C24_CURRICULUM

DIPLOMA IN

CIVIL ENGINEERING

STATE BOARD OF

TECHNICAL EDUCATION AND TRAINING TELANGANA HYDERABAD

V SEMESTER

S.NO	Course		Teaching Scheme					Examination Scheme						
			Instruction Periods per week			Total Periods per semester	Credits	Continuous Internal Evaluation (CIE)			Semester End Examination (SEE)			
	Code	Course Name	L	T	P			Mid Sem 1	Mid Sem 2	Internal Evaluation	Max marks	Min marks	Total Marks	Min marks for passing including internal
1	CE-501	Construction Management And Entrepreneurship	4	1	0	75	2.5	20	20	20	40	14	100	End Marks shall be ≥35% of Topper Marks and Subject Total Shall be ≥ D-Hybrid Grade Minimum
2	CE-502	Steel Structures	4	1	0	75	2.5	20	20	20	40	14	100	
3	CE-503	Soil Mechanics	4	1	0	75	2.5	20	20	20	40	14	100	
4	CE-504	Advanced Quantity Surveying	4	1	0	75	2.5	20	20	20	40	14	100	
5	CE-505A	Theory Of Structures	4	1	0	75	2.5	20	20	20	40	14	100	
	CE-505B	Integrated Waste Management												
6	CE-506A	Construction Technology And Valuation	4	1	0	75	2.5	20	20	20	40	14	100	
	CE-506B	Green Buildings And Energy Conservation												
7	CE-507	Structural Engineering Drawing	1	0	2	45	1.25	20	20	20	40	20	100	End Marks shall be ≥50% of Topper Marks and Subject Total Shall be ≥ D-Hybrid Grade Minimum
8	CE-508	Civil Engineering Computer Applications Lab	1	0	2	45	1.25	20	20	20	40	20	100	
9	CE-509	Construction Technology Lab	1	0	2	45	1.25	20	20	20	40	20	100	
10	CE-510	Project Work	1	0	2	45	1.25	20	20	20	40	20	100	
			28	6	8	630	20	200	200	200	400	164	1000	

CE-501- CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP

Course Title:	**Construction Management and Entrepreneurship**	Course Code :	**CE-501**
Semester:	**V Semester**	Course Group :	**Core**
Teaching Scheme in Periods(L:T:P):	**60:15:0**	Credits :	**2.5**
Methodology :	**Lecture+Tutorials**	Total Contact Periods :	**75**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This course requires the knowledge of Building materials and construction practice and Quantity surveying

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Realize the purpose of Management in construction organization and relate the Organization structure of any engineering department/public sector, duties of different officers.
CO2	Adapt scheduling technique for construction project for effective utilisation of resources
CO3	Acquire Knowledge about the Contracts, Tenders and able to select the suitable Contractor from a tender
CO4	Discuss management of Resources in Construction Industry
CO5	Develop insight to discover and create entrepreneurial opportunities and the expertise to successfully launch, manage, and grow their own venture.
CO6	Manage the Human relations, interpersonal relationship for effective work culture and performance in organization,

Course Content and Blue Print of Marks for SEE

<table>
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<tr><td>1</td><td>Introduction and Organizational Aspects</td><td>12</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
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<tr><td>6</td><td>Entrepreneurshipand Professional Ethics</td><td>13</td><td>Q7,Q8</td><td>Q10(b), Q12(a), Q12(b)</td><td>Q14(b), Q16(a), Q16(b)</td></tr>
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Course Contents

UNIT-1: Introduction and Organizational Aspects

Duration: 12Periods(L: 10 – T:2)

a) Stages of a Construction Project, Importance of Construction and Construction Industry, Indian construction industry, Need for Construction Management, Definition and concept of management.

b) Organizational structure of a State Government Engineering department. – Duties of various Officers as per hierarchy– Preliminary Estimates – Detailed estimate –Budget provision – Administrative approval and Technical sanction – Powers of sanction.

c) Public sector Organizations: Organizational structure of a Construction company – Duties of Chief Engineer.

UNIT- 2: Management Tools

Duration:13Periods(L: 10 – T:3)

a) Different Management Tools – Gantt Bar chart, Modified Gantt Bar chart – Limitations of Bar charts – Introduction to Network Tools- CPM and PERT – Advantages of CPM and PERT – Terminology used in CPM – Formation of Network – Basic rules – Problems on determination of the Critical path – Limitations of CPM –Comparison of CPM and PERT.

UNIT- 3: Contracts, Tenders and Arbitration

Duration: 12Periods (L: 10– T:2)

a) Contracts – Legality of Contracts – ContractDocument – Types of Contracts – Piece-work contracts –Item rate contracts – Lump sum contracts –Cost plus Perentage contracts – Negotiated rates – Departmental Execution of Works – Merits and Limitations of each Contract System – Conditions of Contract, related to Civil Engineering works.

b) Tenders – Necessity of Tenders – Sealed tenders – TenderNotice – Tender Documents – Earnest Money Deposits and Security Deposits – Opening of Tenders – Comparative Statement – Acceptance of Tenders – Work-Order – Contract Agreement – Measurement Book-Rules for recording measurements- Pre-Measurement and Check-Measurement-Preparation of Bills-Modes of Payment-Hand receipts-Recoveries to be made from Bills.

c) Arbitration-Need for arbitration.

UNIT- 4:Management of Resources in construction industry

Duration:13Periods (L:10 – T:3)

a) Plant and Equipment: Need for Mechanization – Optimum Utilization of Plant and Equipment – Preventive Maintenance –Overhauling and Replacement

b) Accidents in Construction Industry: Causes and Effects of Accidents-Preventive measures- Personal Protective Equipments(PPE)-Enhance Safety Measures in accordance with BIS, following relevant IS Codes.

c) MIS-Management Information System-Design of MIS-Role of MIS-Human Resources Accountancy-Advantages-Social Audit.

UNIT- 5: Stores and Financial Management

Duration:12Periods (L:10 – T:2)

a) Stores: Classification of Stores-General Stock items, Consumables and Non-Consumables-Receipts-Issues-Transfer order entry-MAS Account- Indent-Invoice- Stock Register-Verification of Stores-Accounting for Shortages and Surplus-Write off.

b) Financial Management-Finance as a Resource- Purpose of Cost Control-Stages of Cost control-Pre Contract Stage and Post contract stage- Financial control at Head office Level and Site Level

UNIT - 6: Entrepreneurship and Professional Ethics

Duration: 13 Periods (L: 10 – T:3)

a) Entrepreneur – Concept, Definition, Role, Expectations – Characteristics of Entrepreneur – Risks and Rewards of an Entrepreneur-Government Policies introduced to finance an Entrepreneur-Financial institutions funding and giving subsidies.

b) Human relations and Performance in Organization – Understand Self and Others for Effective behaviour – Interpersonal relationship for effective work culture – Need for professional ethics.-Inculcation of Universal Human Values

Reference Books

1) Management in construction Industry – P.DharwadkerOxford & IBH Publishing Co. Pvt., Ltd.,
2) Construction Management and Accounts –V.N.Vazirani&S.P.Chandola.Khanna Publishers.
3) Construction Planning and Management. U.K. Shrivastava Galgotia Publications Pvt. Ltd., New Delhi.
4) Construction Management and Planning - B. Sengupta& H. Guna Tata Mc. Graw Hill Publishing Company Ltd.
5) Construction Management and Accounts. HarpalSingh. Tata Mc. Graw Hill Publishing Company Ltd.
6) Construction project management: Theory and Practice, 2nd edition, 2016, Kumar NirajJha, Pearson Education Publishers.
7) Project management for engineering and Construction, By Garold D Oberlender, 2nd edition McGraw Hill Education (India), Pvt. Ltd.
8) BIS –Standards related to Safety in Construction must be referred.

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1 - Realize the purpose of Management in construction organization and relate the Organization structure of any engineering department/public sector, duties of different officers.

1.1. Describe a Construction Project.
1.2. List the Various phases of a Construction Project.
1.3. State the importance of Construction and Construction Industry
1.4. Define Management.
1.5. State the functions of Management.
1.4 Give the Organizational structure of any Engineering department (Government).

1.5 List the Duties and Responsibilities of various Officers in an Engineering department as per the hierarchy order.

1.6 Define Preliminary Estimate, Detailed estimate, Administrative approval and Technical sanction.

1.7 State the limit of powers of sanction by various officers in an Engineering Department (Government).

1.8 Give the Organizational structure of a Public sector Construction company.

1.9 List the Duties of Chief Engineer in a Construction company.

CO2 - Adapt scheduling technique for construction project for effective utilisation of resources

2.1 Define CPM and PERT.

2.2 State the advantages of CPM and PERT.

2.3 Explain the Use of Bar chart and its limitations

2.4 Define: Network, Activity, Event, Duration, dummy activity, EST, EFT, LST, LFT, total float, free float, critical path.

2.5 Prepare network diagram using basic rules of network formation.

2.6 Calculate time on CPM network identifying critical activities, critical path, free float and total float.

2.7 State the limitations of CPM.

2.8 Distinguish between CPM and PERT.

2.9 List the software tools available in project management

CO3 - Acquire Knowledge about the Contracts, Tenders and able to select the suitable Contractor from a tender

3.1 Define contract

3.2 State the contents of a contract document.

3.3 Explain different contract systems available for construction works.

3.4 List the merits and limitations of each of the contract systems.

3.5 List the general conditions of contract for a civil engineering project.

3.6 Define tender and explain the need for calling of tenders.

3.7 List the steps involved in fixing up agency through tender system.

3.8 Draft a tender notice for a work

3.9 Prepare tender documents.

3.10 Explain the need of earnest money deposit and security deposit.

3.11 Prepare a comparative statement.

3.12 Explain the method of selecting a contractor from the tenders.

3.13 List out the conditions of contract agreements.

3.14 State the importance of measurement book and rules to be followed

3.15 State the need for pre measurement and check measurement

3.16 Identify the types of payments and bills/payments to the contractor

3.17 List the recoveries to be made from the bills

3.18 Arbitration and need for Arbitration

CO4 - Discuss management of Resources in Construction Industry

4.1 Explain the scope of materials management
4.2 Explain the need for mechanization.
4.3 Explain the need for optimum utilization of plant and equipment.
4.4 Explain about the preventive maintenance of plant and equipment.
4.5 Explain causes and effects of accidents in construction industry and preventive measures.
4.6 BIS –Relevant Codes of practice must be implemented sculpurously
4.7 Explain about Management information system(MIS)
4.8 State the factors involved in design of MIS
4.9 Explain the role of MIS
4.10 Explain the importance of Human Resources accountancy and its advantages
4.11 Explain the importance of Social Audit

CO5 - Develop insight to discover and create entrepreneurial opportunities and the expertise to successfully launch, manage, and grow their own venture..

5.1 Identify the different types of stores materials
5.2 State the classification of items held in general stock
5.3 Explain Transfer entry order
5.4 State the need for materials at site account.
5.5 Explain the terms indent and invoice.
5.6 Explain the importance of periodical inspection of stores.
5.7 Explain the method of accounting for shortages and surplus in stores
5.8 Explain the procedure for write off of equipment
5.9 State the importance of finance as a resource.
5.10 State the purpose of cost control.
5.11 Explain the different stages at which cost control can be achieved.
5.12 Explain the financial control at head office level and site level.

CO6 - Manage the Human relations, interpersonal relationship for effective work culture and performance in organization,

6.1 Define the words entrepreneur and entrepreneurship.
6.2 Outline the concepts of entrepreneurship.
6.3 State the role of entrepreneur in economic development.
6.4 List the characteristics of an entrepreneur.
6.5 Evaluate the risks and rewards of an entrepreneur.
6.6 List Government policies introduced to motivate entrepreneurship or to provide financial help
6.7 State the role of Human relations and performance in organization.
6.8 State the role of Interpersonal relationship for effective work culture.

Suggested Student Activities

1. Visit any construction contracting firm and interact about the present tendering process (e-tendering) and awarding of contract
2. Visit any nearby construction site & interact with the construction team regarding type of structure & its organization structure
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 ongoing construction activity with the help of available open source project management software.
5. Visit any nearby PWD/ R & B/ Irrigation dept. office or any construction company, collect the documents (BOQ, M B, Tender, SR, lead statement) related to the project and prepare report on it and also organizational setup at divisional office
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 detailed specifications for the following: a) Building construction system. b) Irrigation engineering system. c) Transportation engineering system. d) Environment engineering system.
11. Study the application of CPM & PERT technique in planning software.
12. Prepare a report on women entrepreneurship, rural entrepreneurship, Agri-entrepreneurship.
13. Collect the various entrepreneurship development programs.
14. Collect the details required for getting a contract license from corporation and prepare a report on it.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2		1		2	2	3	1,3,5,6,7
CO2	2	2	2		1	2	3	1,2,3,5,6,7
CO3	2				2	2	3	1,5,6,7
CO4	2		1		2	2	3	1,3,5,6,7
CO5	2				1	2	3	1,5,6,7
CO6	2				1	2	3	1,5,6,7

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V SEMESTER
Mid Semester-I Examination

Course Code:CE-501 **Duration:1 hour**
Course Name: Construction Management & Entrepreneurship **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries **one** mark 4**x1 = 4 Marks**

1) List any twophases of construction project
2) Define ConstructionManagement
3) Define (i) Event (ii) Activity
4) State any two limitations of CPM

PART-B

Answer **two** questions. Each question carries **three** marks **2x 3 = 6 Marks**

5(A) State the need of construction management

(OR)

5(B) Write in brief about Preliminary estimates and mention the three types.

6(A) Write a short note on Gantt Bar chart and its limitations

(OR)

6(B)Define i) Critical Path ii)EST iii) LFT

PART-C

Answer **two** questions. Each question carries **five** marks **2x 5 = 10 Marks**

7(A) Give the Organizational structure of a public sector construction company

(OR)

7(B) List any TEN responsibilies of an Assistant Executive engineer in various aspects.

8(A) Distinguish between CPM and PERT

(OR)

8(B) A project has eleven activities, the expected time of each activity is given below

Activity	1-2	2-3	2-4	2-5	3-6	5-6	5-7	4-7	6-8	7-8	8-9
Duration	4	3	5	6	4	7	8	8	5	7	9

Draw the project network and identify the critical path, tabulate the values of EST,LST,EFT,LFT and Float

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V SEMESTER
Mid Semester-II Examination

Course Code:CE-501 **Duration:1 hour**
Course Name: Construction Management & Entrepreneurship **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries **one** mark 4**x1= 4 Marks**

1) Define Contract
2) What do you mean by sealed tender and when is it preferred
3) What is social audit
4) State the need for mechanization

PART-B

Answer **two** questions. Each question carries **three** marks **2x 3 = 6 Marks**

5(A) Write short notes on arbitration and need for it

(OR)

5(B) Write briefly about Pre measurement

6(A) Outline three points stating the need for optimum utilization of plant and equipment

(OR)

6(B) What are the salient features of MIS?

