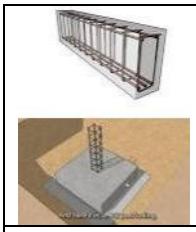
Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru



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)

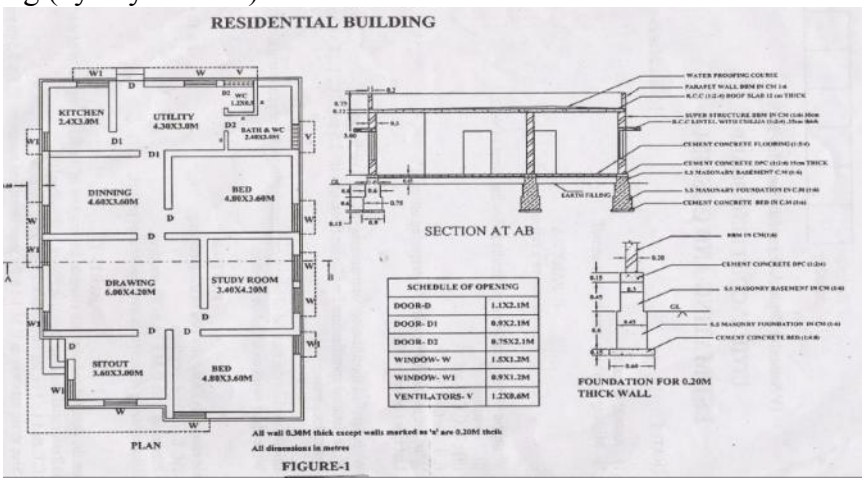


FIGURE-1

-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

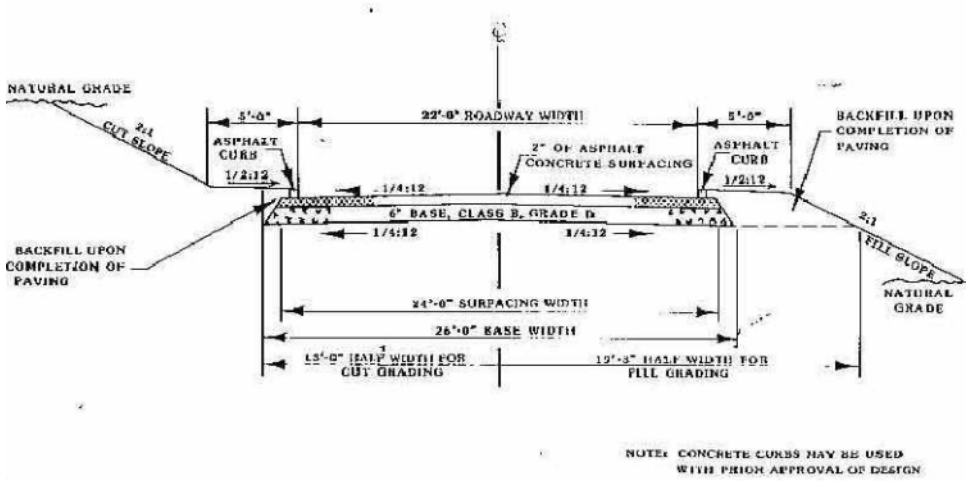
5. Estimate the quantity of earthwork for the portion of a road between chainages 0 to 10 from the following data, lengths being measured with a standard 20m chain.

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.

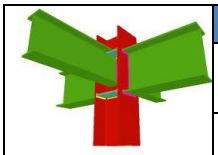
Jargon

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.

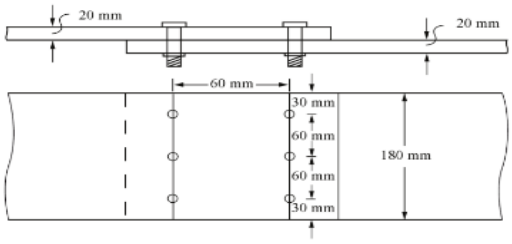


Figure 3.16

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

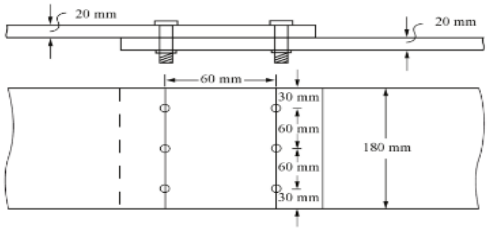
Cognitive Level: Remembering
1. State the advantages and disadvantages of steel as a structural material?
2. What are the types of structural steel?
3. What are the different types of loads acting on the steel structures?
4. What is meant by Limit state design?
5. State different limit states.
6. What 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.

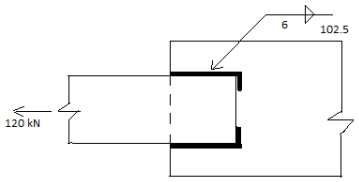
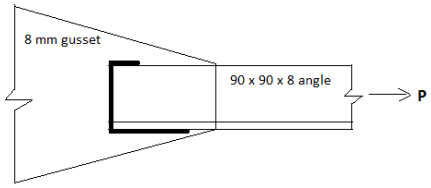
2	Find the efficiency of the lap joint shown in figure. Given M20 bolts of grade 4.6 and Fe 410 plates.  **Figure 3.16**

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

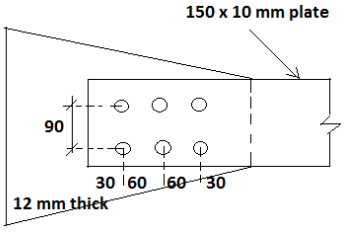
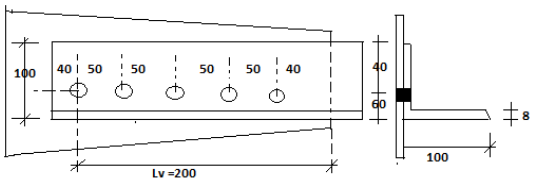
Cognitive Level: Application & Analysis	
1	Calculate the moment carrying capacity of a laterally restrained simply supported beam with ISMB 400 section for a length of 3 meters
2	Calculate the load carrying capacity of laterally restrained simply supported beam with ISMB 500 section for a length of 4 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.

	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.

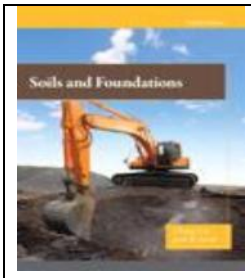
5. Write a note on traffic capacity of roads.
6. What are the advantages and disadvantages of traffic signals?
7. What are the usual forms of road markings?
8. Why are street lights necessary? Mention the usual types of street lights.

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

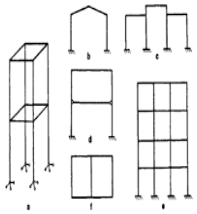
CO5: To understand the phenomena of Impacts on environment		
Remember	**Application**	**Understand**

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:

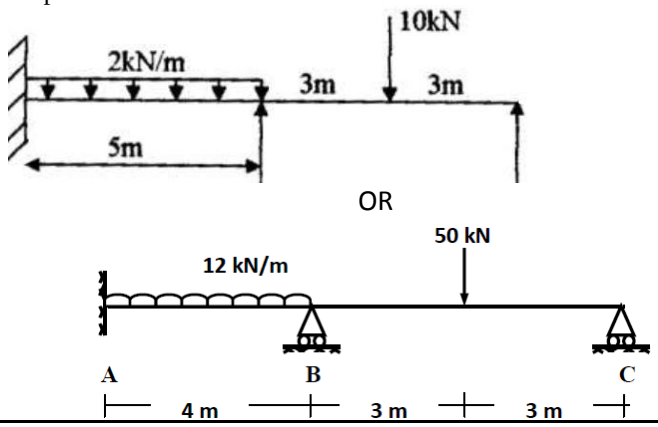
Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	23%
2	Applying the knowledge acquired from the course	41%
3	Analysis	36%
4	Synthesis (Creating new knowledge)	0%
5	Evaluation	0%

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.

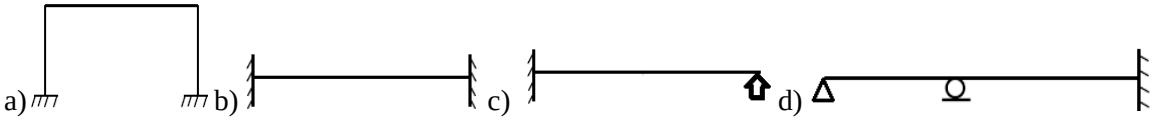
12. Elementary Structural analysis, Norris and Wilbur, International student edition, Tata McGraw Hill book Co, New York.
13. Structural Analysis by R C Hibler, 5th edition, Pearson Education Inc.
14. J. Sterling Kinney, "Indeterminate Structural Analysis", Oxford and Publishing Co.
15. Noris C.H., Wilbur 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

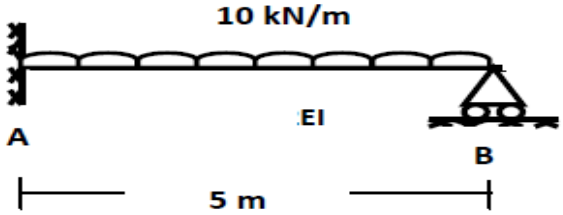
Time: 3hours **THEORY OF STRUCTURES** Max.marks:100

Answer any five full question 20 x 5= 100

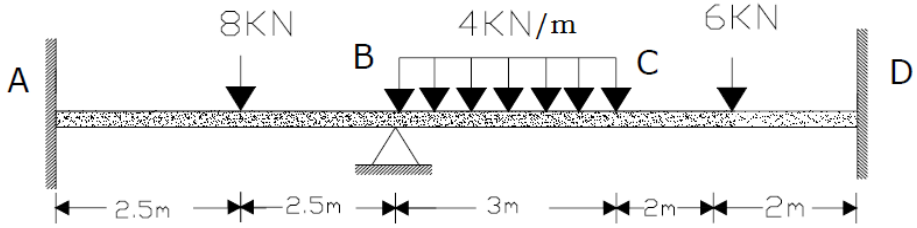
1. a)State Conditions of equilibrium b)Define redundant force
   c)Mention the difference between Static and Kinematic indeterminacy with exmples
2. Find degree of indeterminacy of structures as given below



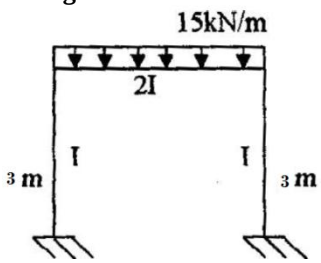
3. a) Give the fixed end moment for the beam below 1) full UDL 2)centre point load
   b) Analyse the proped beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



