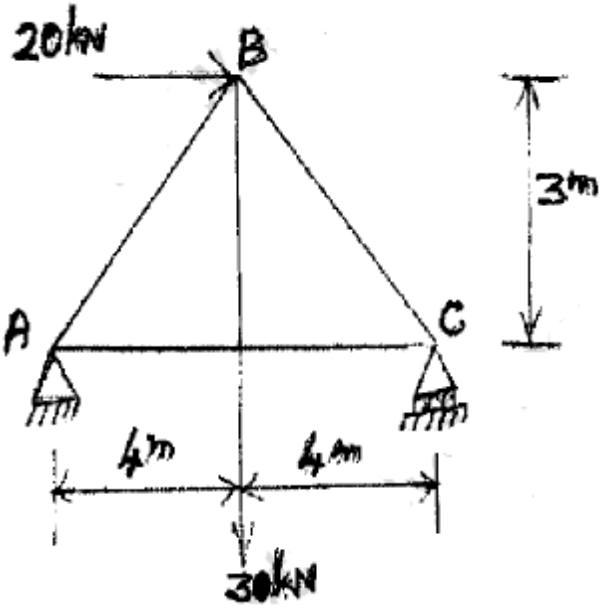


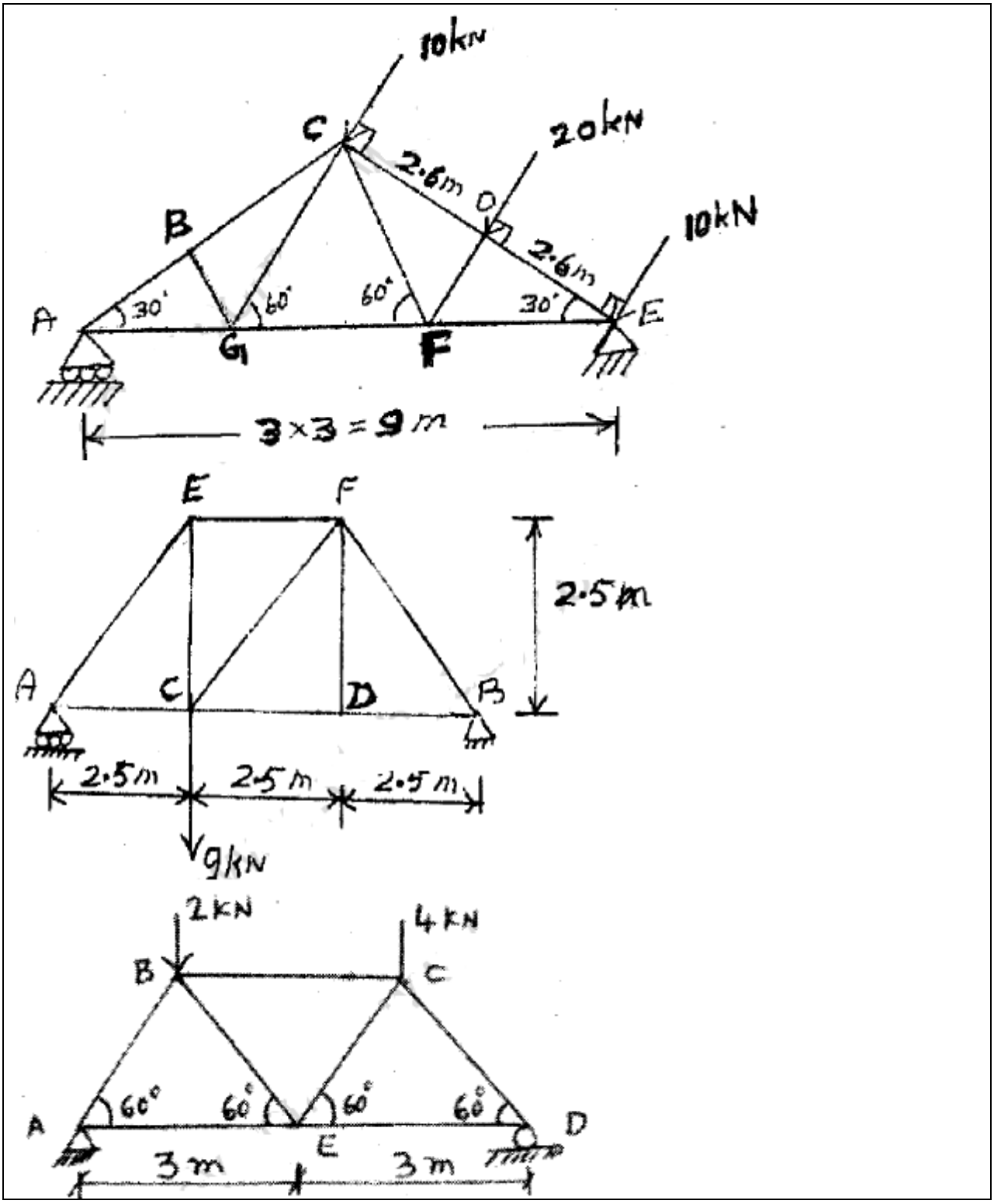
26. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