PART-C

Answer **two** questions. Each question carries **five** marks **2x 5 = 10 Marks**

7(A) Explain the method of selecting a contractor from the tenders

(OR)

7(B) Write any five irregularities made while recording measurements in measurement books

8(A) Explain about preventive maintenance of plant and equipment

(OR)

8(B) Explain the role of MIS in human resource accountancy

State Board of Technical Education and Training, Telangana
Model Question paper
DCE V SEMESTER
Semester End Examination

Course Code: CE-501 **Duration:2 hours**
Course Name: Construction Management & Entrepreneurship **Max.Marks:40**

PART-A

Answer **all**questions.Each question carries **one** mark **8x1 = 08 Marks**

1) Define construction management
2) What do you mean by contract document and arbitration
3) State the necessity of Tender
4) What do you understand by Activity and EST
5) What is bin card and details to be entered in bin cards
6) Define indent and invoice
7) What are Ethics
8) Define Entrepreneur

PART-B

Answer **four** questions Each question carries **three** marks **4 x 3 = 12 Marks**

9(a) Draw the Organizational structure of any government engineering department

(OR)

9(b) Give the classification of stores

10(a) What is tender, sealed tender and list any three tender documents to be submitted

(OR)

10(b) State the need for professional Ethics

11(a) Write briefly about Transfer order entry in stores

(OR)

11(b) What is the purpose of cost control in financial management

12(a) Brief entrepreneurship and expectations of entrepreneurship

(OR)

12(b) Illustrate the ethical principles to be followed by an organization

PART-C

Answer **four** questions. Each question carries **five** marks **4 x 5 = 20 Marks**

13(a) A project has eleven activities , the expected time of each activity is given below

Activity	1-2	2-3	2-4	2-5	3-6	5-6	5-7	4-7	6-8	7-8	8-9
Duration	4	3	5	6	4	7	8	8	5	7	9

Draw the project network and identify the critical path, tabulate the values of EST,LST,EFT,LFT and Float

(OR)

13(b) Write briefly about verification of stores

14(a)List any four contract systems and explain any two contract systems in brief

(OR)

14(b) Brief the role of entrepreneur in economic development and any five characteristics of entrepreneur

15(a) Explain about financial control at pre-contract and post contract stage

(OR)

15(b) Explain the procedure of write-off

16(a) Discuss any four risks of an entrepreneur

(OR)

16(b) Elaborate the role of financial institutions in entrepreneurial development

CE-502 STEEL STRUCTURES

Course Title:	**Steel Structures**	Course Code :	**CE-502**
Semester:	**V Semester**	Course Group :	**Core**
Teaching Scheme in Periods (L:T:P):	**60:15:0**	Credits :	**2.5**
Methodology :	**Lecture+Assignments**	Total Contact Periods :	**75 Periods**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This course requires the knowledge of subjects Engineering Mechanics, Strength of Materials and Material testing laboratory

Course Outcomes

Upon the completion of the course, the student shall be able to

CO1	Illustrate the basic concepts of limit state design and suitability of different types ofstandard rolled steel sections
CO2	Analyse and Design a suitable connection based upon the conditions according to standards
CO3	Design the tension members considering the various failure patterns as per codal provisions.
CO4	Design suitable compression member and a slab base for the given conditions as per code
CO5	Design and analysis of suitable laterally restrained beam as per code
CO6	Plan a suitable roof truss for the given span as per standards and Calculate the loads acting on the truss using relevant Indian Standards

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
1	Introduction and Fundamentals of LimitState Design of Steel structures	08	Q1		Q9(a)	Q13(a)
2	Design of Bolted and Welded Connections	15				
3	Design of Tension members	12	Q2		Q10(a)	Q14(a)
4	Design of Compression members	15				
5	Design of Beams	14	Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Design of Roof trusses	11		Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
	Total	75	8		8	8

UNIT-1: Introduction and fundamentals of limit state design of steel structures

Duration: 08 Periods (L: 6 – T: 2)

a. Merits and demerits of steel structures.
b. Loads considered in the design of steel structures as per I.S:875 -2015.
c. Introduction to I.S. 800-2007
d. Physical and Mechanical properties of structural steel
e. Standard structural sections as per SP-6, part-1
f. Classification of cross sections – class 1(plastic), class2(compact), class3(semi compact) and class4(slender).
g. Concept of Limit State Design – limit state of strength – limit state of serviceability –classification of actions – strength – partial safety factors for loads and materials.

UNIT-2: Design of Bolted and Welded Connections Duration: 15 Periods (L: 13 – T:2)

a. Different types of joints
b. Different types of Connections
c. Difference between bolted joints and welded joints.
d. Advantages and disadvantages of bolted connections.
e. Types of bolts, grades of bolts, difference between unfinished bolts and High strength friction grip bolts (HSFG).
f. Behavior of bolted joints, failure of bolted joints
g. Design Strength and Efficiency of lap joint and butt joint with chain pattern for bearing type bolts only.
h. Advantages and disadvantages of welded joints.
i. Different forms of welded joints.
j. Fillet welded joint – detailed sketch showing the component parts.
k. Stresses in welds as per I.S.800-2007 – Codal requirements of welds and welding.
l. Problems on calculation of design strength of a fillet welded joint.
m. Design of fillet welded joint for a plate to resist the given load.
n. Design of fillet welded joint for single angle carrying axial loads.

UNIT-3: Design of Tension Members Duration: 12 Periods (L:10– T:2)

a. Introduction to tension members.
b. Different forms of tension members and their behavior.
c. Different modes of failures – gross section yielding, net Section rupture and block shearfailure.
d. Maximum values of effective slenderness ratios as per code.

e. Calculation of net effective sectional area of single angle with bolted and welded connection.

f. Calculation of the design strength due to yielding of gross section, rupture of critical section and block shear – problems on plate and single angle section connected with bolts and welding.

g. Design procedure of tension members.

h. Problems on design of tension members using plates and single angle with bolted and welded connections.

UNIT-4: Design of Compression Members

Duration: 15 Periods (L: 12 – T: 3)

a. Introduction to compression members.

b. Different forms of compression members and their behaviour.
Effective lengths for different end conditions – Table 11 of I.S:800.

c. Buckling class of cross section – imperfection factor and stress reduction factor fordifferent buckling classes

d. Maximum values of effective slenderness ratio as per code

e. Calculation of design strength of compression members – problems (I-sections only)

f. Design of compression members – problems on simple I-sections only (no built-up sections).

g. Codal provisions for angle struts – Design of single angle struts with welded connection only

h. Codal provisions for Lacing and Battens of built-up columns as per code.

i. Column bases-types, Design of slab base along with cement concrete square pedestal – problems.

UNIT-5: Design of Beams

Duration: 14 Periods (L:12– T:2)

a. Concept of limit state design of beams – Classification of beams based upon lateral restraint of compression flange.

b. Types of failures of laterally supported and laterally unsupported beams.

c. Design strength of Laterally supported beam (simply supported and cantilever) considering bending and shear.

d. Design of laterally supported beam - simply supported under symmetrical point loads and udl acting throughout the span, cantilever under point load at free end and udl throughout the span, considering all codal requirements. Check for bending, shear and deflection.

e. Web Buckling and Web crippling- concept (no problems)

f. Shape factor–Problems on Calculation of shape factor for symmetrical sections (rectangular, circular, I-sections only).

g. Component parts of plate girder with sketches – different types of stiffener plates.

UNIT-6: Design of Roof Trusses **Duration: 11 Periods (L:9 – T:2)**

a. Types of trusses – plane trusses, space trusses.
b. Sketches of different roof trusses with their suitability for a given span.
c. Cross sections of truss members.
d. Loads on roof trusses as per I.S – 875-2015.
e. Determination of loads at various nodal points of a given roof truss due to dead load, live load and wind load, considering the coefficients K1, K2, K3, K4, design wind speed, design wind pressure, external and Internal pressure coefficients. – problems.

Reference Books

1. Steel Structures Design & Practice by N.Subramanian, oxford University Press
2. Code of practice: IS 800-2007
3. Limit state Design of Steel Structures by S.K. Duggal/TMH
4. Structural steel design by M.L.Gambhir/TMH
5. Design of Steel Structures by S.S.Bhavikatti
6. Structural Engineering by A.P.Arul Manickam
7. Shah.V.L. and Veena Gore, "Limit State Design of Steel Structures", IS 800–2007 StructuresPublications, 2009.
8. Teaching Resource Material :http://www.steel-insdag.org
9. Teaching Resource Material :http://www.nptel.iitm.ac.in

Suggested E-learning references

1. http://nptel.ac.in/courses/105106112/
2. https://www.youtube.com/watch?v=EFBTSKPW5Ek
3. https://www.youtube.com/watch?v=C4Mm3mvN1P0

Suggested Learning Outcomes

After completion of the course, the student shall be able to

CO1 - Illustrate the basic concepts of limit state design and suitability of different types of standard rolled steel sections

1.1 List the common types of steel structures.

1.2 State the merits and demerits of Steel Structures.

1.3 List the loads considered in the design of steel structures as perI.S:875-2015.

1.4 State the importance of code of practice I.S. 800-2007

1.5 State the physical and mechanical properties of structural steel.

1.6 List different types of rolled steel sections as per SP-6 part 1

1.7 Explain the classification of cross sections

1.8 Explain the Concept of Limit State Design.

1.9 State the various types of limit states.

1.10 Define the terms: design action and design strength.

1.11 State the partial safety factor values for loads in limit state of strength and serviceability.

1.12 State the partial safety factor values for materials in limit state.

CO2 - Analyse and Design a suitable connection based upon the conditions according to standards.

2.1 State the different types of joints

2.2 State the different types of Connections.

2.3 Differentiate between Bolted joints and Welded joints.

2.4 State the advantages and disadvantages of bolted connections.

2.5 Specifications of bolted joints.

2.6 State the difference between bearing type bolts and high strength friction grip bolts

2.7 Explain the behavior of bolted joints and reasons for failure of bolted joints

2.8 Calculate the strength of lap joint and butt joint with chain pattern for bearing type bolts only

2.9 Calculate the efficiency of a bolted joint.

2.10 List the features of a fillet welded joint.

2.11 State different stresses in welds as per I.S.800-2007.

2.12 Specifications of welded joints.

2.13 State the formula for design strength of a fillet welded joint.

2.14 Calculate the design strength of a fillet welded joint.

2.15 Design a fillet welded joint for a given load.

2.16 Design a fillet welded joint for a plate and single angle connected to the gusset plate by fillet welds along the sides and at ends carrying axial loads

CO3 - Design the tension members considering the various failure patterns as per codal provisions.

3.1 Define the term 'Tie'.

3.2 State the applications of tension members.

3.3 Sketch different forms of tension members.

3.4 Explain the behavior of tension members.

3.5 State the different modes of failures of tension members

3.6 Describe briefly with sketches the different modes of failures of tension members.

3.7 State the maximum values of effective slenderness ratio as per code considering reversal of stresses

3.8 Determine the net effective area of flat and a single angle connected to gusset plate by bolts.

3.9 Determine the design strength due to yielding of gross section, rupture of critical section and block shear failure of a flat and a single angle connected by bolts and welds.

3.10 Explain design procedure of tension members.

3.11 Design a flat and a single angle tension member connected by welds only.

CO4 - Design suitable compression member and a slab base for the given conditions as per code

4.1 State the different types of compression members like column, strut, etc.

4.2 Sketch different forms of compression members.

4.3 Explain the behavior of compression members - classification of cross sections.

4.4 Explain the terms: actual length and effective length

4.5 Define the terms a) least radius of gyration b) slenderness ratio.

4.6 State effective lengths to be used for different end conditions as per code.

4.7 Explain buckling class of cross section – imperfection factor and stress reductionfactor.

4.8 State the maximum values of effective slenderness ratios as per code

4.9 Determine the design strength of compression members (No built up sections).

4.10 Explain design procedure of compression members.

4.11 Design of columns with single I section.

4.12 Explain design details – effective sectional area – codal provisions for angle struts.

4.13 Design single angle struts.

4.14 State codal provisions for design specifications of single / double lacing and battening for built-up columns.

4.15 Design a slab base along with a cement concrete pedestal (square shape only) for single I-section column.

CO5 - Design and analysis of suitable laterally restrained beam as per code

5.1 Illustrate the concept of limit state design of beams.

5.2 Explain the behavior of steel beams.

5.3 Define the terms: elastic moment of resistance, plastic moment of resistance, elasticsection modulus, plastic section modulus, shape factor.

5.4 Determine the shape factor values for Symmetrical sections (Rectangular, circular, and I-sections)

5.5 State the classification of cross sections, class 1 to 4

5.6 State the classification of beams based on lateral restraint of compression flange.

5.7 Determine the design strength of beam in bending and shear.

5.8 Describe briefly web buckling and web crippling (no problems)

5.9 Design laterally supported simply supported (under symmetrical point loads and udl) and cantilever beam (under point load at free end and udl throughout the span) considering all codal requirements. Check for flexure, shear and deflection

5.10 State component parts of plate girders with sketches –Name the different types of Stiffeners with their suitability.

CO6 - Plan a suitable roof truss for the given span as per standards and Calculate the loads acting on the truss using relevant Indian Standards

6.1 State types of trusses – plane trusses, space trusses.

6.2 Explain the situations where roof trusses are used.

6.3 Sketch different types of roof trusses with their suitability for a given span.

6.4 Sketch a roof truss and name the component parts.

6.5 State cross sections of truss members.

6.6 Estimate the type of loads on roof trusses as per I.S – 875-2015.

6.7 Describe briefly how the wind load is calculated on roof trusses.

6.8 Determine loads at nodal points of a given roof truss due to dead load, live load andwind load, considering the coefficients K1, K2, K3, K4, design wind speed, design wind pressure, external and internal pressure coefficients.

Suggested Student Activities

1. Visit a nearby construction site and identify the various types of connections used in steelstructures and prepare a report.
2. Collect & Prepare a list of Indian Standard codes referred for structural steel design with thepurpose of each code.
3. Collect the catalogues of various types of structural steel sections
4. Collect the map showing Basic wind speed throughout the country and analyse those maps.
5. Prepare 2D & 3D models of various structural steel sections using CADD.
6. Prepare the structural detailing of designed sections as per SP 6-1 (1964): ISI Handbook forStructural Engineers -Part- 1
7. Tech fest/Srujana
8. Paper/Poster presentation
9. Quiz
10. Group discussion
11. Surprise Test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledg	Experiments andpractice	Engineering Tools	Engineer andsociety	Environment &	Ethics	Individual and Teamwork	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	2				1	1		2	2	1,2,6,7,9,10
CO2		2					1		2	2	2,7,9,10
CO3		2		2		1	1	2	2	3	2,4,6,7,8,9,10
CO4		2					1		2	2	2,7,9,10
CO5		3					1		2	2	2,7,9,10
CO6	1	3		2		3	1		2	3	1,2,4,6,7,9,10

State Board of Technical Education and Training, Telangana
Model Question paper (C-24 Scheme)
DCE V semester Mid Semester-I Examination

Course Code: CE-502 **Duration:1 Hour**
Course Name: Steel Structures **Max.Marks:20 Marks**

PART – A Marks**: 4 X 1 = 4**

*NOTE: 1) Answer **all** questions and each question carries **one** mark.*

1. Define limit state.
2. State any two physical properties of steel.
3. List different types of joints.
4. List the types of bolts.

PART – B Marks: **2 X 3= 6**

*Answer **two** questions and each question carries **three** marks*

5(a)State the loads that are to be considered in the design of steel structures.

(OR)

5(b)Explain actions and their classifications.

6 (a) Two plates of thickness 10mm each are connected by lap joint by using 4-M16 bolts of grade 4.6. Calculate the rupture strength of plate, if four bolts are arranged in two bolt lines. Take, fu=410MPa, width of plate =150mm.

(OR)

6 (b) Calculate the design strength of the welded joint if the size of the weld is 5mm and its length is 212mm.The ultimate shear stress in the weld is 410N/mm^2.Assume the connections are made in the workshop.

PART – C

Answer **two** questions and each question carries **five** marks. **Marks: 2 X 5 = 10**

7(a) Explain about different types of limit states.

(OR)

7(b) Write any five advantages and disadvantages of steel structures.

8(a) The longer leg of ISA 150 mm×115 mm×10 mm is connected to a gusset plate of 12mm thick by a lap joint using side welds only, at site. The member carries an axial design tensile force of 500 kN acting through centre of gravity of the angle. Design the joint taking ultimate shear stress in the filled weld as 410 MPa.

(OR)

8(b) Two plates of 6 mm thick are connected by a single bolted lap joint with 20 mm diameter bolts at 60 mm pitch, calculate the efficiency of the joint. Take ultimate stress of plate as 410 MPa and assume 4.6 grade of bolts.