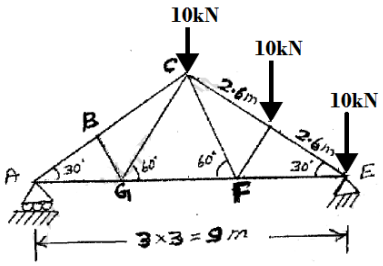
4. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



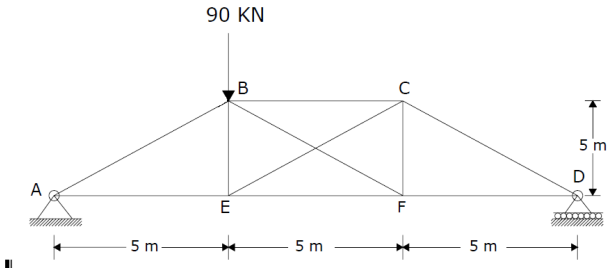
5. Analyse the beam as shown in **Figure** above (same of Q4) and draw BMD. Use Moment distrubution Method
6. Analyse the Portal frame as shown in **Figure below a**nd draw BMD. Use Moment distrubution Method



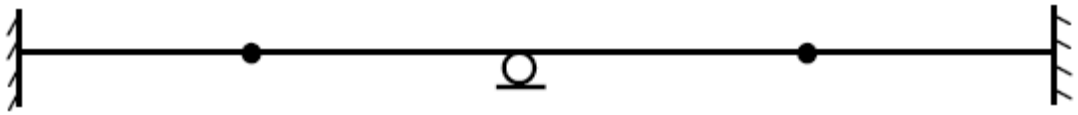
7. Analyse the truss by method of joints and indicate the member of forces with neat sketch

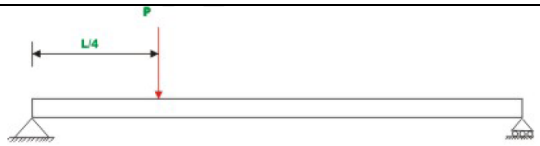


8. Analyse the truss by method of joints and indicate the member of forces with neat sketch



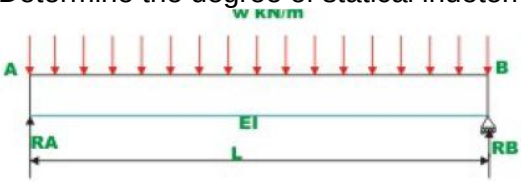
Model Questions Bank

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.

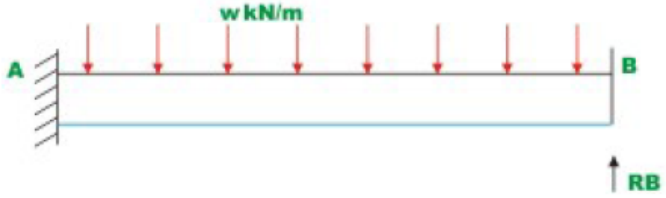


4. Check whether the following beam is statically determinate or not.

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

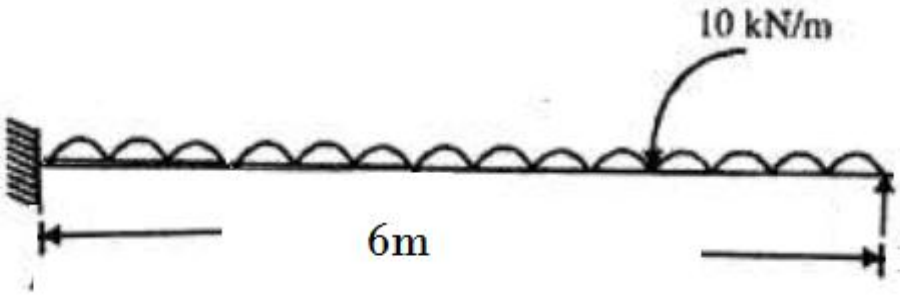
State the limitations of slope deflection method?
Write down the equilibrium equations used in slope deflection method?
What is the basic assumption made in slope deflection method?
Give the fixed end moment for the beam below a) full UDL b)centre point load c) 2 point load both l/3 distance from support
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

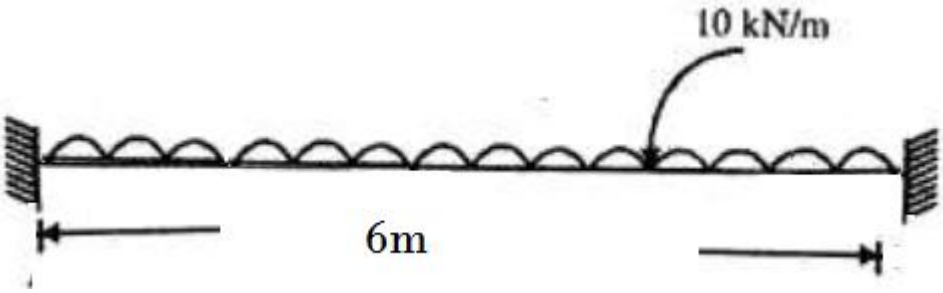
Say true or false and if false, justify your answer “slope deflection method is a force method”?
What are the reasons for sway in portal frames?
What are the sign conventions used in slope deflection method?
Why slope-deflection method is called a displacement method?
Mention any three reasons due to 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

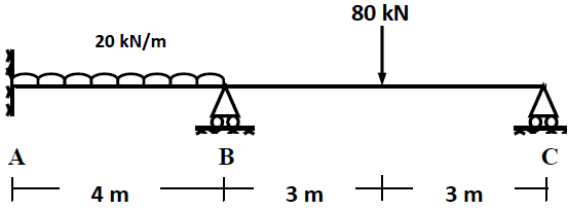
4. Analyse the Proped beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



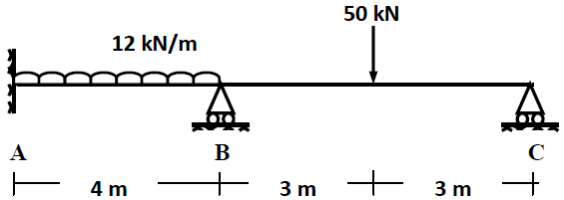
5. Analyse the Fixed beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



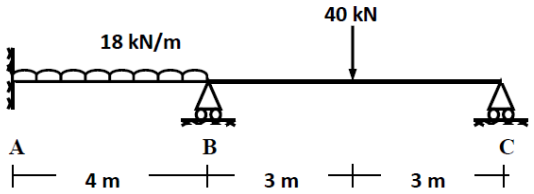
6. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



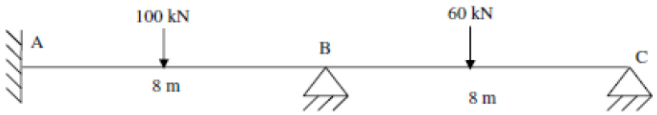
7. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



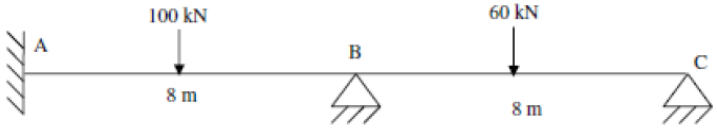
8. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



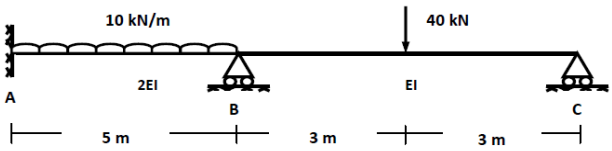
9. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



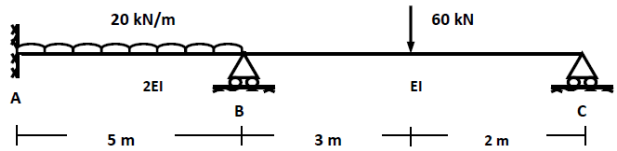
10. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



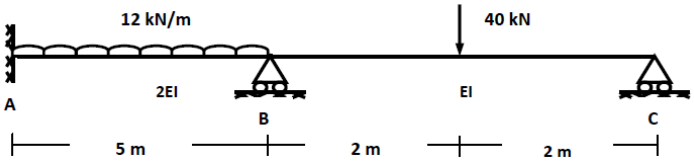
11. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



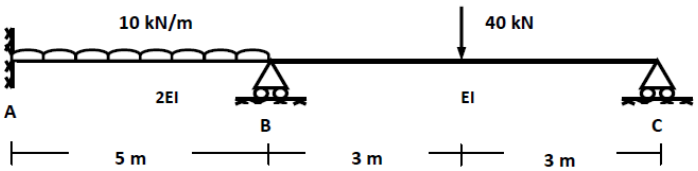
12. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



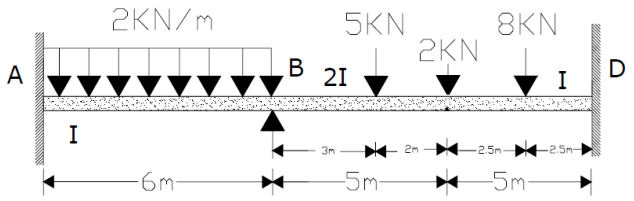
13. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



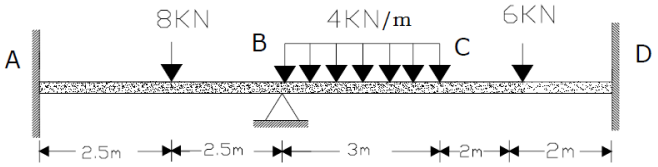
14. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



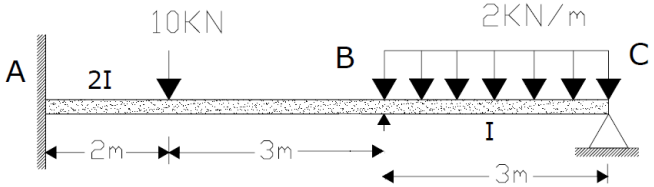
15. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



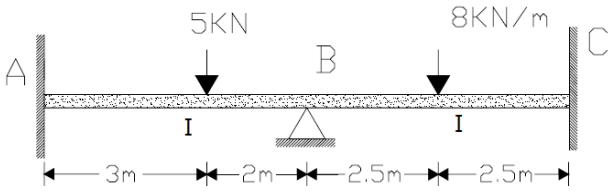
16. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



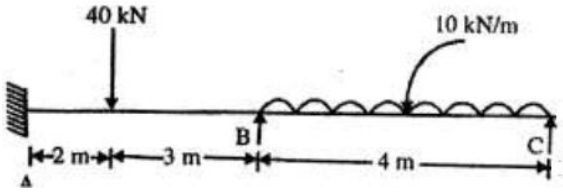
17. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