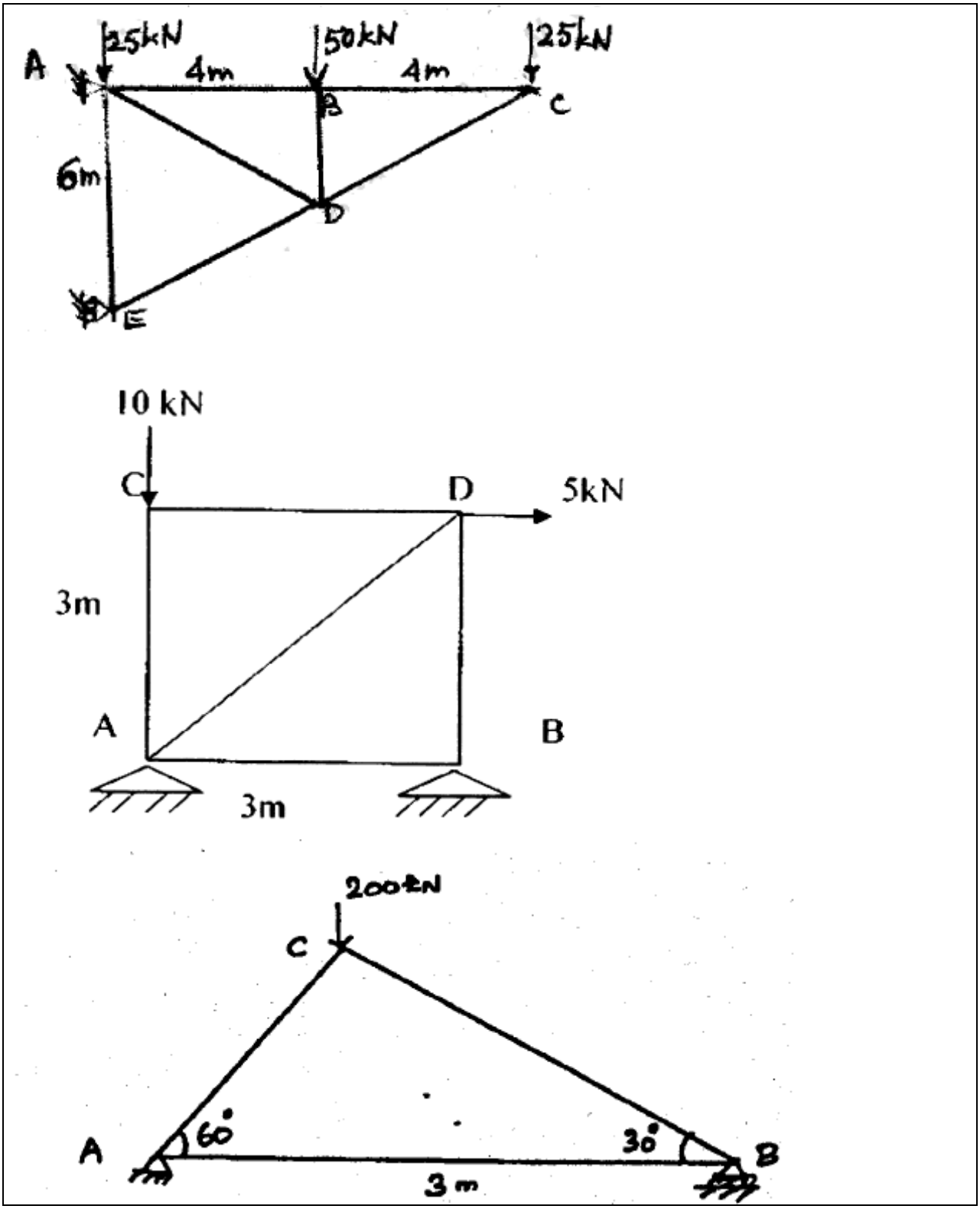


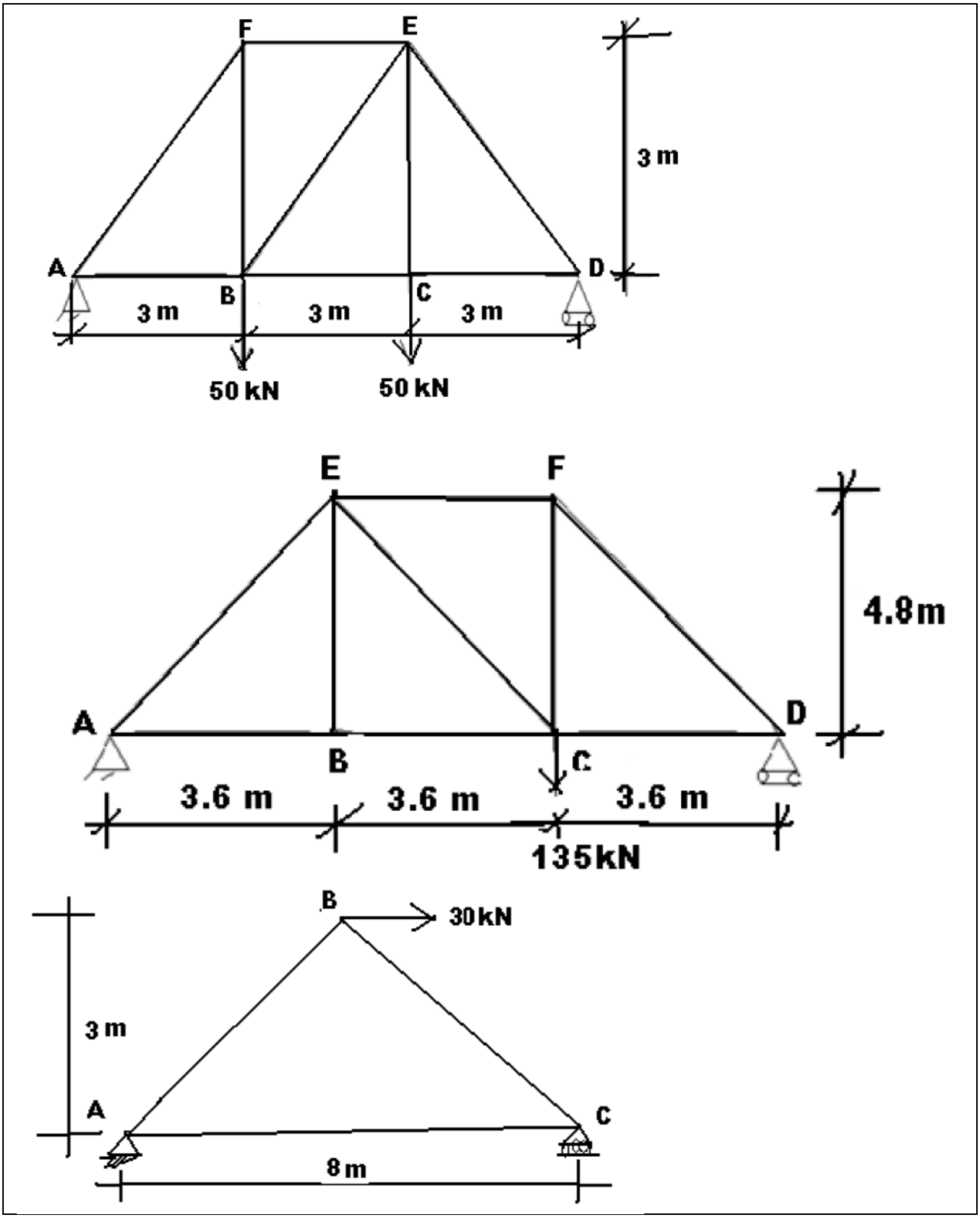
27. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