Model Question paper (C-24 Scheme)

DCE V semester Mid Semester-II Examination

Course Code: CE-502 **Max.Marks:20 Marks**

PART – A **Marks: 4 X 1 = 4**

NOTE: 1) Answer all questions and each question carries one mark.

1. Define tie
2. Write formula for design strength of the member due to yielding of gross section.
3. Define a strut.
4. Sketch the two different forms of compression members.

PART – B **Marks : 2 X 3 = 6**

*NOTE: 1) Answer **two** questions and each question carries **three** marks*

5(a) Write the design procedure of tension members.

(OR)

5(b) Sketch the figures of angles connected to

i) the same side of gusset plate

ii) both sides ofthe gusset plate showing welds in appropriate places.

6(a) An ISMB 250 @37.3 kg/m is used as a column. Classify the buckling class of columns as per code.

(OR)

6(b) Draw a sectional elevation of a slab base showing the components.

PART – C

Answer **two** questions and each question carries **five** marks **Marks: 2 X 5 M= 10 M**

7(a) Determine the design tensile strength of single ISA 100 x 65x 10 mm when its longer legis connected to 10 mm thick gusset plate by 6 mm size fillet welds. The length of weldis 150 mm. Take fy = 250 MPa, fu = 410MPa

(**OR)**

7(b) Design a single angle tension member to carry a tensile force of 225KN.The angle is to be connected to a gusset plate by longer leg by fillet welds. f_y=250N/mm^2 and f_u=410N/mm^2.

8(a) Design a steel column using a single rolled I- section to carry an axial load of 800 kN. Both ends of the column are restrained against rotation and translation. The actual length of the column between the intersections is 8m. The yield stress of steel is 250MPa.

(OR)

8(b) Design a square slab base for a column ISHB 350 @72.4 kg/m to carry an axial factored load of 1200 kN. Adopt M_{20} grade concrete for concrete pedestal. Design concrete pedestal also. Assume SBC of soil as 180kN/m^2.

State Board of Technical Education and Training,Telangana

Model Question paper(C-24 Scheme)

DCE V Semester

Semester End Examination

Course Code: CE-502 **Duration:2 Hours**

Course Name: Steel Structures **Max. Marks: 40Marks**

PART – A Marks: 8 X 1 = 8

*NOTE : 1)Answer **all** questions and each question carries **one** mark.*

1. State the two types of loads acting on the steel structures?
2. State the most suitable angle for a tension member.
3. State any one classification of beam.
4. State the differences between unfinished and HSFG bolts
5. What is plate girder.
6. Define Shape factor
7. State the relation between design wind speed and design wind pressure.
8. Define slope and pitch of a roof truss

PART – B

*Answer **four** questions . Each question carries **three** marks* **4x 3 = 12**

9(a) Find the design strength of a plate of width 200mm, if it is connected to a gusset plate by 3-16 dia bolts arranged in single bolt line.

What are the different types of column bases. Explain any one of them.

(OR)

9(b) Draw the cross section of plate girder and label the component parts.

10(a) Write three different types of failures of a tension member?

(OR)

10(b) Draw the line sketches of i) fan truss ii) fink truss iii) pratt truss

11(a) Derive an expression for calculating the shape factor of a circular section of diameter d

(OR)

11(b) Find the design shear strength of beam, made of ISMB 400@616N/m.
Takefy=250MPa

12(a) Draw a neat sketch of a roof truss and name the component parts.

(OR)

12(b) What is a purlin? Determine the live load on a truss if the angle of slope of roof is 25^0.

PART – C

Answer four questions. Each question carries five marks

4x 5 = 20

13 (a) Two plates of width 150mm and thickness 10mm are connected by a double cover butt joint with 8mm thick cover plates. 4-16mm diameter bolts are provided on each side of joint in 2 bolt lines. Calculate the efficiency of the joint. Take K_b=0.5

(OR)

13 (b) Calculate the design bending strength of an I-section ISHB 300@58.8kg/m assuming the beam is classified as low shear. Take fy=250MPa.

14 (a) Design a tension member considering a single-angle section to carry a tensile force of 250 kN. Adopt length of welded connection as 150 mm and use Fe 410 steel

(OR)

14 (b)Sketch different types of roof trusses with their suitability for a given span.

15 (a) A simply supported laterally restrained beam is proposed to carry a UDL of 32kN/m including self-weight acting over an effective span 5m. Design an I-section and check its safety, in bending and shear. Take fy=250MPa.

(OR)

15 (b) An ISLB 350@495N/m is used as a simply supported beam over a span of 6 m and carries a udl of 25kN/m including self-weight. The compression flange of the beam is adequately restrained. Check for shear and maximum deflection if fy= 250 N/mm^2 and$E=210\ kN/mm^2$

16(a) A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24 m x 40m. The height of building is 12 m at the eves. Determine the basic wind pressure

(OR)

16 (b) A Pratt truss of span 12 m span with each panel of length 2m and pitch 25º carries AC sheet roofing. The truss are 3 m apart. The design wind pressure may be assumed as 1200 N/m^2.

Assume

(i) self-weight of AC sheet = 200 N/m^2 of slope area

(ii) weight of purlin = 100 N/m^2 of plan area.

Determine (a) live load and (b) dead load at various nodal points of the truss.

CE-503 SOIL MECHANICS

Course Title:	Soil Mechanics	Course Code	CE-503
Semester:	V Semester	Course Group	Core
Teaching Scheme in Periods(L:T:P):	4:1:0	Credits	2.5
Methodology	Lecture+Tutorials	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

Basic Knowledge of Mathematics and Engineering Mechanics

Course Outcomes

Upon completion of course, the student shall be able to

CO1	Characterize and classify soils.
CO2	Develop volumetric relationships between different soil parameters and explain the experimental methods to measure the physical and mechanical properties of the soils.
CO3	Classify the soils based on different parameters.
CO4	Explain permeability and shear strength parameters of soils
CO5	Discuss bearing capacity of soils in foundation design along with presumptive bearing capacity values and use IS code equation for computing bearing capacity of soils
CO6	Analyze the principles of consolidation and compaction of soils.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	General characteristics of soils	12	Q4	Q1		Q9(a)	Q13(a)
2	Basic definitions and simple tests on soils	13					
3	Classifications of soils	12		Q2		Q10(a)	Q14(a)
4	Hydraulic and Mechanical properties of soils	13					
5	Bearing capacity of soils	12		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Consolidation and Compaction of soils	13			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		75	8			8	8

Course Contents

UNIT 1: General characteristics of Soils **Duration: 12 Periods (L:10– T:2)**

a) Soil mechanics – Importance of soil mechanics – Origin of soil – Formation of soil - types of soils – Residual soil, Transported soil, sand, silt, clay, peat, loess, muram, caliche, clay, bentonite –Major soil deposits in India
b) Mechanical analysis of soils – Hydrometer and Sieve analysis of soil particles – semi logarithmic grain size curve.
c) Physical properties of soils – plasticity, cohesion, consolidation.

UNIT 2: Basic Definitions and Simple Tests on soils

Duration: 13Periods (L:10– T:3)

a) Three phase diagram of soil – Volumetric Relationships- Voids ratio, Porosity, Degree of saturation, Percentage air voids, Air content, Volume- Mass Relationships, Bulk density, Dry density, Saturated density, Submerged density, Density of solids, Volume-Weight Relationships-Bulk unit weight, Dry unit weight, Saturated unit weight, Submerged unit weight, Unit weight of solids , Density index.
b) Water content – Tests for determination of soil moisture content-oven drying method-Pycnometer method- Specific gravity of solids – Mass Specific Gravity-Absolute Specific gravity- Tests for determination of specific gravity of soil- Pycnometer method.
c) Atterberg's Limits - Liquid Limit, Plastic Limit, Shrinkage Limit – Tests for determination of Atterberg's Limits – plasticity index.
d) Relationships of volume of voids, moisture content, density of soil mass, dry density, saturated density, submerged density, specific gravity, voids ratio, porosity, degree of saturation, percentage of air voids, air content, density index - simple problems using the above relationships. (Derivation of relationships between various soil parameters is not required)

UNIT 3: Classifications of Soils **Duration: 12Periods (L:10– T: 2)**

Classification of soils – different systems of classification of soils – Textural classification of soils – I.S. classification of soils –-Field identification of soil.

UNIT 4: Hydraulic and Mechanical Properties of Soils

Duration: 13 Periods (L:10 – T:3)

a) Permeability of soil –Essentiality of permeability –Darcy's law – Tests on determination of coefficient of permeability – laboratory methods.
b) Compressibility of soils – Shearing resistance of soils– shear strength experiment with direct shear apparatus (Explanation of testing procedure with the help of figures only).

UNIT 5: Bearing Capacity of Soils: **Duration: 12periods (L: 10 – T:2)**

Bearing capacity – Basic definitions: Ultimate bearing capacity, Net ultimate bearing capacity, Net safe bearing capacity, Gross safe bearing capacity – Importance of bearing capacity in foundation design – Bearing capacity of shallow footings – presumptive bearing capacity values – IS code equation for computing bearing capacity (No derivation) – Types of shear failures - Field plate load test.

UNIT 6: Consolidation and Compaction of soils

Duration: 13Periods (L:10 – T:3)

a) Consolidation of Soils

Consolidation –Initial, Primary and Secondary Consolidation, Terzaghi's model analogy of compression springs showing the process of consolidation – field implications.

b) Compaction of Soils

Theory of compaction – compaction and its objectives – factors affecting compaction - Laboratory compaction tests – Proctor's compaction test – Modified Proctor's compaction test – Methods of compaction used in field - field measurement of dry density by core cutter method and sand replacement method.

Recommended Books

1. Soil Mechanics and Foundation Engineering by Dr. B. C. Punmia
2. Modern Geo Technical Engineering by Alam Singh
3. Soil Mechanics (SI Version) by T. W. Lambe and Robert V. Whitman
4. Geo Technical Engineering by Dr. C. Venkatramaiah
5. Soil Mechanics by Lambe and Whiteman
6. Soil Mechanics in Engineering Practice by Terzaghi, R. B. Peckand G. Mesri
7. Geotechnical Engineering by Manoj Datta and S. Gulhat
8. Fundamentals of Soil Behaviour by Mitchell and Soga.
9. Soil Mechanics and Foundation Engineering by Dr. K.R Arora
10. Geo Technical Engineering by Prof T. N. Ramamurthy

Suggested E-learning references

http://nptel.ac.in

Suggested Learning Outcomes

Upon completion of course, the student shall be able to

CO1 - Characterize and classify soils.

1.1 State the importance of soil mechanics.
1.2 State the origin of soil
1.3 State the formation of soil
1.4 List the types of soils
1.5 Describe the hydrometer analysis and sieve analysis of soil particles
1.6 Describe the semi-logarithmic grain size curve.

1.7 Define the physical properties of soils like plasticity, cohesion and consolidation.

CO2 - Develop volumetric relationships between different soil parameters and explain the experimental methods to measure the physical and mechanical properties of the soils.

2.1. Explain the three phase diagram of soil.
2.2. Define the terms: Voids ratio, Porosity, Degree of saturation, Percentage air voids, Air content, Bulk density, Dry density, Saturated density, Submerged density, Density of solids, Bulk unit weight, Dry unit weight, Saturated unit weight, Submerged unit weight, Unit weight of solids, Density index.
2.3. List methods for determination of water content of soil.
2.4. Describe the test procedure for determination of moisture content of soil by oven drying method and pycnometer method.
2.5. List the methods for determination of specific gravity of soil.
2.6. Describe the test procedure for determination of specific gravity of soil by pycnometer method.
2.7. Define the Atterberg's limits/ Consistency limits.
2.8. Describe the test procedures for determination of liquid limit, plastic limit and shrinkage limit of soil.
2.9. Express relationships between volume of voids, moisture content, density of soil mass, dry density, saturated density, submerged density, density of solids, bulk unit weight, dry unit weight, unit weight of solids, saturated unit weight, submerged unit weight, specific gravity, voids ratio and porosity, degree of saturation, percentage of air voids, air content and density index (Derivation of relationships between various soil parameters is not required).
2.10. Work out simple problems using the relationships between various soil parameters.

CO3 - Classify the soils based on different parameters.

3.1. Define soil classification
3.2. State different systems of classification of soils.
3.3. Explain the textural classification of soils with a neat sketch.
3.4. Explain I.S. classification of soils.
3.5. Explain methods for field identification of soils.

CO4 - Explain permeability and shear strength parameters of soils

4.1 Define permeability of soil.

4.2 State the essentiality of permeability in soil engineering.

4.3 Explain Darcy's law.

4.4 State the factors affecting permeability of soil.

4.5 Explain the falling head and constant head permeability tests

4.6 Explain the compressibility of confined layers of soil.

4.7 Explain the shear resistance concept of soils.

4.8 Describe the direct shear test experiment.

CO5 - Discuss bearing capacity of soils in foundation design along with presumptive bearing capacity values and use IS code equation for computing bearing capacityof soils

5.1 Define bearing capacity of soil.

5.2 Define Ultimate bearing capacity, Net ultimate bearing capacity, Net safe bearing capacity, Gross safe bearing capacity of soil.

5.3 Importance of bearing capacity in the design of foundations.

5.4 Justify the importance of 'factor of safety' and 'safe bearing capacity' values in foundation design.

5.5 Methods for determining bearing capacity of soil.

5.6 State the presumptive bearing capacity values and the IS code equation for the calculation of bearing capacity.

5.7 Explain types of shear failures.

5.8 Explain the 'field plate load test' for determining the ultimate bearing capacity of soils.

CO6 - Analyze the principles of consolidation and compaction of soils.

6.1 Define the principle of 'consolidation'.

6.2 Explain Initial Primary and secondary consolidation

6.3 Explain in detail the Terzaghi's model analogy of compression springs, showing the process of consolidation.

6.4 Explain the basic principles of compaction and its objectives.

6.5 State the factors affecting compaction.

6.6 Describe the Proctor's compaction test and Modified proctor's compaction test.

6.7 State the methods of compaction used in field.

6.8 Explain measurement of field density by core cutter method and sand replacement method.

Students activity

1. Visit any construction site and collect soil samples and identify the type of soil by Visual inspection and prepare a report.
2. Prepare a chart of types soils available in different states of India and show them on Indian map with different colour coding.
3. Classify the locally available soil with basic knowledge.
4. Conduct the field tests on soil samples from your college and prepare a report on the tests.
5. Prepare a report on collection of samples of soil.

NOTE 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.

CO-PO Mapping Matrix

	Basic and Discipline Specific	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentati	Practices for Society, Sustainability	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2			2	2	1	3	1,4,5,6,7
CO2	2	2	2				2	1,2.3.7
CO3	2			1	2		2	1,4,5,7
CO4	2	2	1		1		2	1,2,3,5,7
CO5	2				1		2	1,5,7
CO6	2				1		2	1,5,7

State Board of Technical Education and Training, Telangana

Model Question paper

DCE V semester

Mid Semester-I Examination

Course Code: CE-503 **Duration:1 hour**

Course Name: Soil Mechanics **Max.Marks:20 Marks**

PART-A

Answer **all** questions. Each Question carries **one** mark **4x1= 4 Marks**

1) List any two types of soils.

2) Define plasticity of soil.

3) Define Degree of saturation of soil.

4) Define liquid limit.

PART-B

Answer **two** questions. Each question carries **three** marks **2x 3= 6 Marks**

5(a) State the formation of soils

(OR)

5(b) State the origin of soil.

6(a) Write the formula for density index and state the notations.

(OR)

6(b) Determine voids ratio of soil sample when porosity is 40%

PART-C

Answer **two** questions. Each question carries **five** marks **2x 5= 10Marks**

7(a) Explain the dry sieve analysis of soil

(OR)

7(b) Describe semi- logarithmic grain size curve.

8(a) Describe the three-phase diagram of soil.

(OR)

8(b) Describe the test procedure for determination of moisture content of soil by oven drying method.