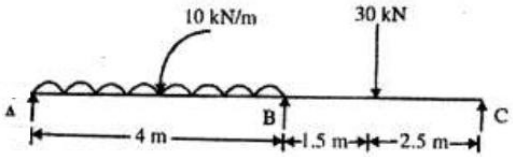
18. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



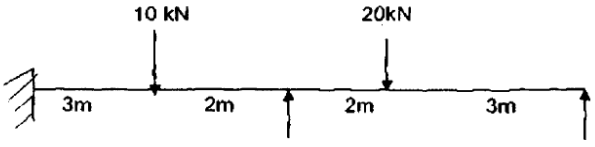
19. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



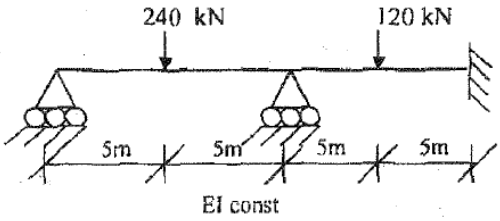
20. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



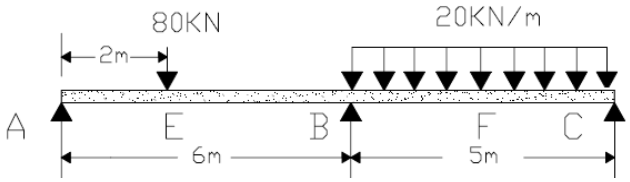
21. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



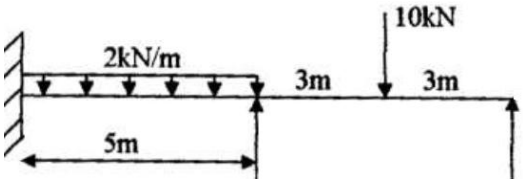
22. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



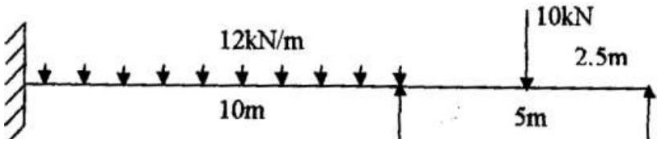
23. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



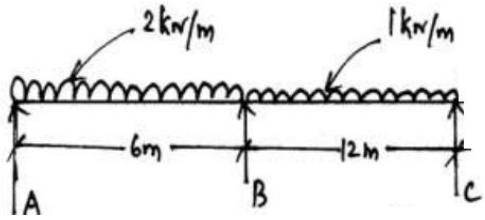
24. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



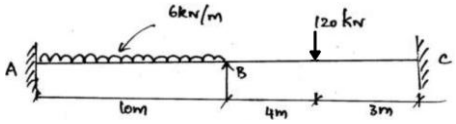
25. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



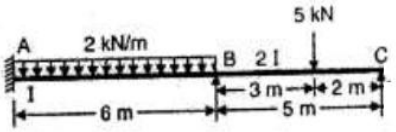
26. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



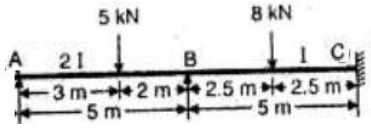
27. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



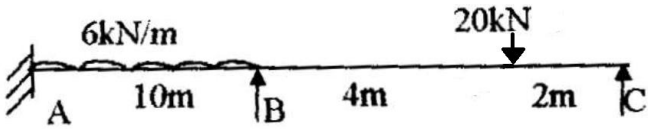
28. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



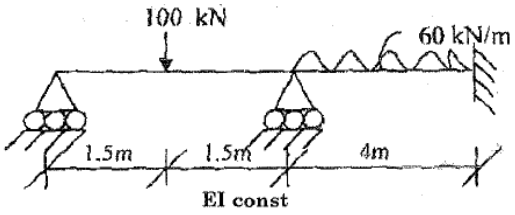
29. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



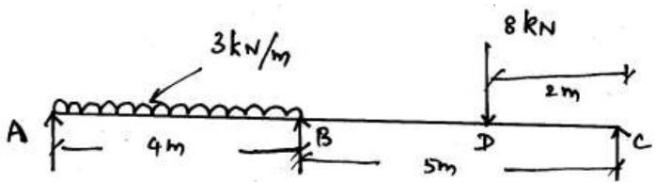
30. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



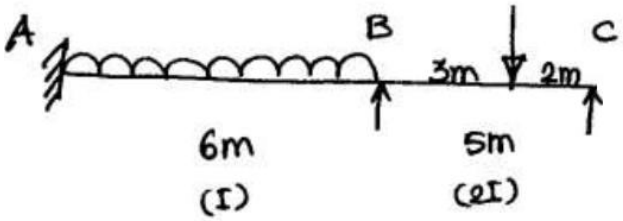
31. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



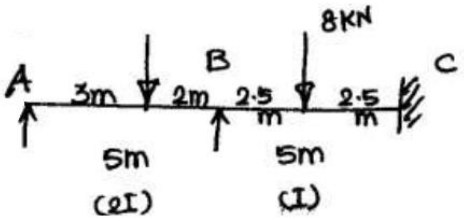
32. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



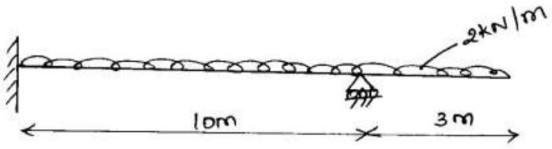
33. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



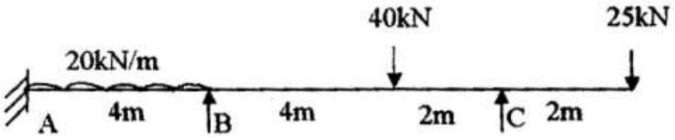
34. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



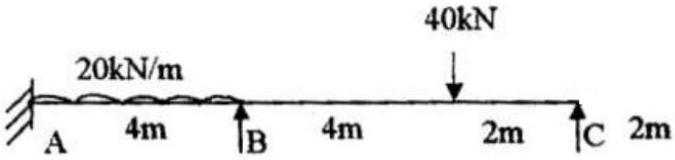
35. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



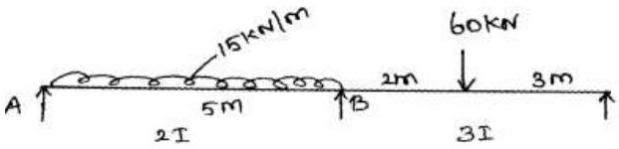
36. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



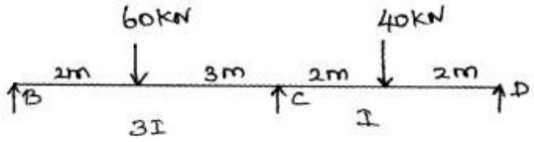
37. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



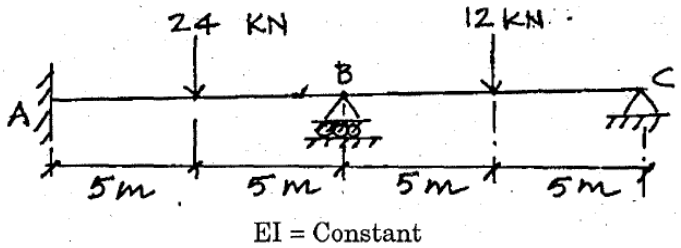
38. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



39. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

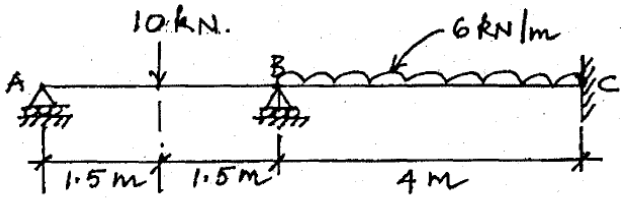


40. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



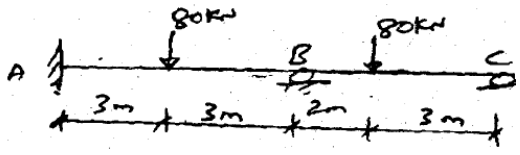
EI = Constant

41. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

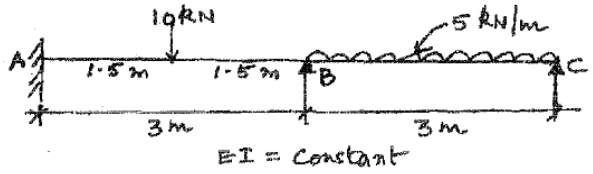


EI = Constant

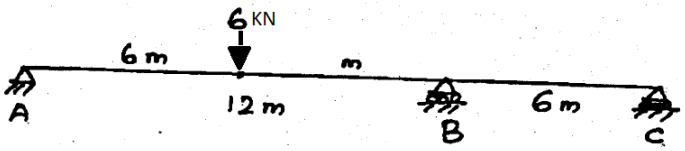
42. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



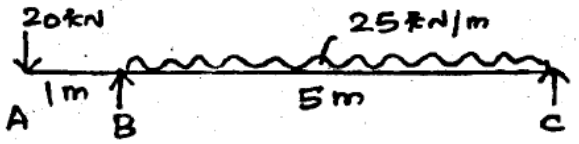
43. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



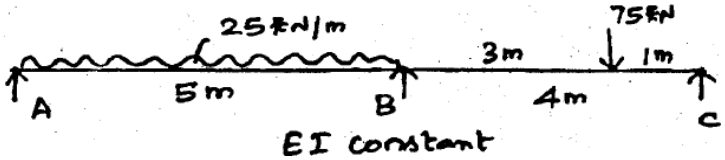
44. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



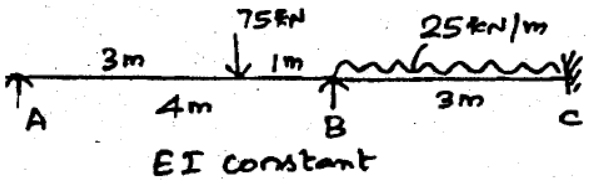
45. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



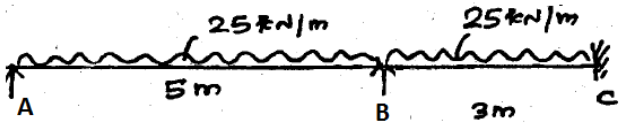
46. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



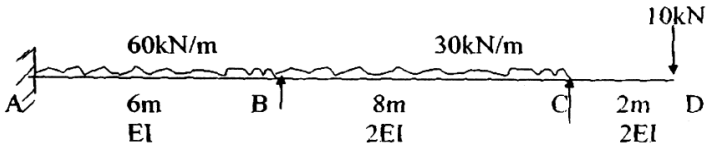
47. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



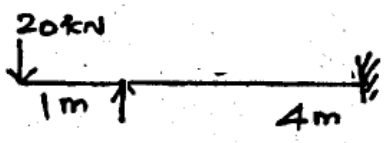
48. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



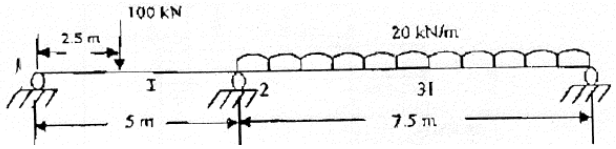
49. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



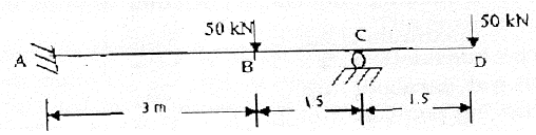
50. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



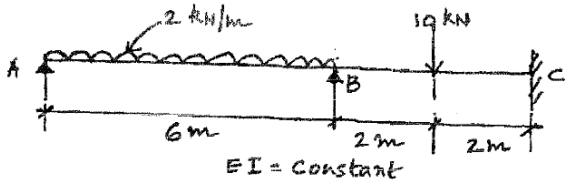
51. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.



52. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

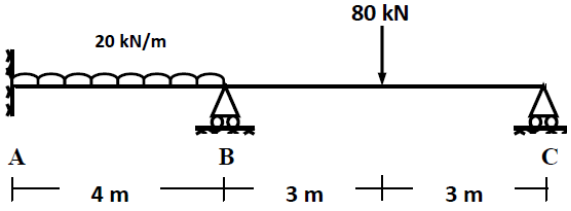


53. Analyse the beam as shown in **Figure** below and draw BMD. Use Slope Deflection Method.

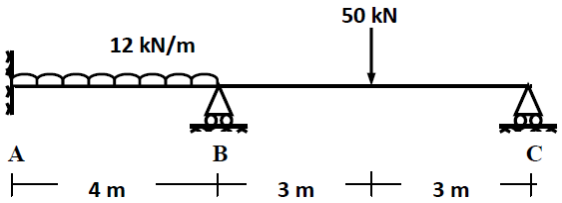


Unit 3- Moment Distribution Method.
Cognitive level –Remember 1. Explain carry over factor and distribution factor. 2. Define: Continuous beam? 3. Define Stiffness? 4. Define: Moment distribution method (Hardy Cross method) 5. Define: Distribution factor 6. Define: Stiffness factor 7. Define: Flexural 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

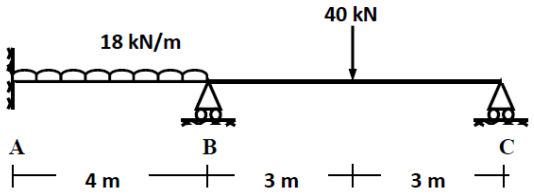
1. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



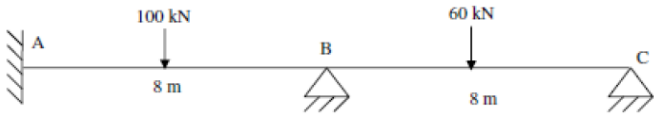
2. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



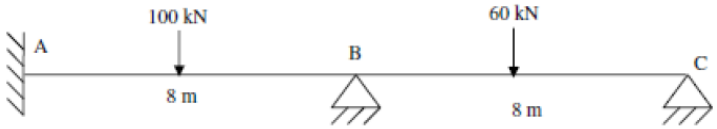
3. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



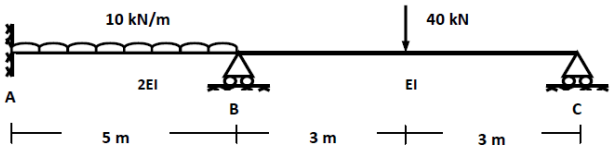
4. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



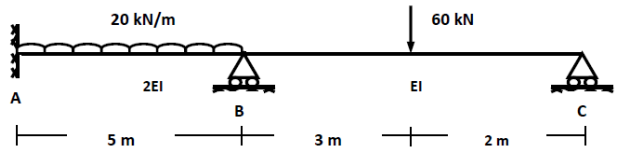
5. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



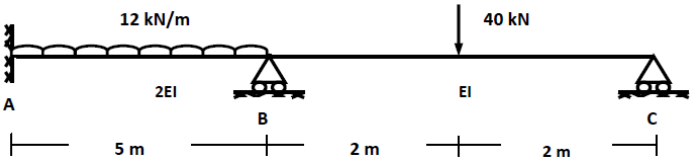
6. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



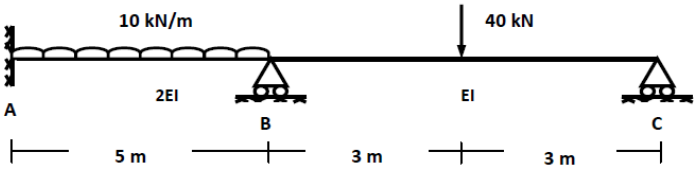
7. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



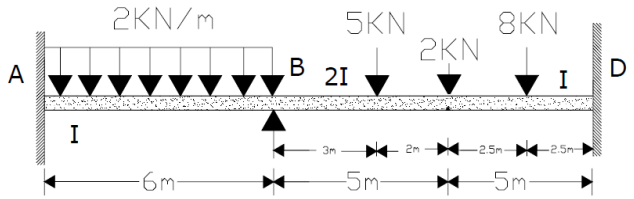
8. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



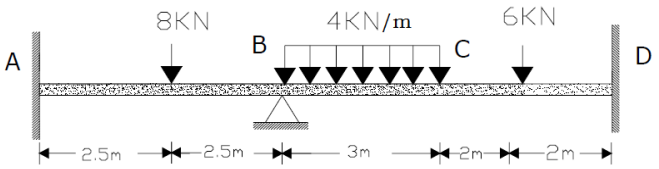
9. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



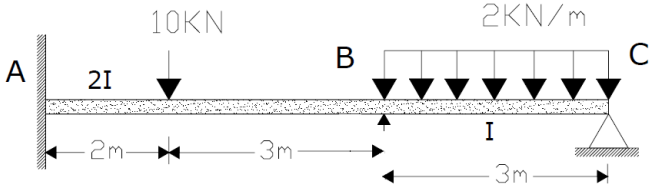
10. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



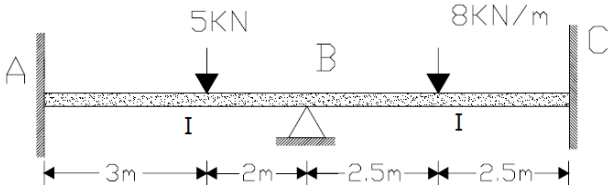
11. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



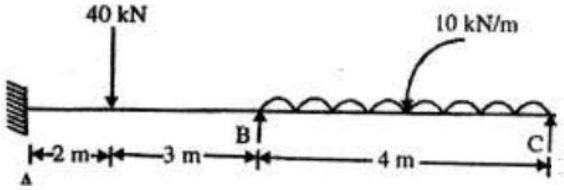
12. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



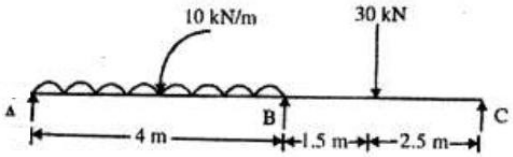
13. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



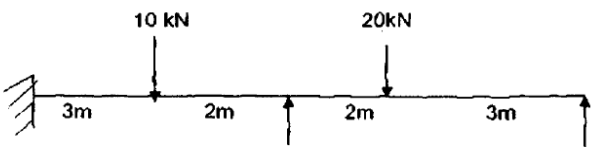
14. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



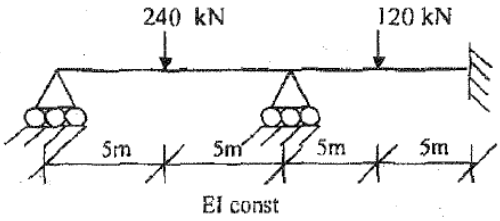
15. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



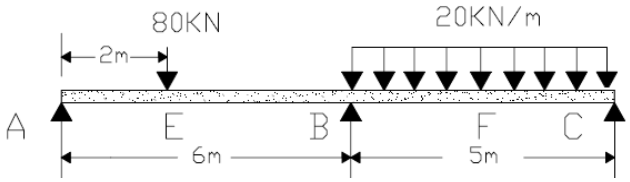
16. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



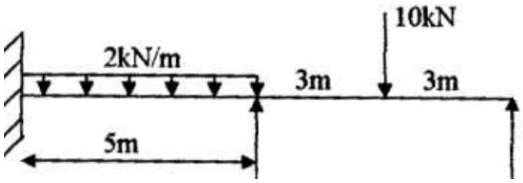
17. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



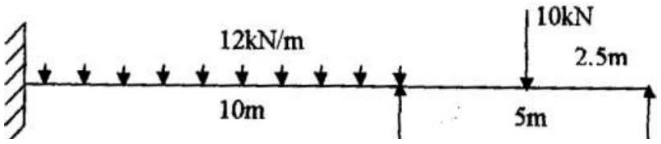
18. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



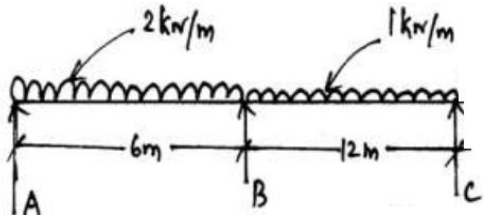
19. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



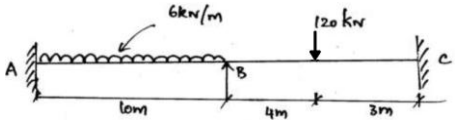
20. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



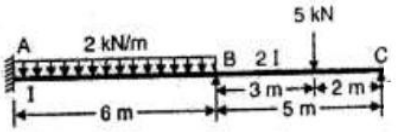
21. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



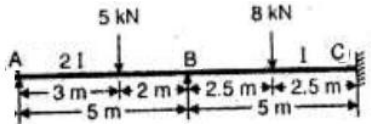
22. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



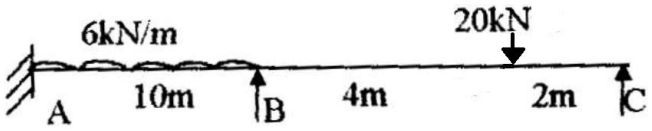
23. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