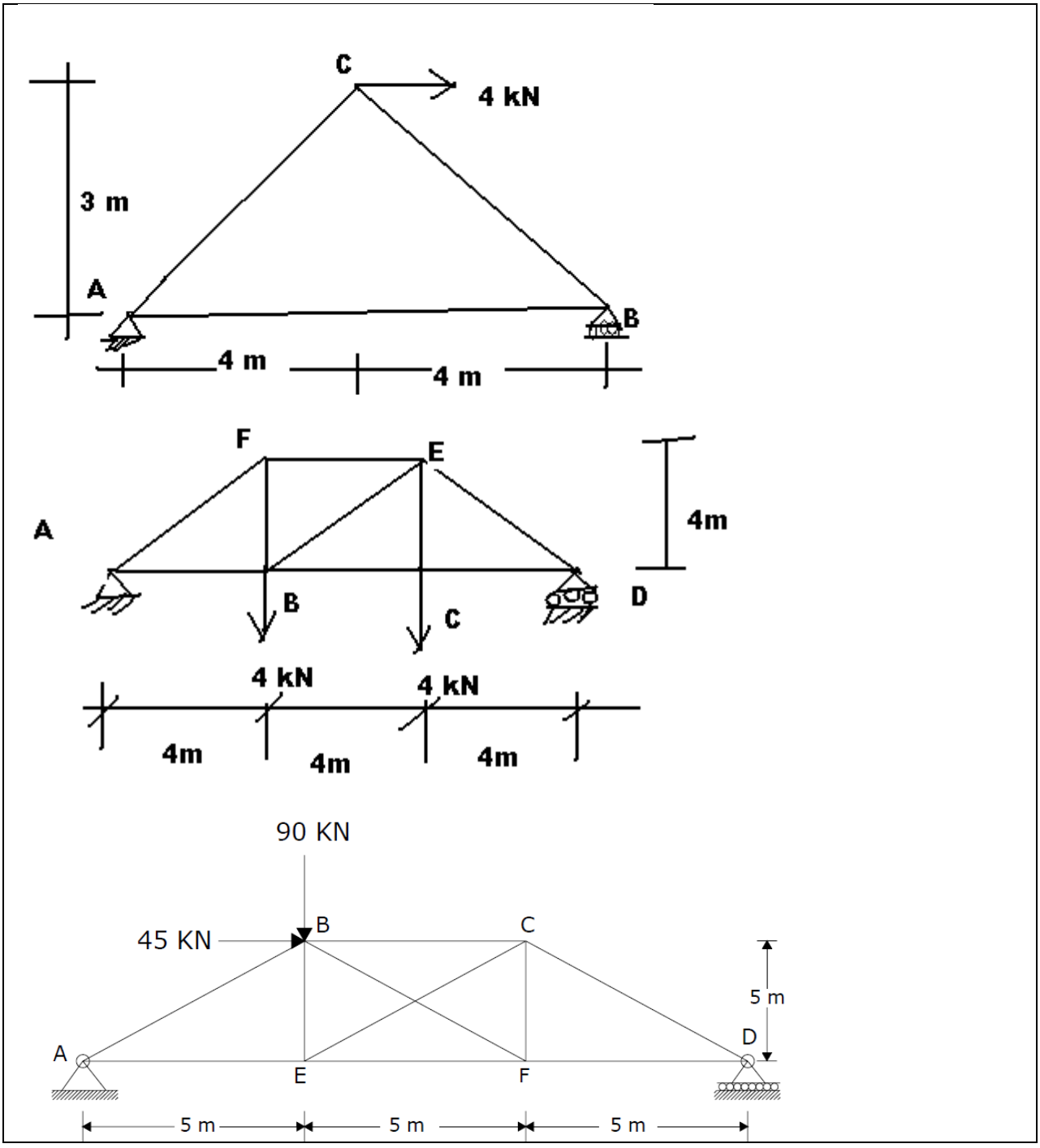


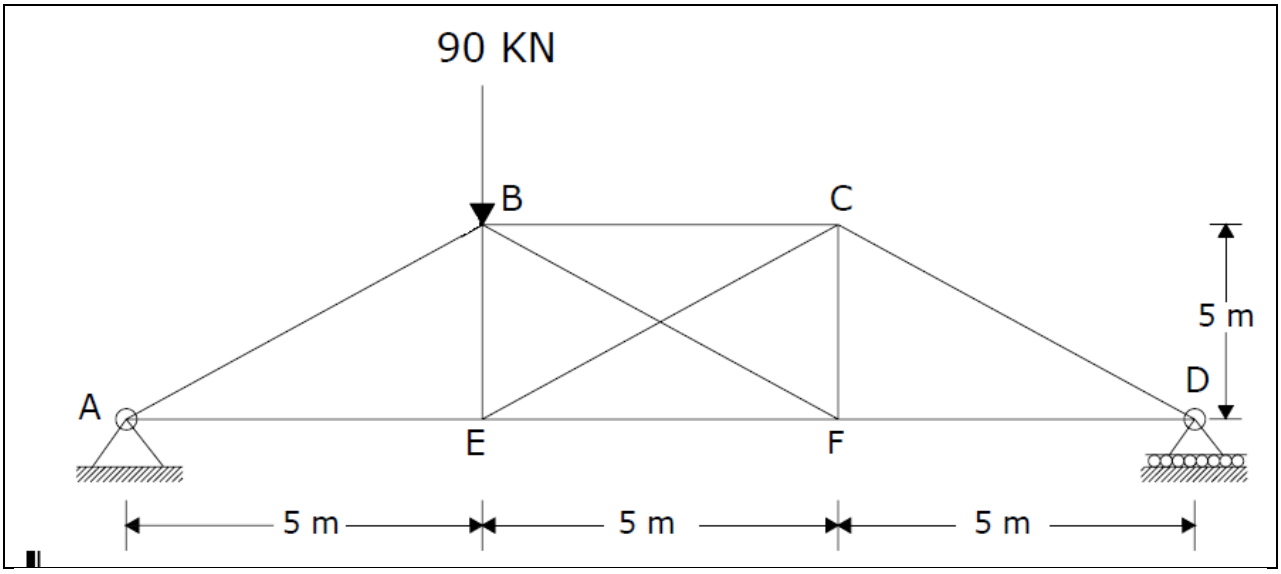
Unit 4
Cognitive level –Remember **Mention the types of truss**
Cognitive level –Understand 1. Write the assumption made in the pin jointed plane truss
Cognitive level –Application Analyse the truss by method of joints and indicate the member of forces with neat sketch       


10kN
C
20kN
2.6m
D
10kN
B
2.6m
A
30°
60°
60°
30°
E
G
F
3×3 = 9 m
E
F
2.5m
A
C
D
B
2.5m
2.5m
2.5m
g kN
2kN
4kN
B
C
A
60°
60°
60°
60°
D
E
3m
3m


25kN
50kN
25kN
A
4m
4m
B
C
6m
D
E
10 kN
C
D
5kN
3m
A
B
3m
200kN
C
60°
30°
A
B
3 m


F
E
3 m
A
B
C
D
3 m
3 m
3 m
50 kN
50 kN
E
F
4.8m
A
B
C
D
3.6 m
3.6 m
3.6 m
135kN
B
30kN
3 m
A
C
8 m


C
4 kN
3 m
A
B
4 m
4 m
F
E
A
4m
B
C
D
4 kN
4 kN
4m
4m
4m
90 KN
45 KN
B
C
5 m
D
A
E
F
5 m
5 m
5 m


90 KN
B
C
5 m
D
A
E
F
5 m
5 m
5 m