State Board of Technical Education and Training, Telangana

Model Question paper

DCE V semester

Mid Semester-II Examination

Course Code: CE-503 **Duration:1 hour**

Course Name: Soil Mechanics **Max.Marks:20 Marks**

PART-A

Answer **all** questions. Each Question carries **one** mark. **4x1= 4 Marks**

1) Define soil classification.

2) List the two types of soils based on grain size.

3) Define permeability of soil.

4) List the two laboratory tests for determination of permeability of of soils

PART-B

Answer **two** questions. Each question carries **three** marks **2x 3= 6 Marks**

5(a) Explain any one test for field identification of fine grained soil.

(OR)

5(b) State various systems of soil classification.

6(a) Explain Darcy's law.

(OR)

6(b) State any three factors which are affecting the permeability of soil.

PART-C

Answer **two** questions. Each question carries **five** marks **2x 5= 10Marks**

7(a) Explain the textural classification of soils with neat sketch.

(OR)

7(b) Explain IS classification of soils.

8(a) Explain the compressibility of confined

layers of soil.

(OR)

8(b) Describe the direct shear test experiment.

State Board of Technical Education and Training,
Telangana Model Question paper
DCE V
semester Semester
End Examination

Course Code: CE-503 **Duration:2 hours**
Course Name: Soil Mechanics **Max.Marks:40 Marks**

PART-A

Answer **all** questions. Each question carries **one** mark **8x1= 8 Marks**

1) Define the term cohesion.
2) Define soil classification.
3) Define bearing capacity of soil.
4) Define the term degree of saturation.
5) Define ultimate bearing capacity of soil.
6) List any two methods for determining bearing capacity of soil.
7) Define consolidation of soil.
8) Define compaction of soil.

PART-B

Answer **four** questions. Each question carries **three** marks **4x 3= 12 Marks**

9(a) State the formation of soil.

(OR)

9(b) State the importance of bearing capacity in the design of foundations.

10(a) State the essentiality of permeability in soil engineering.

(OR)

10(b) State any three objectives of compaction.

11(a) Distinguish between net safe bearing capacity and net ultimate bearing capacity.

(OR)

11(b) State the importance of factor of safety and safe bearing capacity values in foundation design.

12(a) State various methods of compaction used in field.

(OR)

12(b) State any three factors which affect compaction of soil.

PART-C

Answer **four** questions. Each question carries **five** marks **4x 5= 20Marks**

13(a) Describe the sieve analysis of soil particles.

(OR)

13(b) Explain the field plate load test for determining the ultimate bearing capacity of soils.

14(a) Explain the compressibility of confined layers of soil.

(OR)

14(b) Explain in detail the Terzaghi's model analogy of compression of springs showing the process of consolidation.

15(a) Explain types of shear failures.

(OR)

15(b) State the presumptive bearing capacity values and the IS code equation for calculation of bearing capacity.

16(a) Describe the Proctor's compaction test.

(OR)

16(b) Explain measurement of field density by core cutter method.

CE-504 ADVANCED QUANTITY SURVEYING

Course Title	Advanced Quantity Surveying	Course Code	CE-504
Semester	V Semester	Course Group	Core
Teaching Scheme in Periods(L:T:P)	60:15:0	Credits	2.5
Methodology	Lecture + Tutorials	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of basic Mathematics, Materials of Construction, Construction Practice, Reading the drawings and plans.

Course Outcomes

Up on completion of the Course, the student will be able to

CO1	Prepare an estimate for RCC Structural elements -Staircases
CO2	Prepare an Estimate for quantity of Steel in R.C.C elements
CO3	Assess and perform Earth work calculations
CO4	Assess and prepare detailed estimates for Roads and Culverts.
CO5	Prepare detailed estimate for Irrigation and Public Health Engineering works.
CO6	Assess the Valuation of building

Course Content and Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Detailed estimate of RCC elements- Staircases</td><td>12</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>2</td><td>Estimation of quantity of steel in RCC elements</td><td>13</td></tr>
<tr><td>3</td><td>Earth work calculations</td><td>12</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>4</td><td>Detailed estimates of Roads and Culverts</td><td>13</td></tr>
<tr><td>5</td><td>Detailed estimates of Irrigation and Public Health Engineering works</td><td>15</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>6</td><td>Valuation of buildings –</td><td>10</td><td>Q7,Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
<tr><td colspan="2">TOTAL</td><td>75</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT 1: Detailed estimate of RCC elements- Staircases

Duration: 12 Periods(L:10 – T:2)

a) Types of Stair cases, component parts
b) Detailed Estimation of R C C Dog legged stairs
c) Detailed Estimation of R C C Open well stairs
d) Detailed Estimation of R C C Semi round stairs

UNIT 2:Estimation of quantities of Concrete and Steel in R C C elements:

Duration: 13 Periods(L:10– T:3)

Bar bending schedule for the following RC elements.

a) Simply supported singly reinforced R.C.C beams / Lintel / Sunshade
b) Simply supported one-way slab.
c) R.C.C column with square footing.

UNIT 3: Earth Work Calculations

Duration: 12 Periods(L:10– T:2)

a) Lead and Lift – Initial and subsequent values
b) Methods for computing volumes in level sections for roads and Canals - Mid- Ordinate Method – Mean Sectional Area Method – Trapezoidal Rule – Prismoidal Rule and their limitations
c) Taking out quantities from Longitudinal Section and Cross Section in cutting and embankment of level sections-Calculation of Areas, Volumes
d) Capacity of Reservoir from the table of areas and contours

UNIT 4: Detailed Estimates of Roads and Culverts

Duration: 13 Periods (L:10– T:3)

Detailed Estimation of

a) Gravel Road
b) Water bound macadam road
c) Cement concrete road
d) Pipe culvert
e) R C C slab culvert with straight returns

Different items in abstract estimate of above Works

UNIT 5: Detailed Estimates of Public Health Engineering works

Duration: 15 Periods (L:12– T:3)

Detailed Estimates of Irrigation and Public Health Engineering works

a) Open well with masonry staining

b) R C C Over head tank

c) Septic tank with soak pit / dispersion trench

d) Tank sluice with tower head.

e) Different items to be included in the abstract estimates of the above

Unit 6: Basic Principles of Valuation

Duration: 10 Periods(L:8– T:2)

a) Definition, meaning and purpose of valuation.
b) Factors governing valuation-Life of structure, type location maintenance,legal control
c) Scrap value, salvage value, market value and book value sinking fund
d) Calculation of depreciation by different methods.
e) Methods of valuation.

Reference Books

2. Estimating and Costing - B.N. Dutta
3. Estimating and Costing - S. C. Rangwala

Suggested E-learning references

1. http://nptel.ac.in
2. https://www.youtube.com/watch?v=1JdAPaDHueM
3. https://www.youtube.com/watch?v=F4KQoqlDLaY
4. https://www.youtube.com/watch?v=ndgThVc6vMs

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1 - Prepare an estimate for RCC Structural elements -Staircases

1.1 Explain types of staircases, component parts
1.2 Prepare detailed estimates of Dog legged staircase
1.3 Prepare detailed estimates of Open well staircase
1.4 Prepare detailed estimates of Semi round staircase

CO2 - Prepare an Estimate for quantity of Steel in R.C.C elements

2.1 State different methods of estimation of steel required for R C C work involved in a building
2.2 Explain different methods of estimation of steel required for R C C work involved in a building
2.3 State covers for RCC items as per IS 456 : 2000
2.4 Distinguish between straight bars and cranked bars used in simply supported beams
2.5 Preparation of Bar bending schedule of RC elements for below given

a. Simply supported singly reinforced R.C.C beams / Lintel
b. Simply supported one- way slab.
c. R.C.C column with square footing.

CO3 - Assess and perform Earth work calculations

3.1 Explain terms: Embankment, Cutting

3.2 Define: lead and lift

3.3 State the standard values of. Leadand Lift

3.4 Calculate the lead and lift for a given section

3.5 List different methods of computing the areas and volumes

3.6 Explain:

3.6.1 Mean sectional area method

3.6.2 Mid sectional area method

3.6.3 Trapezoidal rule

3.6.4 Prismoidal rule

3.7 State the limitations of prismoidal rule

3.8 Determine the areas of an embankment for a given data

3.9 Determine the areas of a cutting for a given data

3.10 Prepare detailed estimates for earth work for roads, canals and earthen bunds

3.11 Compute gross and effective capacity of a reservoir from the areas of differentcontours

CO4 - Assess and prepare detailed estimates for Roads and Culverts.

3.1 Prepare a detailed estimate for different types of roads and culverts.

a) Gravel road

b) Water bound macadam road

c) Cement concrete road

d) Pipe culvert

e) Slab culvert.

3.2 State the items involved in the abstract estimates of roads and culverts.

CO5 - Prepare detailed estimate for Irrigation and Public Health Engineering works.

5.1 Prepare a detailed estimate for the following items:

a. Open well

b. R.C.C. overhead tank

c. Septic tank with soak pit / dispersion trench.

5.2 State the items to be included in the abstract estimates of above structures

CO6 - Assess the Valuation of building

6.1 Explains terms: Valuation, Scrap value, salvage value, market value, book value, sinking fund, depreciation.

6.2 States the purpose of valuation.

6.3 States the factors governing valuation.

6.4 Calculates depreciation of a building.

6.5 Determines value of a building

Suggested Student Activities

1) Prepare Check list for different items of following type of Civil Engineering works.
    a. Framed structure type of building
    b. Different roads W.B.M.Road.C.C road etc.
    c. Septic Tank
    d. Community well
    e. Over head Tank
    f. Irrigation Structures
2) Collect the market data for cost of construction materials and implement in rate analysis and compare it with the SR book.
3) Rate analysis to be done for construction activities by using alternate materials for River sand and analyze the difference of rates.
4) Rate analysis for works under Lump sum (LS) head to be studied in detail and compared with present SR.
5) Reconciliation of materials for a particular item need to done for an ongoing project.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering practices for Sustainability Society, and Environment	Project Management	Lifel ong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	3	2	-	-	2	2	1,2,3,6,7
CO2	3	3	1	-	-	2	2	1,2,3,6,7
CO3	3	2	1	-	-	2	2	1,2,3,6,7
CO4	3	2	1	-	-	2	2	1,2,3,6,7
CO5	3	2	1	-	-	2	2	1,2,3,6,7
CO6	3	2	1	-	-	2	2	1,2,3,6,7

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-I Examination

Course Code: CE-504 **Duration:1 hour**
Course Name: Quantity Surveying **Max.Marks:20**

PART-A

Answer all questions, Each Question carries one mark.**4x1 = 4 Marks**

1. Name four types of staircases?
2. Write the units for the quantities of a) brick masonry.b) plastering.
3. State two methods of estimating steel in R.C.C elements.
4. How much additional length is provided for one crank of bar dia 'd'.

PART- B

Answer **two questions** .Each question carries **three** marks **2x3=6 marks**

5.(a). Determine the quantity of Brick work in C:M (1:6) for a step of lenth 1.2 m, Rise 150mm, Tread 250 mm.

(OR)

5.(b) Draw the Longitudinal sectional view of dog legged stair case and name the components.

6(a). Briefly explain about the significance of bar bending schedule

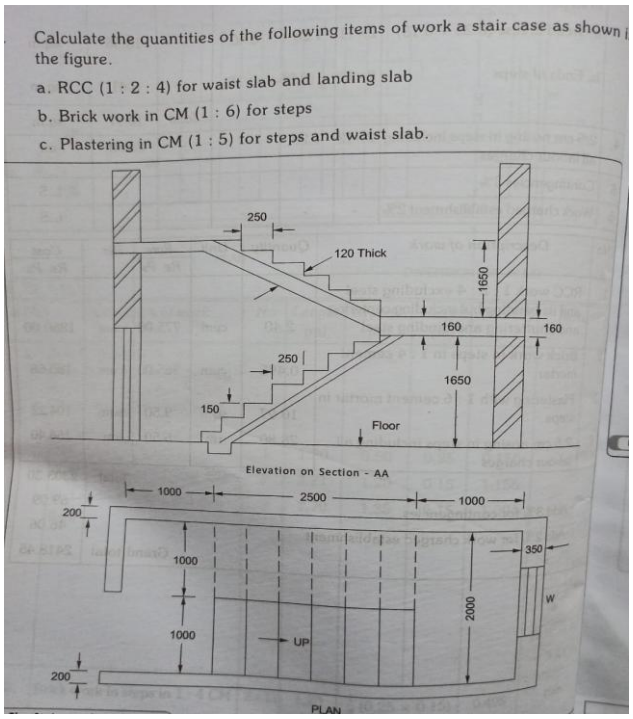
(OR)

6(b) Calculate the length of a stirrup of 6 mm dia for a beam of size 300 mmx 450mm. Assume clear cover 25mm

PART-C

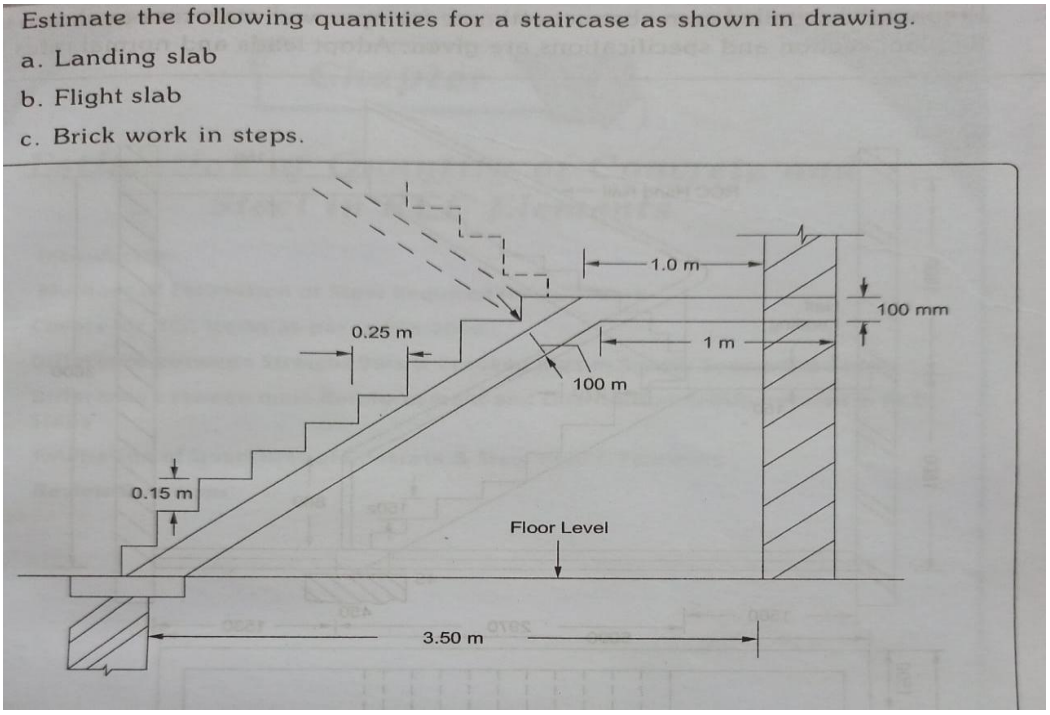
Answer **two questions** .Each question carries **five** marks **2x5=10 Marks**

7(a)

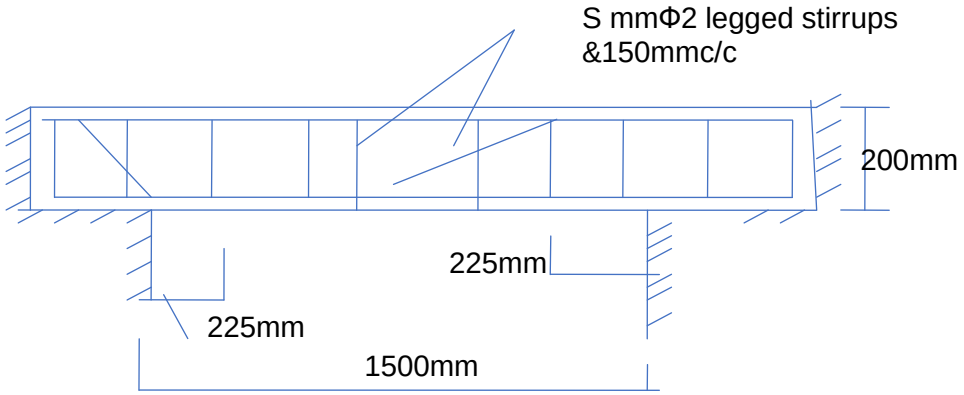


(OR)

7(b).