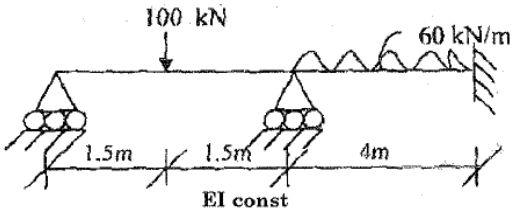
24. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



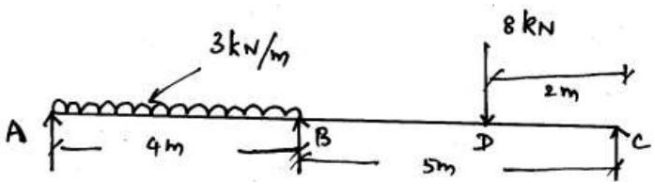
25. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



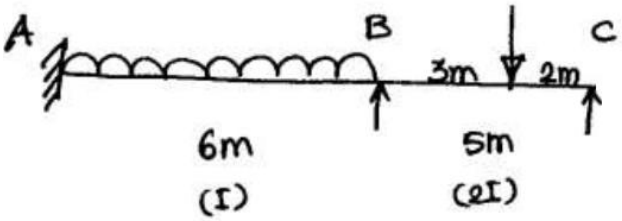
26. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



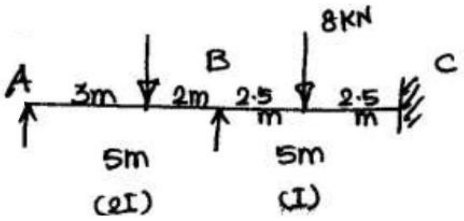
27. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



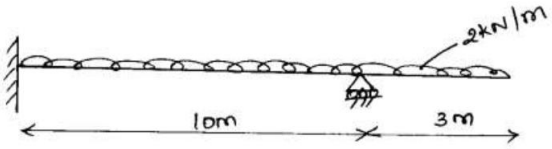
28. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



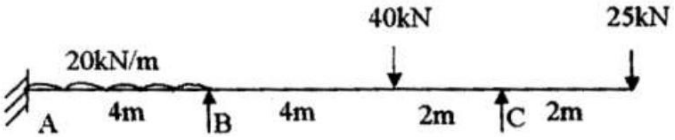
29. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



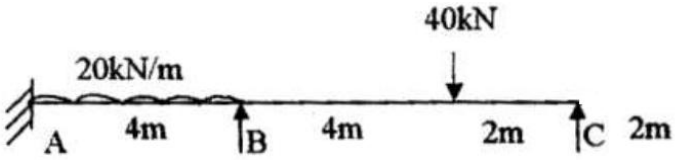
30. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



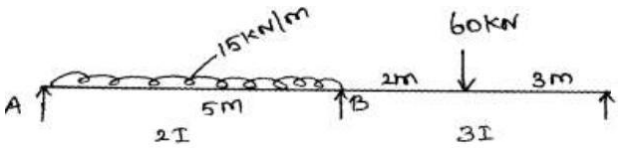
31. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



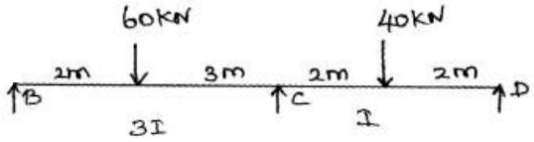
32. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



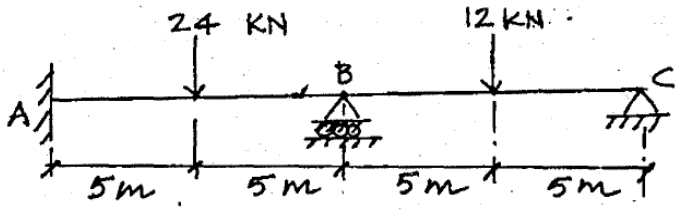
33. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



34. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.

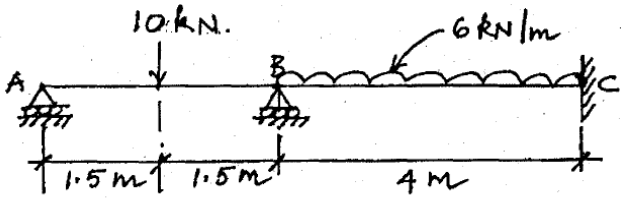


35. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



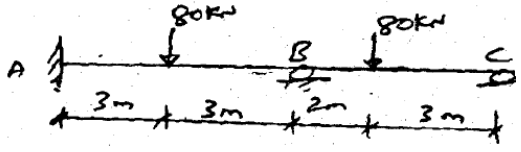
EI = Constant

36. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.

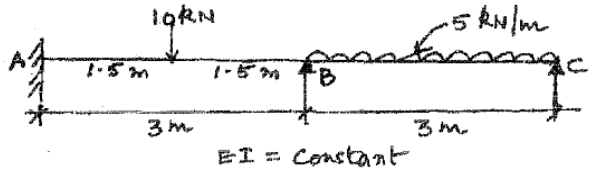


EI = Constant

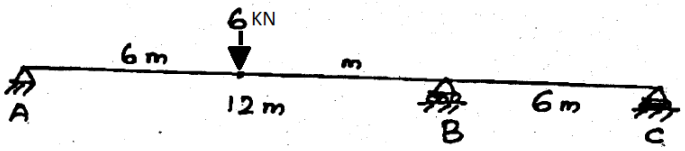
37. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



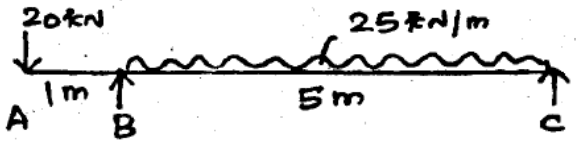
38. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



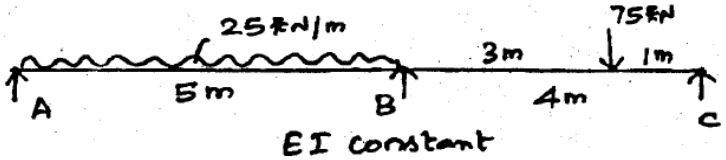
39. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



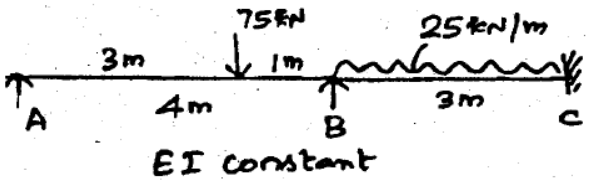
40. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



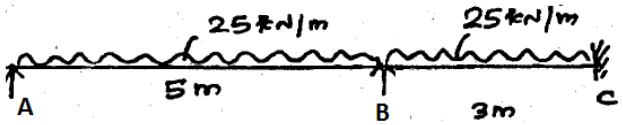
41. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



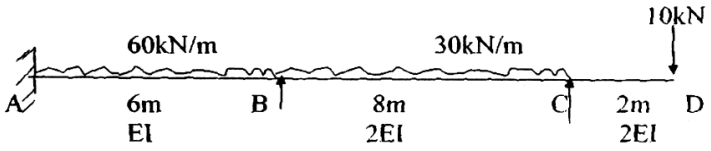
42. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



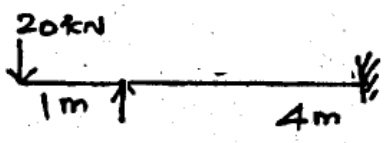
43. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



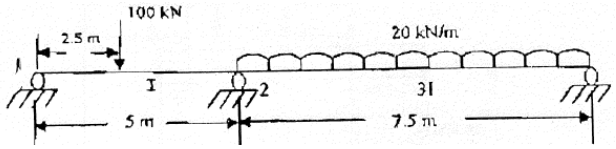
44. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



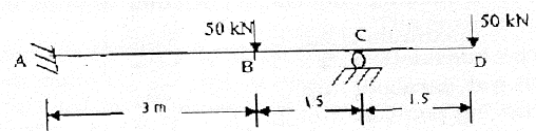
45. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



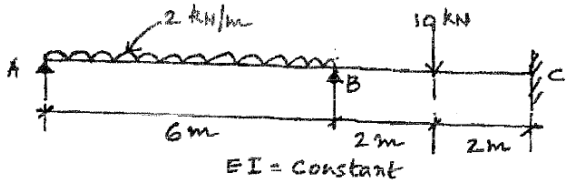
46. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



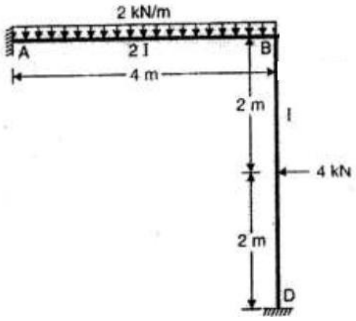
47. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



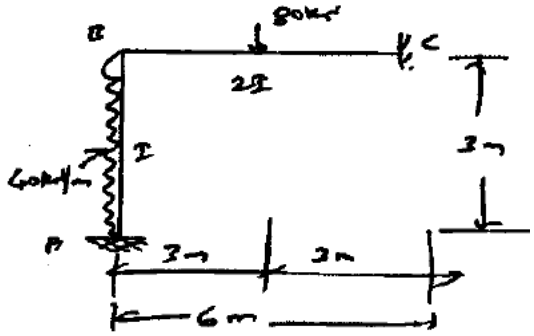
48. Analyse the beam as shown in **Figure** below and draw BMD. Use Moment Distribution Method.