8 a) Prepare a bar bending schedule and calculate the quantity of steel required from this section of lintel.
Width of Lintel 230 mm.



8(b) Determine the quantity of reinforcement in asimply supported singly reinforced R.C.C beam for the given specification

Specifications :

- Clear span = 3500 mm
- Width of beam = 300 mm
- Over all depth of beam = 600 mm
- Bearing of beam = 300 mm
- All covers of steel = assume suitably

Reinforcement details:

20 mm ø --- 3nos -- main steel.
10 mm ø --- 2nos hanger bars.
8 mm ø @ 210 mm c/c at mid span and @ 100mm c/c at end span.

State Board of Technical Education and Training,Telangana

Model Question paper

DCE IV semester

Mid Semester-II Examination

Course Code: CE-404 **Duration:1 hour**

Course Name: Quantity Surveying **Max.Marks:20 Marks**

PART-A

Answer **all** questions. Each question carries **one** mark **4x1 = 4 Marks**

1. .Define the terms lead and lift .
2. State any two methods of calculation of volume of earth work.
3. State the two items of works involved in WBM roads.
4. Name four components of box culvert.

PART- B

Answer **two questions** .Each question carries **three** marks **2x3=6 Marks**

5.(a)Find the area of embankment, if the top width of the road is 6m and depth is 3m. The side slopes are 2:1.

(OR)

5(b).Calculate the quantity of earth work for 1km length for a portion of the road in a uniform ground the heights of banks at the two ends being 1m and 1.5m. the formation width is 10m and side slopes are 2H:1V.

6(a) Find out the quantity of gravel in a layer of compacted thickness 150 mm(loose 250 mm thick).The width of gravel layer is 4.0 m and length is 600 m.

(OR)

6(b) Calculate the quantity of R.R masonry in a abutment of top width 500 mm, bottom width 2000 mm and height 3.0 m. Length of abutment is 5 m

PART-C

Answer **two questions** .Each question carries **five** marks **2x5=10 Marks**

7(a). Calculate the quantity of earthwork for 8 chains length (30M) for a portion of a road embankment on a level ground having 10.5m formation width and 2:1 side slopes .The level difference between formation and ground levelis0.9m,0.7m,1.20m,3.4m,2.90m,3.10m,3.40m,2.60m,2.40m respectively. Use Trapezoidal method.

(OR)

7(b) Explain how the Capacity of Reservoir from the table of areas and contours is determined.

8 (a) Prepare a detailed estimate for laying a cement concrete pavement (1:2:4) 100 mm thick and 4m wide laid over a base course of cement concrete(1:4:8) 100 mm thick for 1Km length over a prepared sub grade (embankment)

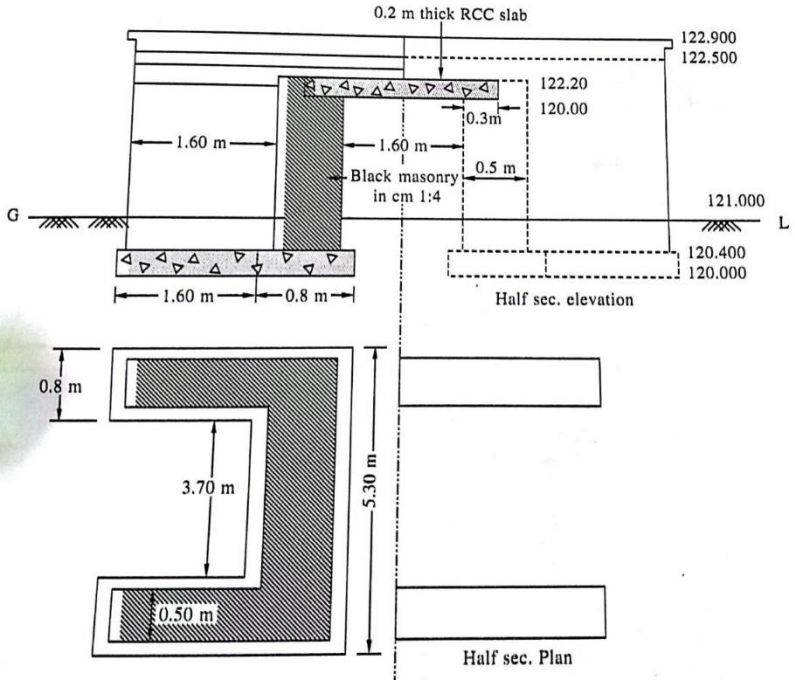
8.(b).

Prepare the detailed estimate of following items of work from drawing of R.C.C. slab culvert.

(a) C.C. bed (1:4:8) for foundation under abutment and returns.

(b) R.R. masonry for abutment and returns

(c) R.C.C. (1:2:4) deck slab for vent way.



State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV Semester
Semester End Examination

Course Code: CE-404 **Duration:2 hours**
Course Name: Quantity Surveying **Max.Marks:40 Marks**

PART-A

Answer **all** questions. Each question carries **one** mark **8x1 = 8 Marks**

1. Write the approximate percentage of steel used in Lintels, columns
2. State two methods to work out earth work calculations
3. Write the units for the measurement of a) Dry stone pitching b) plastering for abutment wall.
4. Nate two components of staircase where R.C.C item is involved.
5. List out four items involved in Soak Pit
6. List out two items involved in open well and their units
7. Define Salvage value
8. What is obsolescence.

PART-B

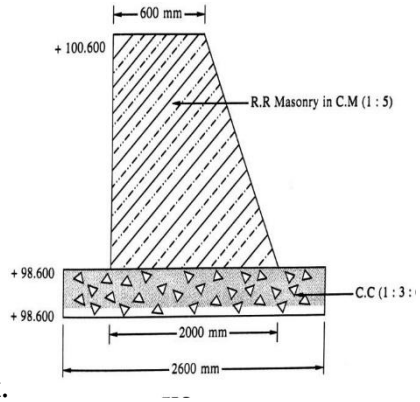
Answer four questions. Each question carries three marks **4x3=12 marks**

9.a). Calculate the length of a lateral tie of 6 mm dia for a column of size 300 mmx 300mm. Assume clear cover 25mm

OR)

9.b). The size of a over head tank is 4.5mx 4.5m with side walls 200mm thick. Calculate the quantity of RCC for a base slab if the thickness is 100mm.

10(a). Calculate the following quantities for an abutment wall shown in fig. take the length of wall as5m.

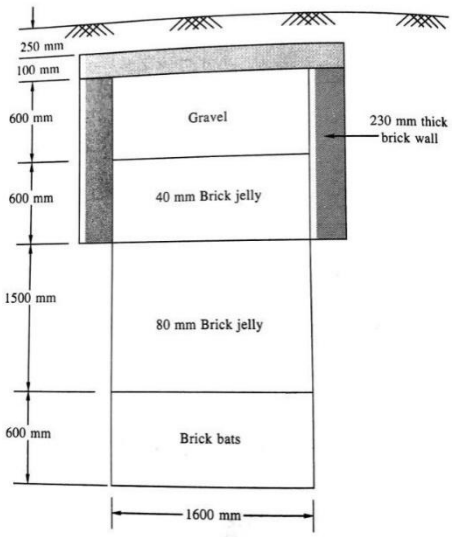


a) CC bed under abutment b) Masonry used in abutment.

(OR)

10(b). State the factors governing valuation

11(a). The cross section of a dispersion trench is 1.6m dia is shown in fig. Calculate the quantity of brick masonry for the side walls.



(OR)

11(b) The size of a over head tank is 4.5mx 4.5m with side walls 200mm thick. Calculate thequantity of RCC for a base slab if the thickness is 100mm.

12(a). State any six objectives of valuation of building.

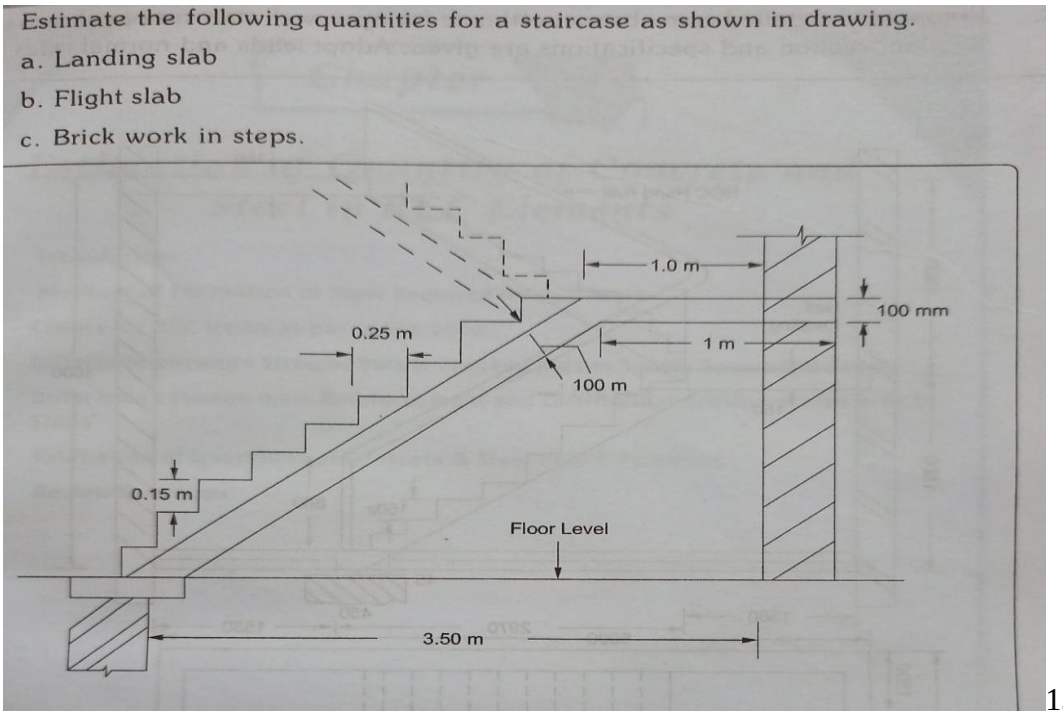
(OR)

12(b) Define the term depreciation. State two types of depreciation

PART-C

Answer any 4 questions. Each question carries five marks 4x5=20 marks

13 a)



13.a).

(OR)

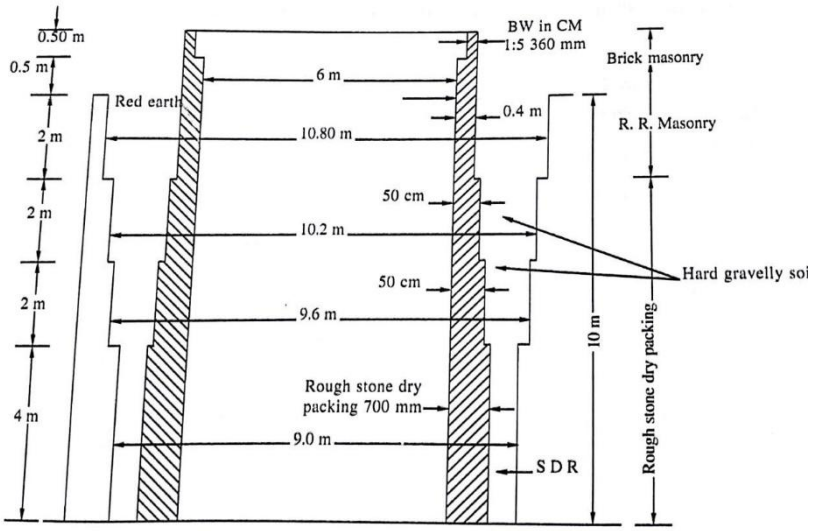
13(b)

Prepare detailed estimate of open well of drawing

(i) Earth work excavation

(ii) Rough stone dry packing

(iii) R.R. masonry in C.M. (1:6)



14.(a). For an embankment 60m long of uniform gradient when the height of bank is 3m at one endand 1.8m at the other .The width of embankment at top is 6m and its side slopes are 1.5:1 .

Estimate the quantity of earth work by

a) Mid sectional area method b) Prismoidal method.

(OR)

14 b) A cost of construction of a building was Rs.5,00,000 in 1978. The life of building is 60 years. Calculate the total depreciation now assuming salvage value of 10%, by

1. Straight line method.
2. Constant percentage method
3. Sinking fund method with an interest rate of 6%.

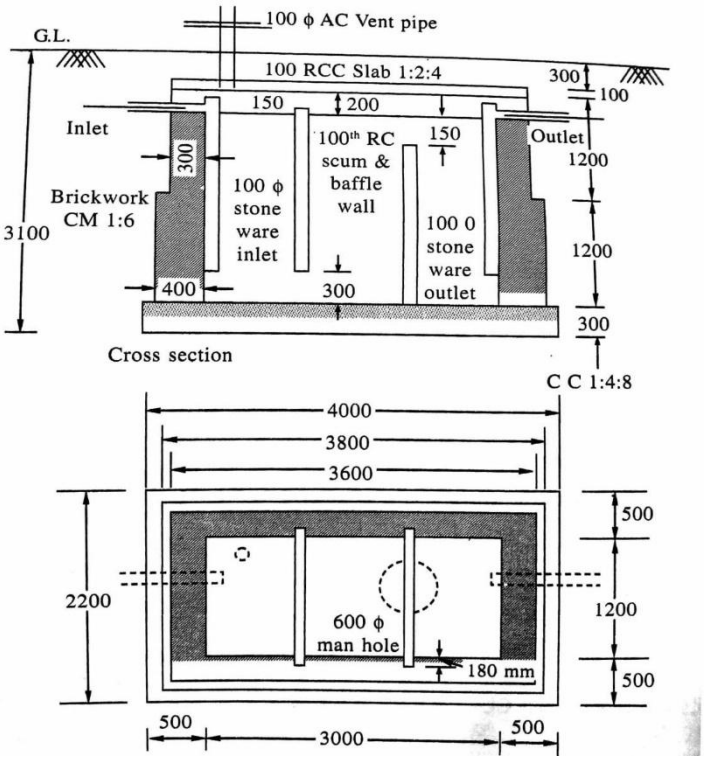
15.a).

Calculate the following quantities of a septic tank in the Fig. 5.21.

(a) C.C. (1:4:8) under septic tank

(b) Brick masonry in CM (1:5) for side walls

(c) R.C.C. (1:2:4) for roof cover, scum board and baffle wall.



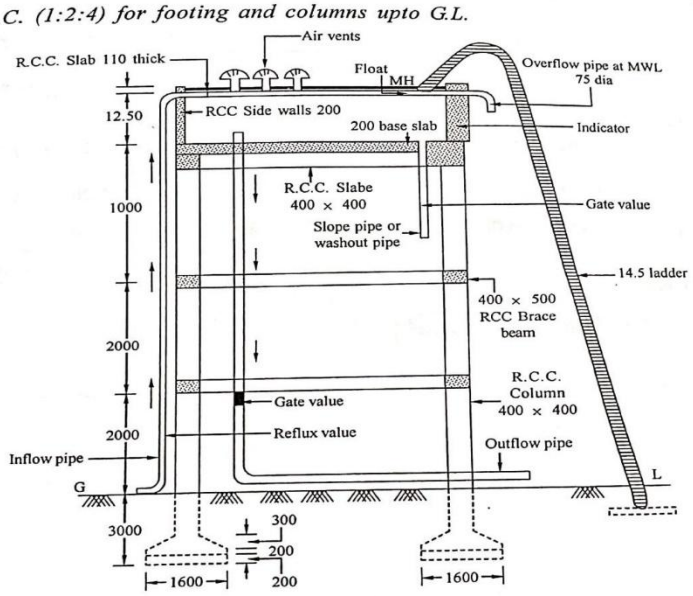
(OR)

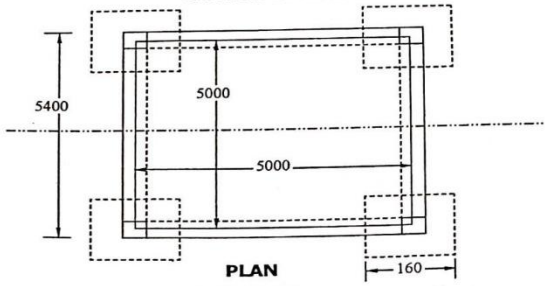
15.b)

Prepare a detailed estimate of following items of work for an over head tank shown in Fig. 8.24.

(a) Earth work excavation for foundation.

(b) R.C.C. (1:2:4) for footing and columns upto G.L.





16 a) Explain briefly various Methods of building Valuation.

OR

16 b) The gross rent accruing to a property is Rs.5000/- per month. Allowing 10% as deductions for repairs , maintenance and management of the property, estimate the value of the property by rental method at the rate of interest is 10% . Assume the rent to be realized for very long period.

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CE-505A THEORY OF STRUCTURES

Course Title	**Theory of Structures**	Course Code	**CE-505A**
Semester	**V Semester**	Course Group	**Elective**
Teaching Scheme in periods(L:T:P)	**60:15:0**	Credits	**2.5**
Methodology	**Lecture+Tutorials**	Total Contact periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

Knowledge of Engineering Mechanics, Strength of Materials and Basic Engineering Mathematics

Course Outcomes

On completion of the course, the student shall be able to

CO1	Calculate the thickness of a thin cylinder based on hoop stress and longitudinal stress
CO2	Identify and Resolve the various loads acting on the dams and evaluate the stresses and failure conditions.
CO3	Determine the stresses at the base of retaining wall with and without surcharge.
CO4	Analyze the indeterminate structures like Propped cantilevers and Fixed beams.
CO5	Evaluate the continuous beams using Moment Distribution method.
CO6	Resolve and evaluate the axial forces of indeterminate trusses using Method of joints and method of sections.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Thin cylinders	10	Q4	Q1		Q9(a)	Q13(a)
2	Dams	15					
3	Retaining walls	12		Q2		Q10(a)	Q14(a)
4	Statically indeterminate beams-Propped Cantilevers and Fixed beams	13					
5	Statically Indeterminate beams-Continuous beams	12		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Stresses in Frames	13			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
	Total	75	8			8	8

Course Contents

UNIT 1: Thin Cylinders

Duration:10 Periods(L:8 – T:2)

Introduction- Thin cylinders - Failures of thin cylinders-Longitudinal and Hoop stresses in thin cylinders (Derivations not required) – Calculation of thickness of thin cylinder under internal pressure – Problems - strains and change in dimensions (δd, δl, δv) of thin cylinders – Problems.

UNIT 2: Dams

Duration:15 Periods(L:13 – T:2)

Introduction – rectangular dams – trapezoidal dams(one side batter only) - Calculation of maximum and minimum stresses at the base of a dam - trapezoidal dams having water face vertical and inclined on one side only– Conditions for the stability of a dam – Calculation of minimum base width of a dam.

UNIT 3: Retaining Walls

Duration:12 Periods(L:10 – T:2)

Active and passive earth pressure - Angle of internal friction, Angle of surcharge. Calculation of active earth pressure by Rankine's formula with and without surcharge. Calculation of maximum and minimum stresses at the base of retaining wall having soil face vertical with levelled earth and surcharge. (Walls with batter on earth face not included). General conditions of stability of retaining walls – Middle third rule – Distribution of pressure on foundation of retaining walls – calculation of minimum base width – Problems on one side batter only other than earth face.

UNIT 4: Statically indeterminate beams-Propped Cantilevers and Fixed beams

Duration:13 Periods(L:10 – T:3)

a) Statically determinate and indeterminate structures –Analysis of propped cantilevers with UDL on whole span and cantilevers with point load between fixed and propped ends – Calculation of prop reactions – SFD and BMD.

b) Fixed Beams: Introduction- Determination of fixed end moments by Moment Area method – standard cases – fixed beams subjected to symmetrical concentrated loads – Fixed beams subjected to U.D.L throughout –B.M.D. and S.F.D – problems (without sinking of props) – Maximum deflection formulae of fixed beams subjected to central point load and fixed beams subjected to U.D.L throughout (No derivation) – problems.

UNIT 5: Statically indeterminate beams-Continuous beams

Duration:12 Periods(L:10 – T:2)

Introduction of Moment Distribution Method (Hardy cross method) – Sign conventions – stiffness factor – carry over factor – distribution factor – Application to continuous beams with same moment of inertia through out the span carrying single point load (central or eccentric) or UDL throughout the individual span of two span and three span beams only(combination of UDL and point loads not included together)-sketching of B.M.D only

UNIT 6: Stresses in frames **Duration: 13 Periods(L:7.8 – T:5.2)**

Frames – Definition – classification based on number of members and number of joints – Determination of forces in members of statically determinate pin jointed trusses – method of joints and method of sections– application to simple trusses-(simply supported and cantilever) trusses under loads acting at the joints.

RecommendedBooks

1. Strength of Materials by R. Subramanian , Oxford university Press
2. Analysis of Structures by Thandavamoorthy, Oxford university Press
3. Theory of structures by S.Ramamrutham and R.Narayan, Dhanpath Rai publications
4. Strength of materials by B.C.Punmia, Laxmi publications
5. Theory of structures by B.C.Punmia and A.K.Jain, Laxmi publications
6. Structural Analysis –A Unified Approach by D S PrakashRao, Universities press publications
7. Strength of materialsby R.K .Rajput, S.Chand publications
8. Strength of Materials by R.K. Bansal,Laxmi publications
9. https://www.sciencedirect.com/book/9780080116549/basic-theory-of-structures

Journals

1. https://www.sciencedirect.com/journal/engineering-structures
2. https://www.sciencedirect.com/journal/thin-walled-structures
3. https://www.sciencedirect.com/journal/computer-methods-in-applied-mechanics-and-engineering

Suggested E-learning references

1. https://archive.nptel.ac.in/courses/105/105/105105166/
2. https://www.youtube.com/watch?v=HmQjDvcnKzo
3. https://nptel.ac.in/

Suggested Learning Outcomes

On completion of the subject the student shall be able to

CO1 - Calculate the thickness of a thin cylinder based on hoop stress and longitudinal stress

1.1. Define thin cylinder
1.2. Explain failures of thin cylinders
1.3. Explain longitudinal and hoop stresses in the cylinder under internal pressure
1.4. State the formulae for longitudinal and hoop stresses in thin cylinders.
1.5. Calculate the longitudinal and hoop stresses in the cylinder under internal pressure, given the dimensions of thin cylinders
1.6. Calculate the thickness of a thin cylinder
1.7. State the formulae for strains and changes in dimensions of a thin cylinder
1.8. Calculate the changes in dimensions of a thin cylinder under internal pressure
1.9. Problems based on joint efficiency.

CO2 - Identify and Resolve the various loads acting on the dams and evaluate the stresses and failure conditions.

2.1 Define a dam.
2.2 List the forces acting on a dam .
2.3 Calculate maximum and minimum stress intensities at the base of a trapezoidal dam with water face vertical and inclined.
2.4 Sketch the stress distribution at the base of a dam for different conditions
2.5 Calculate the stress intensity at the base of a Rectangular / Trapezoidal dam(one side batter only) with or without free board
2.6 List the conditions of stability of a dam
2.7 Check the safety of dam:
  (i) to avoid tension in the masonry dam at its base,
  (ii) to prevent over-turning of the dam,
  (iii) to prevent sliding of the dam
  (iv) to prevent the crushing of masonry
2.8 Define middle third rule
2.9 Minimum base width of a dam
2.10 Calculate minimum base width of a trapezoidal(one side batter only)/ rectangular / triangular sections of a dam without free board to avoid tension at the base
2.11 Calculate the minimum base width of a trapezoidal dam with water face vertical and having free board to avoid tension and sliding.
2.12 Solve the problems on checking the stability of a dam with water face vertical.

CO3 - Determine the stresses at the base of retaining wall with and without surcharge.

3.1 Define: i)Retaining wall and
ii) Angle of repose of soil iii) Angle of Surcharge
iv) Active earth pressure v) Passive earth pressure

3.2 Differentiate between active earth pressure and passive earth pressure

3.3 Compute the lateral earth pressure on a retaining wall having soil face vertical with levelled earth and surcharge.

3.4 Calculate the stresses at the base of a retaining wall for the above cases

3.5 Calculate the minimum base width of a retaining wall with vertical soil face and levelled earth to avoid tension and sliding near the base

3.6 Check the stability of a retaining wall with soil face vertical and having levelled and surcharged earth

CO4 - Analyze the indeterminate structures like Propped cantilevers and Fixed beams.

4.1. Differentiate between a statically determinate and indeterminate structure.

4.2. Define the degree of static indeterminacy

4.3. Calculate the degree of static indeterminacy for a propped cantilever beam, fixed beam and two span continuous beams.

4.4. Calculate the prop reaction of a propped cantilever beam subjected to UDL throughout OR a single point load between fixed and propped ends

4.5. Calculate SF and BM and draw SFD and BMD for a propped cantilever beam with UDL throughout or single point load .

4.6. Calculate the location of point of contra flexure in propped cantilever beam with UDL throughout or single point load only.

4.7. State the merits and demerits of fixed beams.

4.8. Sign convention of sagging and hogging bending moments.

4.9. Derive the conditions required for the analysis of fixed beams by moment area method.

4.10. Derive the formulae for the fixed end moments due to central point load or UDL throughout on a fixed beam.

4.11. Draw SFD and BMD for a fixed beam with UDL throughout or central point load only.

4.12. State the formulae for maximum deflection in a fixed beam with UDL throughout or Central point load only..

4.13. Calculate the maximum deflection in a fixed beam using the above formulae.

CO5 - Evaluate the continuous beams using Moment Distribution method.

5.1 Define the stiffness factor, distribution factor and carry over factor.

5.2 Calculate stiffness factor and distribution factor at an intermediate support of a beam or non-hinged joint.

5.3 Calculate span moments and support moments for two span or three span continuous beams with different end conditions, carrying single point load (central or eccentric) or UDL throughout the individual span, using the moment distribution method

5.4 Draw BMD only for the two span or three span continuous beams with the above type of loading and end conditions, using the moment distribution method (overhangs, beams with varying moment of inertia, supports at different levels not included)

CO6 - Resolve and evaluate the axial forces of indeterminate trusses using Method of joints and method of sections.

6.1. Define a truss.

6.2. Classify the trusses based on the number of members and number of joints.

6.3. Show the sign convention for different types of stresses in members of a truss

6.4. Explain the rules for assuming the direction of stresses in the members.

6.5. Explain the method of calculating stresses / forces in the members of a truss by the method of joints.

6.6. Calculate the stresses / forces in the members of a simply supported or cantilever trusses subjected to loads at nodal points by the method of joints and prepare force table.

6.7. Explain the method of calculating stresses / forces in the members of a truss by the method of sections(no problems).

6.8. Differentiate between the method of joints and the method of sections.

6.9. Calculate the Forces in the members of a simply supported or cantilever truss subjected to loads at nodal points by the method of sections and prepare force table

Suggested Student Activities

1. Analyse part of your institution building framed structure elements by Moment Distribution Method
2. Prepare a report on identifying and analyzing the trusses found in nearby workshop premises of your institution
3. Prepare the list of dams constructed in India from 2000 to 2024.
4. Submit a detailed report on dams or barrages failures happened recently in India.
5. Examine the retaining walls constructed at the hill roads.
6. Evaluate the retaining walls constructed in the underground construction of the buildings or ramps

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2	1	3	3	3	2	1,2,3,7
CO2	2	2	2	2	2	2	3	1.2.3.7
CO3	2	2	2	2	2	2	2	1,2,3,7
CO4	2	2	1	1	3	1	3	1,2,3,7
CO5	2	2	2	2	3	2	2	1,2,3,7
CO6	2	2	1	2	2	2	2	1,2,3,7

State Board of Technical Education and Training,Telangana

Model Question Paper

DCE V Semester Mid Semester-I Examination

Course Code: CE-505E (A) **Duration:1 hour**

Course Name: THEORY OF STRUCTURES **Max.Marks:20 Marks**

PART-A

Answer **all** questions, Each Question carries **one** mark **4x1 = 4 Marks**

1. What is seamless joint?
2. State the assumptions made in analyzing the thin cylinders.
3. State the stability conditions of the dam.
4. Sketch the elementary profile of the dam?

PART-B

Answer **TWO** questions. Each question carries **THREE** marks **2x 3 = 6 Marks**

5(a). Determine the longitudinal stress of a thin cylinder if the maximum shear stress is 30N/sqmm and the radius is 200mm.

(OR)

5(b). Evaluate the ratio of hoop strain to longitudinal strain when Poisson's ratio is 0.5.

6(a). Sketch the stress diagram at the base of the dam, when the compressive stress is 150Mpa at heel and 50Mpa at toe of the dam.

(OR)

6(b). Summarize the importance of middle third rule from safety point of view of dam

PART-C

Answer **TWO** questions. Each question carries **FIVE** marks **2x 5 = 10 Marks**

7(a). A cylindrical shell 2.5m long has 1.2m internal diameter and 10mm thickness. Calculate circumferential and longitudinal stresses and changes in dimensions of the shell, if it is subjected to an internal pressure of 2.5 N/mm^2. Take E = 2 x 10^5 N/mm^2 and 1/m = 0.3

(OR)

7(b). Calculate the minimum wall thickness required for a thin cylinder 1.2m diameter, if it is to withstand an internal pressure of 3 N/mm^2 and
(i) Longitudinal stress is not to exceed 30 N/mm^2
(ii) Hoop stress is not to exceed 40 N/mm^2

8(a). A trapezoidal masonry dam 5m high, 1m wide at its top and 3m wide at its bottom retains water on its vertical face. What are the maximum and minimum stresses at the base when the reservoir is empty? Take ω_m= 22kN/m^3 and ω_w= 9.81kN/m^3.

(OR)

8(b) A dam of rectangular section having 10 m high and retains water up to the top of the dam height. Find the minimum base width to avoid tension at the base, if the Weight of masonry 25 kN/cu.m, and specific weight of water 10kN/cu.m

State Board of Technical Education and Training,Telangana

Model Question paper

DCE V semester Mid Semester-II Examination

Course Code:CE-585505E (A) **Duration:1 hour**

Course Name:THEORY OF STRUCTURES **Max.Marks:20**

PART-A

Answer **ALL** questions, Each Question carries **ONE**mark **4x1 = 4 Marks**

1. State the ratio of active earth pressure to Passive earth pressure for the angle of repose 30 degrees.
2. What is Surcharge?
3. Define Propped support.
4. Define point of contraflexure.

PART-B

Answer **TWO** questions. Each question carries **THREE** marks **2x 3 = 6 Marks**

5(a). A trapezoidal retaining wall 10m high, 3m top width retains earth on vertical face and has a slope of 1:2.5 on the other side. Calculate the distance of itscentre of gravity from the toe of the wall.

(OR)

5(b). A trapezoidal masonry retaining wall 2m wide at top and 5m wide at bottom is 7m high. The vertical face retains earth having an angle of repose of 30^0 at a surcharge of 20^0 with the horizontal. Calculate the earth pressure.