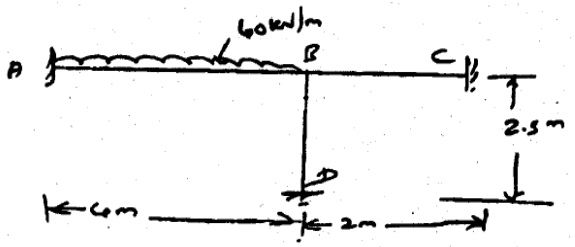
1. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



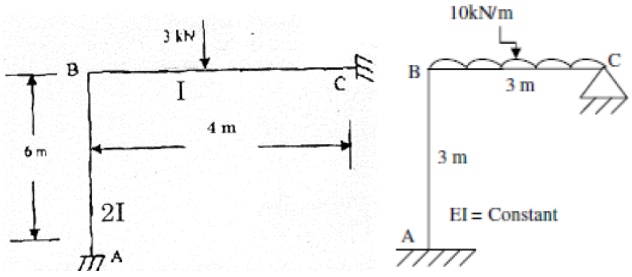
2. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



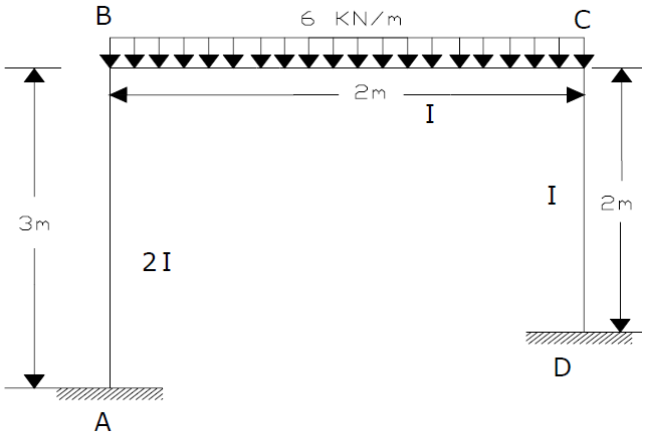
3. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



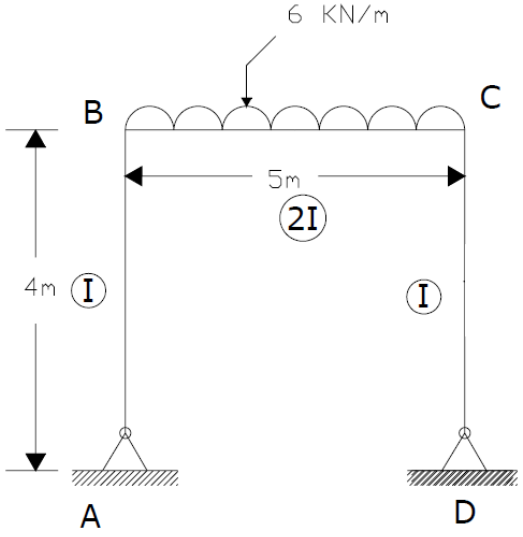
4. Analyse the frame (single bay single column) shown in fig. by moment distribution method & draw the SFD & BMD.



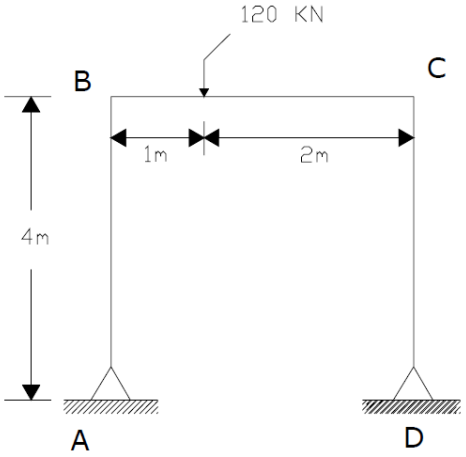
5. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



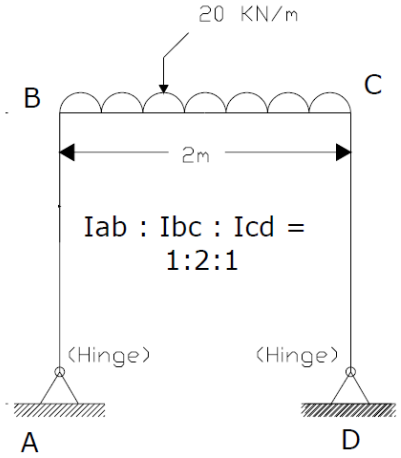
6. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



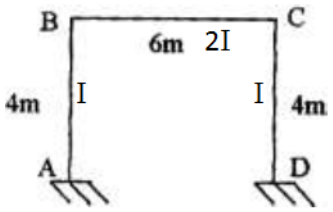
7. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



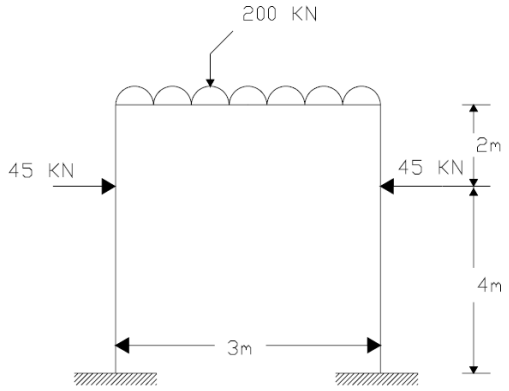
8. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



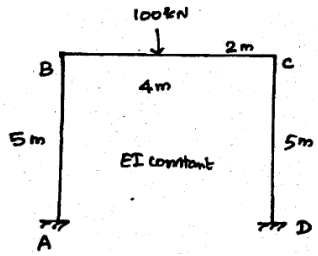
9. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



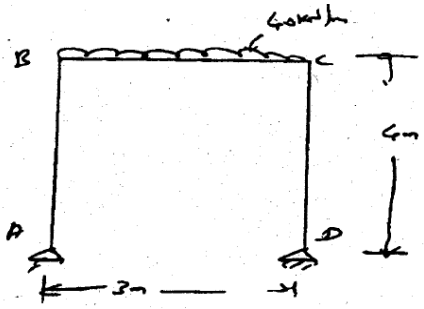
10. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



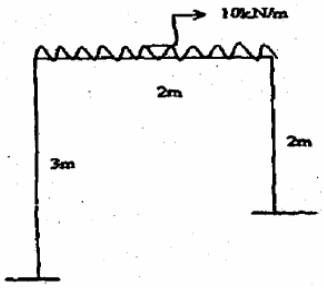
11. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



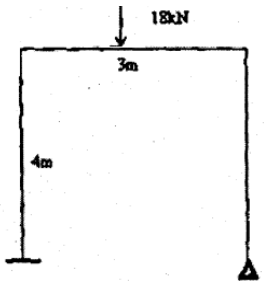
12. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



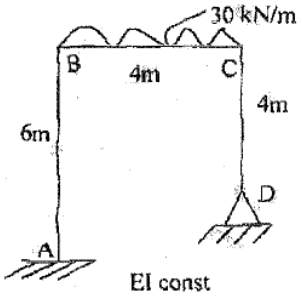
13. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



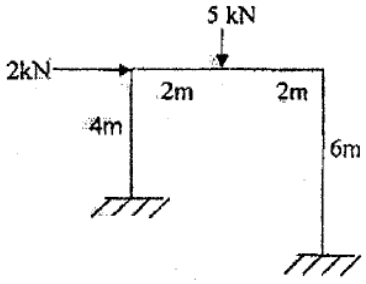
14. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



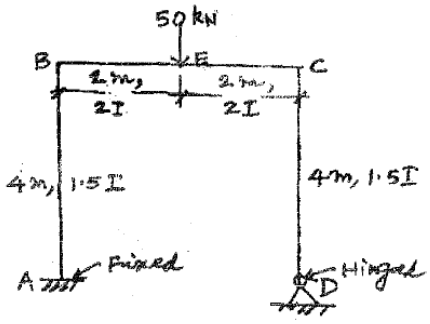
15. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



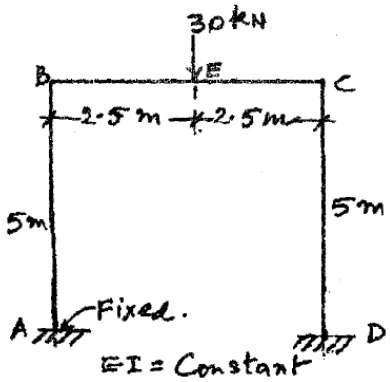
16. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



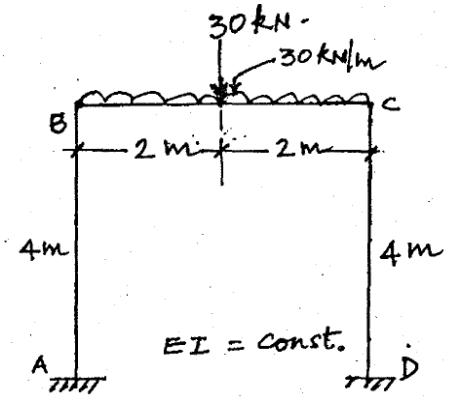
17. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



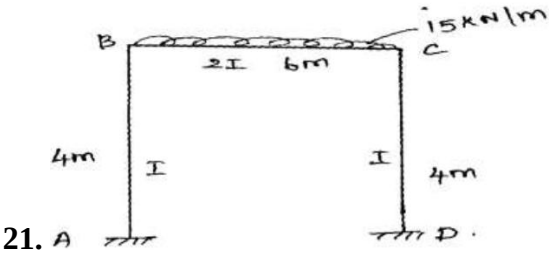
18. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



19. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

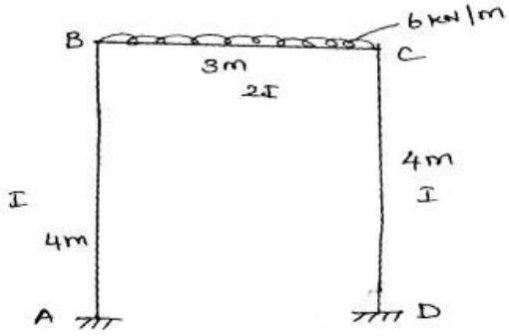


20. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

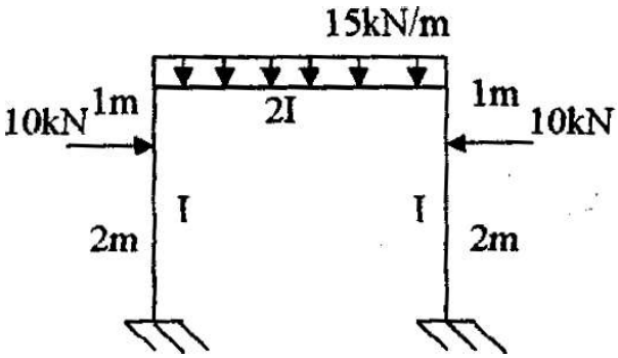


21.