6(a). A propped cantilever beam of span 4m carries a Point load of 22 kN at the mid span. Find the prop reaction.

(OR)

6(b). A fixed beam of span 5m carries a UDL of 10kN/m over entire span. Calculate net positive bending moment.

PART-C

Answer **TWO** questions. Each question carries **FIVE** marks **2x 5 = 10 Marks**

7(a). A trapezoidal masonry retaining wall is 12m high and 2m wide at top and 5m wide at bottom with a vertical face retained earth up to its top. Specific weight of masonry and earth are $22kN/m^3$ and $18kN/m^3$ respectively. Angle of repose of soil = 32^0. Calculate the stresses at the base.

(OR)

7(b). A trapezoidal masonry retaining wall is 10m high and 2.5m wide at top and 6m wide at bottom with a vertical face retained earth up to its top. Check the stability of the wall if the allowable pressure on soil is $300kN/m^2$, co-efficient of friction between masonry and the earth is 0.6. The earth pressure on the wall is 960 kN andself weight of wall is 1400 kN.

8(a). A cantilever beam of span 3m propped at its free end is subjected to a u.d.l of 10kN/m over its entire span. Determine the prop reaction and draw the SFD and BMD showing the values at salient points.

(OR)

8(b). A cantilever of 5m span subjected to a point load of 10kN at a distance of 3m from fixed end. If it is propped at its free end, determine the prop reaction and draw the SF and BM diagrams.

State Board of Technical Education and Training,Telangana

Model Question paper

DCE V semester

Semester End Examination

Course Code: CE-585505E (A) **Duration:2 hours**

Course Name: THORY OF STRUCTURES **Max. Marks: 40 Marks**

PART-A

Answer **all**questions.Each question carries **one** mark **8x1 = 8 Marks**

1. Write any two stability conditions ofa dam.
2. What is the difference between a dam and a retaining wall?
3. Define a truss and draw a simple truss.
4. What is meant by statically indeterminate beam?
5. Define 'Distribution Factor' in Moment Distribution Method?
6. Draw the deflected shapes of a two span continuous beam.
7. State the difference between perfect frame and imperfect frame.
8. Mention any two assumptions made in the analysis of frames.

PART-B

Answer **FOUR** questions. Each question carries **three** marks. **4 x 3 = 12 Marks**

9(a) A boiler shell is made of 10mm thick plate having limiting tensile stress of 120 N/mm^2. The efficiencies of longitudinal and circumferential joints are 70% and 40% respectively. Find the maximum permissible diameter of the shell to withstand a pressure of 1.5 N/mm^2.

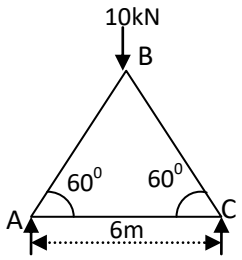
(OR)

9(b) Describe the assumptions of Moment distribution method.

10(a) A fixed beam of span 4.5m carries a point load of 50kN at the centre. Calculate net positive bending moment.

(OR)

10(b) Determine the forces in all the members of the truss shown in figure by method of joints.



11(a) A two span continuous beam ABC of spans 4m and 6m is fixed at A and C. Calculate the distribution factors at the joint B.

(OR)

11(b) Explain “Distribution factors” and “Carry over factors”.

12(a) Distinguish between a deficient frame and redundant frame with the help of an example.

(OR)

12(b) Briefly explain the method of sections of determining the forces in the members of a frame.

PART-C

Answer **FOUR** questions. Each question carries **five** marks. **4 x 5 = 20**

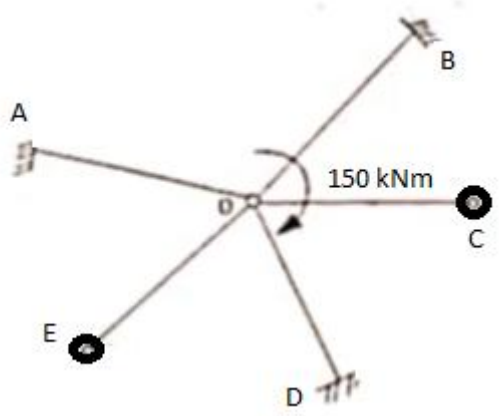
Marks

13(a) The inside diameter of the shell is 0.8m and its length is 1.8m. The thickness of the shell is 15mm. Find the changes in diameter, length and volumewhen a fluid is introduced in it at a pressure of 1.5 N/mm^2. Take E=200 kN/mm^2 and 1/m = 0.35

(OR)

13(b) Five members of same material are rigidly connected at O as shown in Fig. If a moment of 120 KN-m is applied at the joint O. Find out the moments distributed among the members as per table below.E is constant.

Member	Length in meters	Moment of inertia in mm4
OA	2.0	$15X10^4$
OB	2.6	$13X10^4$
OC	2.8	$18X10^4$
OD	2.4	$22X10^4$
OE	2.0	$21X10^4$



14(a) A cantilever beam of span 3m propped at its free end is subjected to a u.d.l of 10kN/m over its entire span. Determine the prop reaction and draw the SFD and BMD.

(OR)

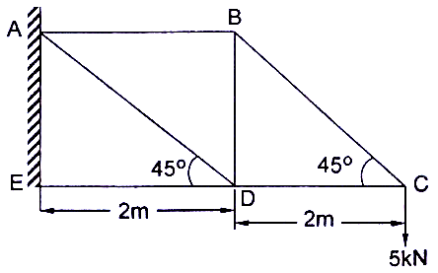
14(b)

15(a) A two span continuous beam ABC is fixed at A and C. Span AB = 5m and span BC = 6m. A central point load of 20kN acts in span AB and a central point load of 40kN acts over span BC. Calculate fixed end moments using Moment Distribution method and draw bending moment diagram.

(OR)

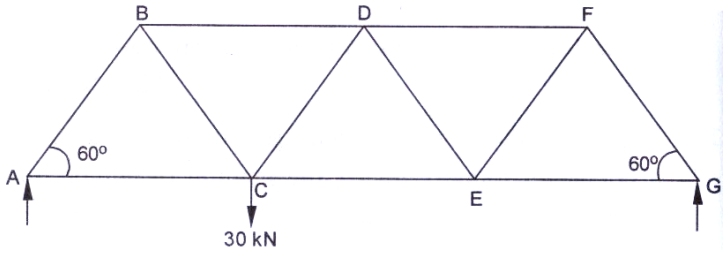
15(b) A two span continuous beam ABC is simply supported at A, B and C. Span AB = 6m and span BC = 4.5m. A central point load of 20kN acts in span AB and a UDL of 8kN/m acts over span BC. Calculate fixed end moments using Moment Distribution method and draw bending moment diagram.

16(a) Determine the forces in the members BC, DC and BD of the truss shown in figure by method of joints.



(OR)

16(b) Determine by method of sections the magnitude and nature of forces induced in the members BD, CA and CE of the girder shown in the figure. Span AC=CE=EG=3m,



CE-505B INTEGRATED WASTE MANAGEMENT

Course Title:	**Integrated Waste Management**	Course Code :	**CE - 505B**
Semester:	**V Semester**	Course Group :	**Elective**
Teaching Scheme in Periods(L:T:P):	**60:15:0**	Credits :	**2.5**
Methodology :	**Lecture+Assignments**	Total Contact Periods :	**75**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This subject requires basic knowledge of Sanitary Engineering

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Identify the principles of safe disposal of solid waste
CO2	Explain the quality and recycling of municipal solid waste.
CO3	Analyze the components of integrated MSW handling system
CO4	Explain the laws on Management of biomedical solid waste.
CO5	Evaluate the importance and recycling of C& D waste
CO6	Illustrate the impacts of e-waste.

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Introduction to Solid Waste Management-	10	Q4	Q1		Q9(a)	Q13(a)
2	Municipal Solid Waste - Characteristics and Quantities	15					
3	Disposal of Municipal Solid Waste	12		Q2		Q10(a)	Q14(a)
4	Biochemical process and Composting	13					
5	Construction and Demolition (C&D) of Waste Management	13		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Electronic Waste Management	12			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
	Total	75	8			8	8

Course Contents

UNIT 1: Introduction to Solid Waste Manageme

Duration: 10 Periods(L:7 – T:3)

a) Definition of Solid waste
b) Classification of solid waste
c) Necessity of Solid waste disposal
d) Safe disposal of solid waste.

UNIT 2:Municipal Solid Waste Characteristics and Quantities

Duration:15Periods(L:11 – T:4)

a) Composition of MSW.
b) Quantity of generated MSW
c) Collection and Transportation of Municipal solid waste.
d) Separation for recycling and reuse of plastics, paper and glass from the MSW.

UNIT 3: Disposal of Municipal Solid Waste

Duration: 12 Periods(L:8.5 – T:3.5)

a) Disposal of MSW.
b) Disposal of MSW by Sanitary Land filling method.
c) Land sealants for the control of gas and Leachate movement.
d) Disposal of MSW by Shredding and Pulverisation.
e) Disposal of MSW by Composting.
f) Disposal of MSW by barging it out into Sea.

UNIT 4: Biochemical process and Composting

Duration: 13 Periods(L:9.5 – T:3.5)

a) Biomedical wastes and their impacts on Health and Environment.
b) Legislative laws on Management of Biomedical wastes in India.
c) Collection, transportation and treatment of Biomedical wastes.
d) Disposal of Biomedical waste.
e) Human Resources issues on biomedical wastes

UNIT 5: Construction and Demolition (C&D)Waste Management

Duration: 13 Periods(L:9.5 – T:3.5)

a) C&D Definition, applicability and waste generating activities.
b) Estimation of C&D waste generation for India.
c) Initiatives to promote recycling of C & D waste in India
d) Importance of recycling C & D Wastes.
e) C&D Waste processing
f) The rules promote C&D Waste utilization.

UNIT 6: Electronic Waste (E-Waste) Management

Duration: 12 Periods(L:8.5 – T:3.5)

a) Definition of E- Waste.
b) Classification of E- Waste.
c) Adverse health and environmental impacts of E-Waste on its improper disposal.
d) Environmental and Occupational Hazards posed by disposal of certain categories of E- Waste.
e) Menace of E- Waste in India

Reference Books

1. Sewage Disposal by S.K. Garg.
2. Municipal Solid waste management by P Jayarami Reddy
3. C&D Waste Management Rules 2016.
4. NPTEL

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes

Upon completion of course, the student shall be able to

CO1 - Identify the principles of safe disposal of solid waste

1.1 Define Solid Waste Management

1.2 Classify Solid Waste Management

1.3 State the necessity of SWM(Solid Waste Management).

1.4 Explain the importance of safe Disposal.

CO2 - Explain the quality and recycling of municipal solid waste.

2.1. Define composition of MSW(Municipal Solid Waste).

2.2. Characteristics of MSW

2.3. Estimate generated quantity of MSW.

2.4. Describe collection and transportation of MSW.

2.5. Explain separation for recycling.

2.6. Explain reuse of Plastics, Paper and Glass from MSW.

CO3 - Analyze the components of integrated MSW handling system

3.1 Define disposal of MSW.

3.2 Explain the methods of disposal

b. By Sanitary Land filling method

c. By Shredding and Pulverization.

3.3 Explain land sealants for the control of gas and Leachate movement

3.4 Explain Disposal of MSW by Composting.

3.5 Explain MSW by Barging it out into Sea.

CO4 - Explain the laws on Management of biomedical solid waste.

4.1 Define Biomedical Waste

4.2 Explain the Biomedical waste impacts on Health and Environment.

4.3 State the Legislative laws on Management of Biomedical wastes in India

4.4 Explain the procedure to collection and transportation of Biomedical wastes

4.5 Explain the Treatment of Biomedical waste.

4.6 Explain the Disposal of Bio medical waste.

4.7 Human Resources issues on biomedical wastes.

CO5 - Evaluate the importance and recycling of C& D waste

5.1. Define C &D.

5.2. Estimate C & D quantities..

5.3. State the importance of recycling C&D waste.

5.4. Explain effective utilization of C&D waste.

5.5. List the Rules to promote C& D waste utilization.

CO6 - Illustrate the impacts of e-waste.

6.1 Define E- Waste.

6.2 State the Classification of E-Waste

6.3 Explain Adverse Health and Environmental Impacts of E-Waste on its Improper Disposal

6.4 State the Environmental and Occupational Hazards posed by Disposal of Certain categories of E- Waste.

6.5 State Menace of E- Waste India

Suggested Student Activities

1) To submit a report to implement a plan to reduce solid waste at your house/ college.
2) To submit a report on the life cycle of a CD/mobile /Calculator etc and prepare a fact sheet on findings in class in the form of Paper/Poster presentation.
3) Field trip to nearest MSW handling facility
4) Visit to any NGO/Public Health Department dealing with the environmental health program
5) Team work for analyzing the need for recycling
6) Prepare an excel sheet on sources of solid waste in a village/ town in teams.
7) Group discussion
8) Surprise Test

CO-PO Mapping Matrix

	Basic knowledg	Discipline Knowledg	Experiments and	Engineering Tools	Engineer and	Environment &	Ethics	Individual and Team	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO 1		2			3	3	2	2			2,5,6,7,8
CO 2		2			3	3	2	2	2		2,5,6,7,8, 9
CO 3		3			3	3	2	2	2		2,5,6,7,8, 9
CO 4		3					3	2		3	2,7,8,10
CO 5		3			3	3	2	2	2		2,5,6,7,8, 9
CO 6		3			3	2	2	2	1		2,5,6,7,8, 9

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V semester
Mid Semester-I Examination

Course Code: CE - 505 E(B) **Duration:1 hour**
Course Name: INTEGRATED WASTE MANAGEMENT **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries **one** mark **4x1 = 04 Marks**

1) Define Solid waste management.
2) Give the classification of Solid waste management
3) State the necessity of Solid waste management
4) Define composition of Municipal Solid Waste

PART-B

Answer **two** questions, Each Question carries **three** marks **2x3 = 06 Marks**

5(a) Explain the Importance of safe Disposal

(OR)

5(b)Write about the transportation of Municipal Solid Waste.

6(a) How do you Estimate generated quantity of Municipal Solid Waste .

(OR)

6(b) List out any four methods of collection of Municipal Solid waste.

PART-C

Answer **two** questions, Each Question carries **five** marks **2x5 = 10 Marks**

7(a)Explain the Importance of safe Disposal.

(OR)

7(b) Explain separation for recycling

8(a)Explain reuse of Plastics, Paper and Glass from MSW

(OR)

8(b) Draw the flow diagram of Collection to transportation of MSW

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V semester
Mid Semester-II Examination

Course Code: CE - 505 E(B) **Duration:1 hour**
Course Name: INTEGRATED WASTE MANAGEMENT **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries **one** mark. **4x1 = 04 Marks**

1. List the methods of disposal of Municipal Solid waste management.
2. Define biomedical waste.
3. State any two legislative laws on Management of Biomedical wastes in India.
4. What are the land sealants for the control of gas.

PART-B

Answer **two** questions, Each Question carries **three** marks **2x3 = 06 Marks**

5(a) Explain consequent effects of Leachate movement.

(OR)

5(b) Explain the procedure to Collection of Biomedical wastes.

6(a) What the impacts of biomedical waste on environment

(OR)

6(b) Write about any one human resource issue on biomedical waste

PART-C

Answer **two** questions, Each Question carries **five** marks **2x5 = 10 Marks**

7(a) Explain the methods of disposal by Sanitary Land filling method

(OR)

7(b) Explain Disposal of Municipal Solid Waste by barging it out into Sea.