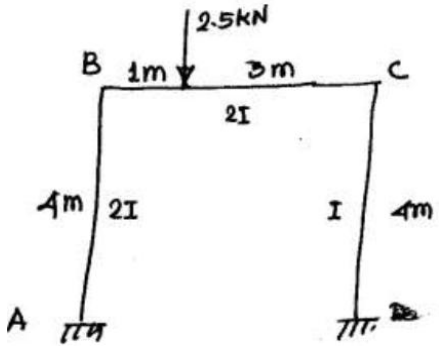
22. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



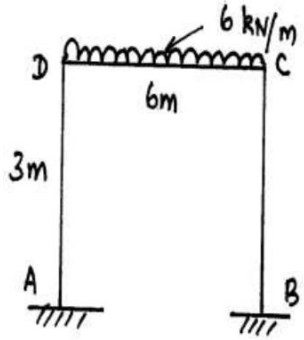
23. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



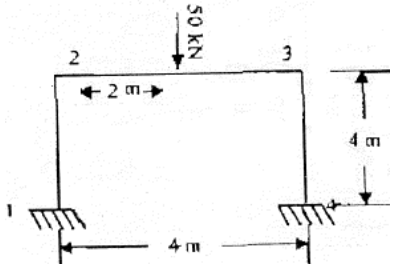
24. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



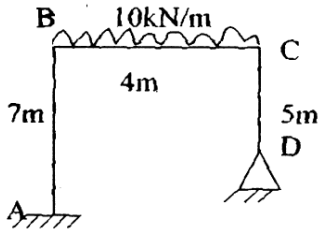
25. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD

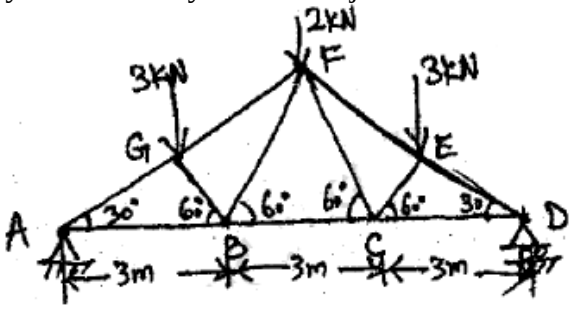
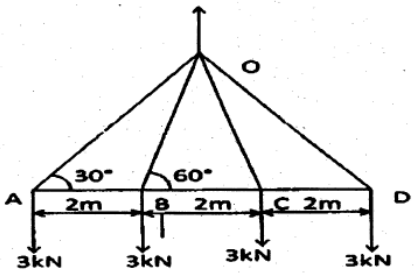
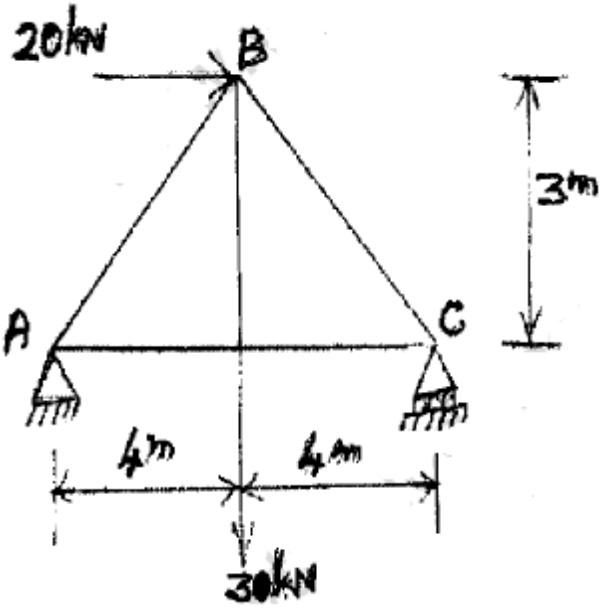


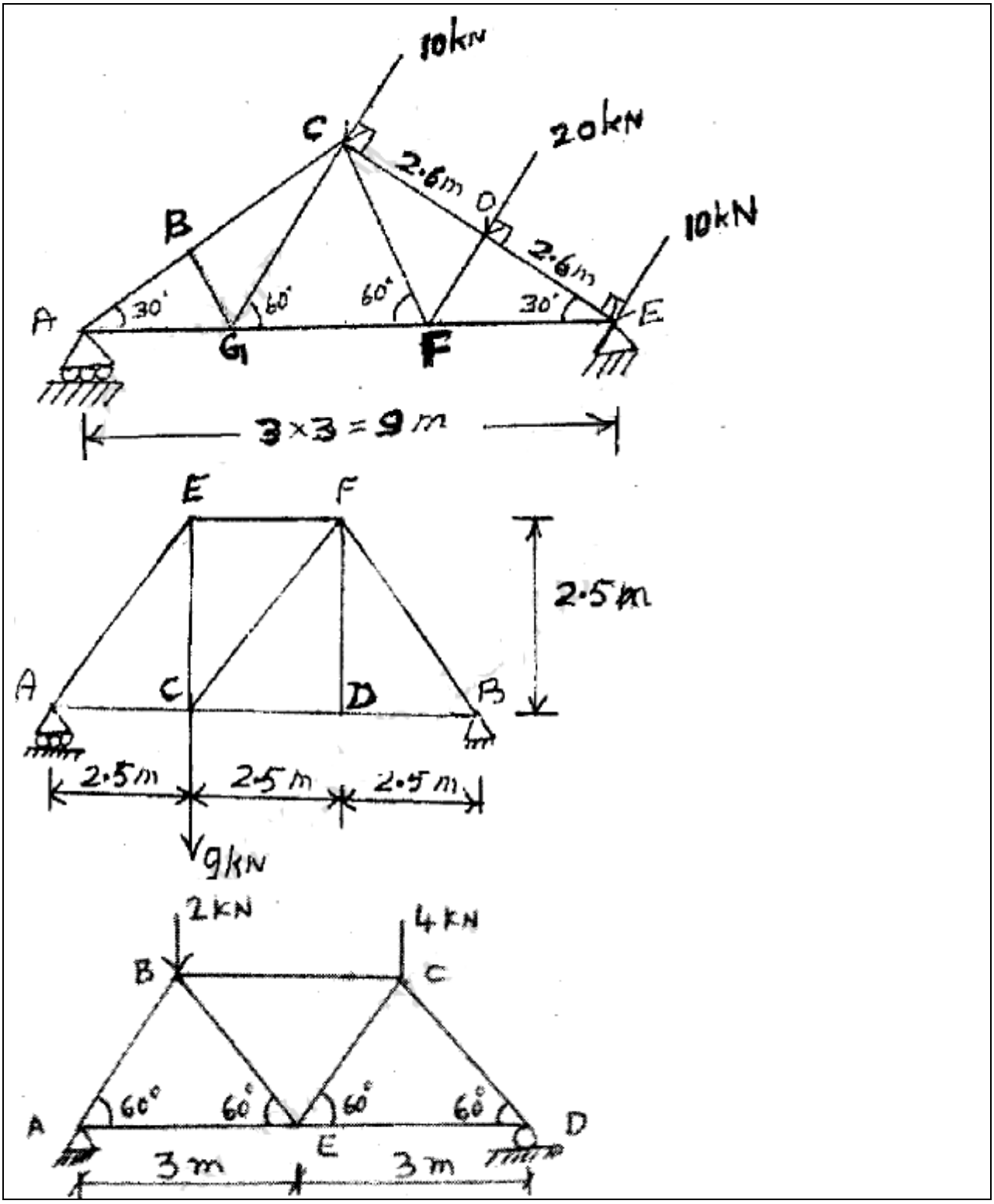
26. Analyse the frame (single bay 2 column) shown in fig. by moment distribution method & draw the SFD & BMD



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       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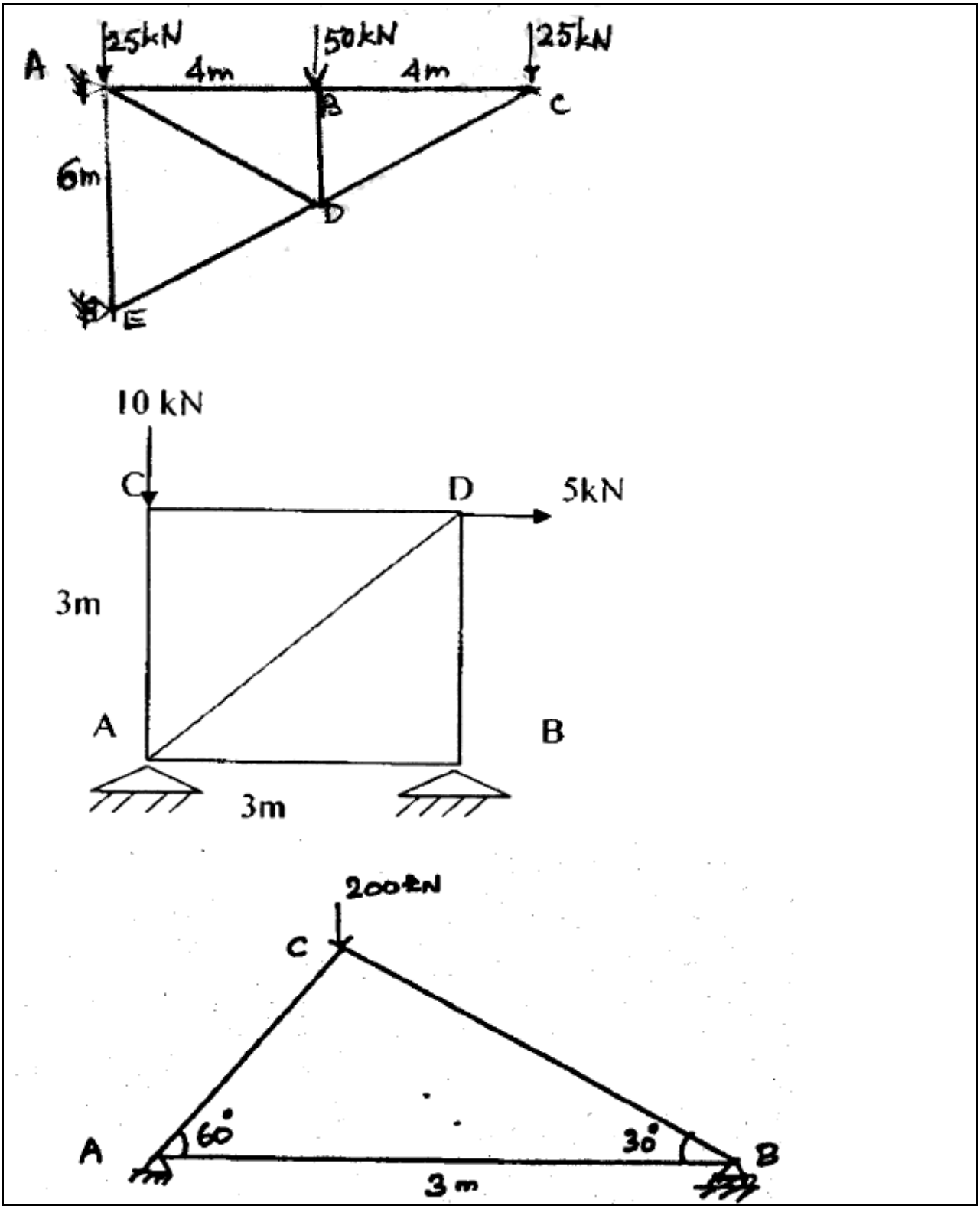
C
20kN
2.6m
D
10kN
B
2.6m
A
30°
60°
60°
30°
E
G
F
3×3 = 9 m
E
F
2.5m
A
C
D
B
2.5m
2.5m
2.5m
g kN
2kN
4kN
B
C
A
60°
60°
60°
60°
D
E
3m
3m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50kN
25kN
A
4m
4m
B
C
6m
D
E
10 kN
C
D
5kN
3m
A
B
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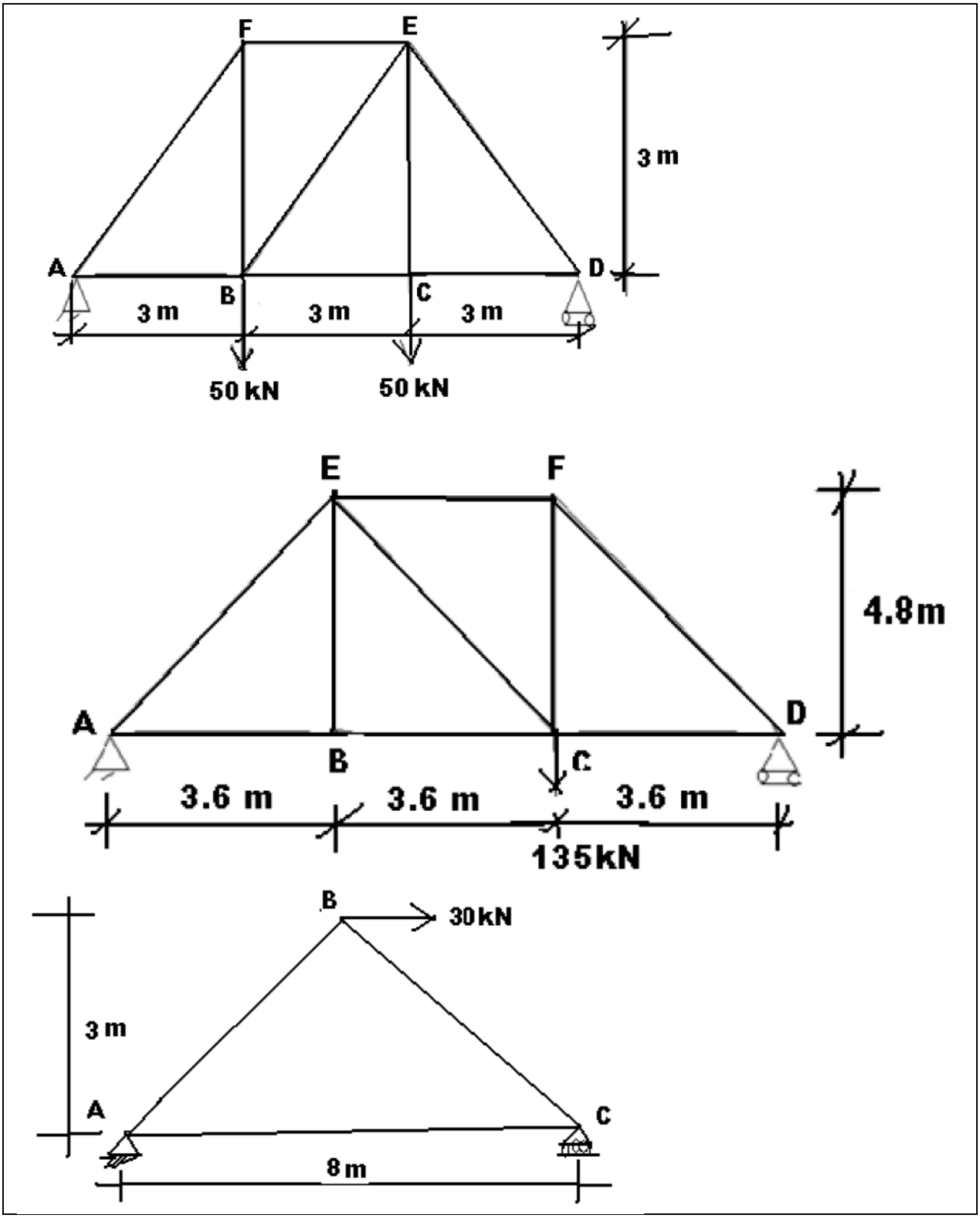
200kN
C
60°
30°
A
B
3 m


F
E
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D
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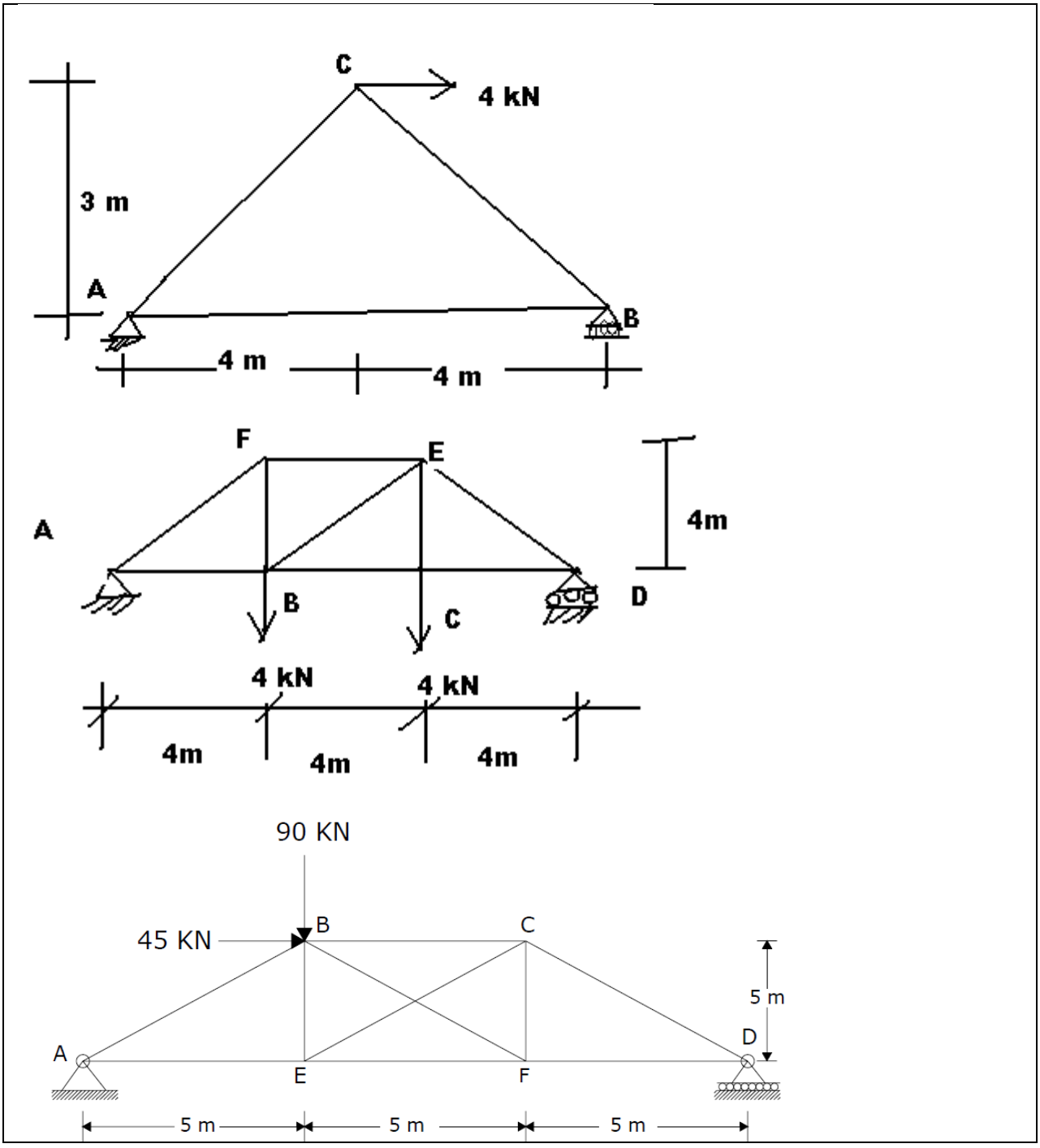
C
8 m


C
4 kN
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4 m
4 m
F
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A
4m
B
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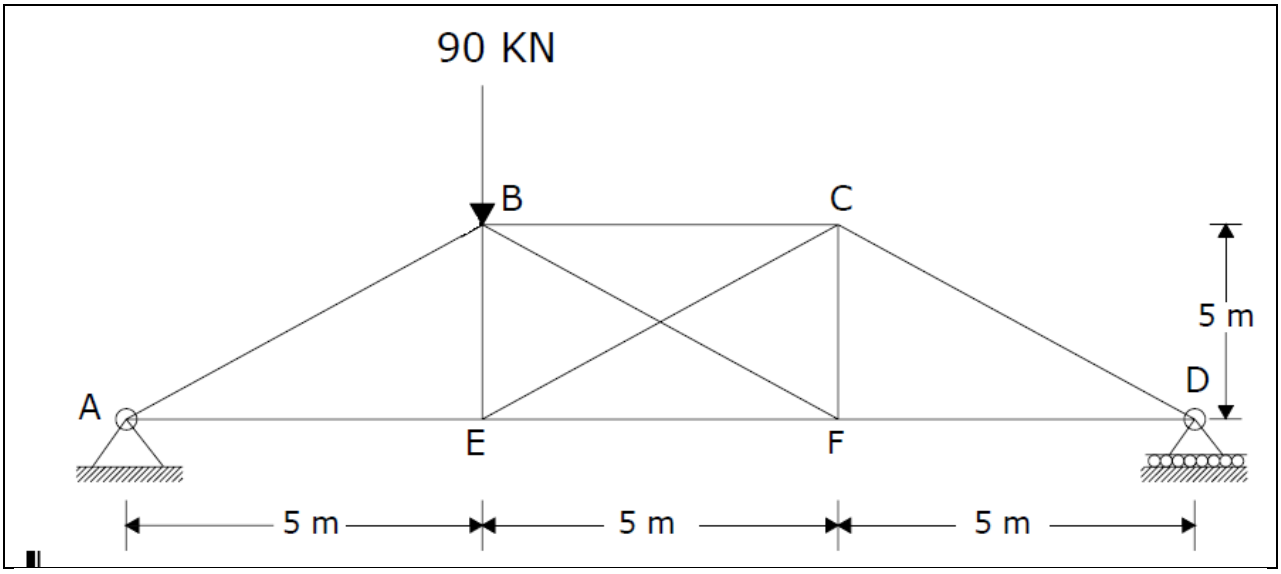
D
4 kN
4 kN
4m
4m
4m
90 KN
45 KN
B
C
5 m
D
A
E
F
5 m
5 m
5 m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5 m

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