8(a) Explain the treatment of biomedical waste

(OR)

8(b) Explain the procedure of transportation of biomedical waste

State Board of Technical Education and Training, Telangana

Model Question paper

DCE V semester

Semester End Examination

Course Code: CE - 505 E(B) **Duration: 2hours**

Course Name: INTEGRATED WASTE MANAGEMENT **Max.Marks:40**

PART-A

Answer **all** questions, Each Question carries **one** mark. **8x1 = 08 Marks**

1. Define Composition of Municipal solid waste.
2. List out the characteristics of Municipal solid waste.
3. State the importance of recycling Construction and Demolition waste
4. What are the land sealants for the control of leacheate movement?
5. State the methods of C& D processing.
6. List any two Rules to promote Construction and Demolition waste utilization
7. State the Environmental Hazards posed by Disposal of certain categories of E- Waste.
8. State Menace of E- Waste in India

PART-B

Answer **four** questions. Each Question carries **three** marks **4 x 3 = 12 Marks**

9(a). Explain the necessity of safe disposal of solid waste.

(OR)

9(b) Explain the procedure for estimation of Construction and Demolition waste quantities

10(a) How do you Estimate generated quantity of Municipal Solid Waste.

(OR)

10(b) What are the environmental and occupational Hazards posed by Disposal of E- Waste.

11(a).Explain the procedure to collection and transportation of Biomedical wastes**.**

(OR)

11(b) State the importance of recycling C& D waste

12(a).Brief the adverse Health Impacts of E-Waste on its improper Disposal.

(OR)

12(b) State Environmental Impacts of E-Waste on its improper Disposal

PART- C

Answer **four** questions. Each Question carries **five** marks **4 x 5 = 20 Marks**

13.(a) Explain the procedure of separation for recycling and reuse of plastics, paper and glass from the Municipal solid waste.

(OR)

13(b) Explain effective utilization of C&D waste.

14(a) Explain the methods of disposal by Shredding and Pulverization

(OR)

14(b) Give the classification of E-Waste

15(a).Explain the procedure to collection and transportation of E-Waste**.**

(OR)

15(b) Explain the processing of C& D waste

16(a). Write the occupational hazards of E-Waste during disposal.

(OR)

16(b) Explain the environmental hazards of E-Waste.

CE-506A - CONSTRUCTION TECHNOLOGY AND VALUATION

Course Title:	**Construction Technology and Valuation**	Course Code	**CE-506A**
Semester:	**V Semester**	Course Group	**Elective**
Teaching Scheme in Periods(L:T:P):	**60:15:0**	Credits	**2.5**
Methodology	**Lecture+ Tutorials**	Total Contact Periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the knowledge of building materials and construction practice

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Identify the ingredients of concrete, Identify the types of admixtures based on its properties, behavior and determine the type of admixtures, principles of concrete mix designs, differentiate between special concrete and conventional concrete with regards to composition, its applications and sustainability along with advantages and disadvantages of both.
CO2	Understand fundamental principles of pre-stressed concrete, methods of pre-stressing and post-tensioning systems.
CO3	List the objectives of Formwork, merits & de-merits of Steel formwork over Timber formwork, understand the need for mechanization and construction activities, uses of different construction equipment.
CO4	Explain the hot water supply distribution using solar water heating system, state the requirements of good lighting in building, , state the requirements of electrical wiring, state the requirements of good ventilation, explain about air conditioning & types of cooling systems.
CO5	List the causes of earthquakes, understands basic terminology of earthquake, explains seismic construction with brick masonry, stone masonry buildings as per codal provisions.
CO6	State the need for building valuation, lists the methods of valuation of buildings, state the methods of rent fixation of building.

Course Content and Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="3">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Concrete Technology</td><td>12</td><td rowspan="6">Q4</td><td colspan="2">Q1</td><td>Q9(a)</td><td>Q13(a)</td></tr>
<tr><td>2</td><td>Pre Stressed Concrete</td><td>13</td></tr>
<tr><td>3</td><td>Form Work, Reinforcement, Construction Machinery and Equipment</td><td>25</td><td colspan="2">Q2</td><td>Q10(a)</td><td>Q14(a)</td></tr>
<tr><td>4</td><td>Building Services</td><td>12</td></tr>
<tr><td>5</td><td>Earthquake Resistant Structures</td><td>13</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b), Q11(a), Q11(b)</td><td>Q13(b), Q15(a), Q15(b)</td></tr>
<tr><td>6</td><td>Building Valuation</td><td>13</td><td>Q7,Q8</td><td>Q10(b), Q12(a), Q12(b)</td><td>Q14(b), Q16(a), Q16(b)</td></tr>
<tr><td colspan="2">Total</td><td>75</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT-1: Concrete Technology

Duration: 12Periods (L: 10 – T:2)

a. State the ingredients of Concrete, define Workability, defines Water/Cement ratio
b. Explain the relation between strength of concrete , workability and water/cement ration
c. Knows about ‘Grades’ of concrete and state the grades of concrete recommended for different types of works, Knows about ‘Normal strength concrete and High strength concrete’
d. Differentiate between ‘Ordinary Concrete and Controlled Concrete’
e. State the functions of Admixtures in concrete and list out different admixtures being used. State the Principles of Concrete Mix Design.
f. State the factors affecting variability of concrete strength.
g. Explain the procedure of Concrete Mix design using IS Code method
h. Knows about various special concretes like Fiber Reinforced Concrete, Light weight concrete, High density concrete, Polymer concrete and Self compacting concrete
i. Knows about concreting under special exposure conditions like under- water concreting, cold weather concreting , hot weather concreting and concreting in high rise buildings
j. Knows about ‘Micro concrete’ and ‘Shotcrete’.
k. State the necessities of Expansion and Construction joints in concrete structures.

UNIT- 2: Pre Stressed Concrete **Duration:13 Periods (L: 10 – T:3)**

a. To understand fundamental principles of pre stressed concrete.
b. To know the materials and permissible stresses.
c. To understand the losses of pre stress.
d. To know the methods of pre stressing and post- tensioning systems.

UNIT- 3: Form Work, Reinforcement, Construction Machinery & Equipment
Duration: 25Periods (L: 20– T:5)

a. State the requirements of formwork, State the Objectives of formwork, State the requirements of formwork, List the loads to be considered for the design of formwork.
b. Draw the formwork arrangements for Slab & Beam system, Column, wall, State the merits and demerits of Steel formwork over Timber formwork.
c. Introduction to Artificial Intelligence in Civil Engineering
d. Artificial Intelligence Techniques
e. Advantages of Artificial Intelligence in Civil Engineering
f. Understands the need for mechanization and construction activities, State the different types of construction equipment and explain.
g. State the factors to be considered for the selection of type of construction equipment.

UNIT- 4: Building Services **Duration: 13Periods (L:10 – T:3)**

a. Explain the hot water supply distribution using solar water heating system.
b. State the requirements of good lighting in building, Define the terms 'glare'
c. and 'day light factor', State the precautions to be taken to avoid glare in building.
d. State the requirements of good electrical wiring, List the power rating of
e. different domestic electrical appliances, List the different types of electrical wirings.
f. State the objectives of electrical earthing and explain the method of earthing.
g. State the requirements of good ventilation.
h. State the functions of sunshades, louvers, sun breakers, and blinds.
i. State the principles of fire protection in buildings, State the causes of fire,
j. Explain about fire fighting.
k. Defines and states purpose of air conditioning, state different types of cooling systems.

UNIT- 5: Earth quake resistant structures **Duration: 12Periods (L:10 – T:2)**

a. Understand the causes, basic terminology, characteristics, seismic zoning
b. To know seismic construction with brick and stone masonry buildings as per codal provisions.
c. Understand seismic construction and detailing of R.C. buildings as per codal provisions.

UNIT - 6: Building Valuation **Duration: 13 Periods (L: 10 – T:3)**

a. Define the terms: 'value', 'cost and price'.
b. State the necessities of valuation.
c. Explain the terms – depreciation, sinking fund, annuity and capitalized value.
d. Lists and explains different methods of valuation of buildings.
e. State and Explain methods of rent fixation of building.

Reference Books

1. Construction Technology by Sarkar, oxford university Press
2. Pre stressed Concrete by N Krishna Raju, Mc Graw Hill, New Delhi.
3. Concrete Technology by M S Shetty
4. Building Technology and valuation TTTI, Chennai
5. Hand book on Design of Concrete mixes S.P.23
6. Valuation of Real Properties by S.C.Rangwala
7. Construction Technology and Valuation by M.R.Dheerendra Babu.

1. Suggested E-learning references

1.

1. http://nptel.ac.in

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1 - Identify the ingredients of concrete, Identify the types of admixtures based on its properties, behavior and determine the type of admixtures, principles of concrete mix designs, differentiate between special concrete and conventional concrete with regards to composition, its applications and sustainability along with advantages and disadvantages of both.

1.1 Describe a Workability, Water/Cement ratio.
1.2Understand Grades of Concrete
1.3 State the functions of Admixtures in Concrete.
1.4 State the principles of Concrete Mix Design.
1.5 Understand the special concretes.
1.6 State the need for Expansion and Construction joints in concrete structures.

CO2 - Understand fundamental principles of pre-stressed concrete, methods of pre-stressing and post-tensioning systems.

2.1 Understand fundamental principles of prestressed concrete.
2.2 List the losses of prestress.
2.3 Explain the methods of Pre-stressing and Post-tensioning methods.

CO3 - List the objectives of Formwork, merits & de-merits of Steel formwork over Timber formwork, understand the need for mechanization and construction activities, uses of different construction equipment.

3.1 Sate the Objectives of Formwork
3.2 Sate the merits of Steel formwork over timber formwork.
3.3 State the de-merits of Steel formwork over timber formwork.
3.4 Understand the need for mechanization ad construction activities.
3.5 State the different types & uses of construction equipment.

CO4 - Explain the hot water supply distribution using solar water heating system, state the requirements of good lighting in building, , state the requirements of electrical wiring, state the requirements of good ventilation, explain about air conditioning & types of cooling systems.

4.1 Explain the hot water supply distribution using solar water heating system.
4.2 State the requirements of good lighting in building.
4.3 State the requirements of good electrical wing.
4.4 Explain the method of earthing.
4.5 State the requirements of good ventilation.
4.6 Sate the principles of fire protection in buildings.
4.7 Explain about fire fighting.
4.8 Explain about air conditioning.
4.9 Sate different types of cooling systems.

CO5 - List the causes of earthquakes, understands basic terminology of earthquake, explains seismic construction with brick masonry, stone masonry buildings as per codal provisions.

5.1 List the characteristics of earthquake, explain seismic zoning.
5.2 Explain seismic construction with stone masonry buildings as per codal provisions.
5.3 Explain seismic construction and detailing of R.C.buildings as per codal provisions.

CO6 - State the need for building valuation, lists the methods of valuation of buildings, state the methods of rent fixation of building.

6.1 Sate the need for valuation.
6.2 Lists different methods of valuation of buildings.
6.3 State methods of rent fixation of building.
6.4 Explain methods of rent fixation of building.

Suggested Student Activities

1. Visit any construction firm and interact about the present and latest technology followed in construction industry.
2. Visit any nearby civil engineering research laboratories & interact with the researchers and technicians in the lab, for better understanding of the lab practices.
3. Visit to the laboratory and filed to understand the pre stressing and post- tensioning systems.
4. Visit to a construction site, to observe the Formwork & Reinforcement works in the field.
5. Study the importance of Artificial Intelligence in Civil Engineering.
6. Visit to the new site under construction, to under the concepts of electrical wiring, ventilation, firefighting and air conditioning in a new building.
7. Refer and study of IS codes for earthquake resistant design of buildings.
8. Study various methods of Building valuation.

NOTE: Students should select any one of the above or other topics relevant to the subject approvedby the concerned faculty, individually or in a group.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2		1		2	2	3	1,3,5,6,7
CO2	2	1	2		1	2	3	1,2,3,5,6,7
CO3	2				2	2	3	1,5,6,7
CO4	2		1		2	2	3	1,3,5,6,7
CO5	2				2	2	3	1,5,6,7
CO6	2	2			1	2	3	1,2,5,6,7

State Board of Technical Education and Training, Telangana
Model Question paper
DCE V SEMESTER
Mid Semester-I Examination

Course Code: CE-506E (A) **Duration:1 hour**
Course Name: Construction Technology and Valuation **Max.Marks:20**

PART-A

Answer all questions, Each Question carries one mark 8x1 = 8 Marks

1) Sate the ingredients of concrete.
2) Define Workability of Concrete.
3) Define 'prestressing'
4) State the types of prestressing.

PART-B

Answer two questions. Each question carries three marks 2x 3 = 6 Marks

5(A) Mention any three objectives of using admixtures in concrete.

(OR)

5(B) Why joints are provided in concrete construction ?

6(A) State the different systems of post tensioning.

(OR)

6(B) Differentiate between pre-tensioning and post-tensioning.

PART-C

Answer two questions. Each question carries five marks 2x 5 = 10 Marks

7(A) Explain the method of concrete mix design IS Code method.

(OR)

7(B) List types of admixtures and write their functions ?

8(A) Explain various methods of prestressing ?

(OR)

8(B) Explain any two methods of post tensioning ?

State Board of Technical Education and Training, Telangana
Model Question paper
DCE V SEMESTER
Mid Semester-II Examination

Course Code: CE-506E (A) **Duration:1 hour**
Course Name: Construction Technology and Valuation **Max.Marks:20**

PART-A

Answer all questions, Each Question carries one mark 4x1= 4 Marks

1) What is the necessity of formwork.
2) What is the necessity of equipments in construction projects ?
3) State the types of Earthing ?
4) Define Airconditioning.

PART-B

Answer two questions. Each question carries three marks 2x 3 = 6 Marks

5(A) Why steel is used as reinforcement ?

(OR)

5(B) Write the advantages of Artificial Intelligence in Civil Engineering ?

6(A) Differentiate between Magnitude and Intensity of an earthquake ?

(OR)

6(B) What are the seismic effects on structure ?

PART-C

Answer two questions. Each question carries five marks 2x 5 = 10 Marks

7(A) Explain the hot water supply using solar water heating system ?

(OR)

7(B) Mention the types of air-conditioning systems and explain any two methods ?

8(A) What are the general principles to be followed for earthquake resistant construction of buildings ?

(OR)

8(B) Explain the failure of stone masonry structures during the earthquake and mention the preventive measures ?

Model Question paper

Semester End Examination

Course Code: CE-506E (A) **Duration: 2 hours**

Course Name: Construction Technology and Valuation **Max.Marks:40**

PART-A

Answer all questions. Each question carries one mark 8x1 = 08 Marks

1) Write the ingredients of Concrete.
2) Define Formwork.
3) What is Epicenter ?
4) What is Water-Cement ratio ?
5) Define the term 'Magnitude'
6) What is a Siesmograph ?
7) Define the term 'Price'
8) What is Salvage Value ?

PART-B

Answer four questions Each question carries three marks 4 x 3 = 12 Marks

9(a) Write the advantages of fibre reinforced concrete.

(OR)

9(b) Define Focus and Epicenter.

10(a) Write the advantages of Artificial Intelligence in Civil Engineering ?

(OR)

10(b) State the methods of building valuation.

11(a) Write the causes of earthquake.

(OR)

11(b) What are the Indian Seismic Zones ?

12(a) Define Depreciation & Annuity.

(OR)

12(b) Write short notes on Rent Fixation.

PART-C

Answer four questions. Each question carries five marks 4 x 5 = 20 Marks

13(a) Write the differences between Reinforced Concrete and Prestressed Concrete.

(OR)

13(b) What are the general principles to be followed for earthquake resistant construction of buildings.

14(a) What is the need for machinery in construction work ? Mention the types of equipments used in construction work.

(OR)

14(b) The total cost of a newly constructed building is R. 12,00,000/-. Find the depreciated cost of the building after 20 years, if the scrap value is Rs. 90,000/-. Assume the useful life of the building is 60 years and rate of interest on sinking fund is 6%.

15(a) Explain the failure of stone masonry structures during the earthquake and mention the preventive measures.

(OR)

15(b) What are the points to be kept in mind for the design of building to ensure ductility.

16(a) Mention the methods of building valuation, explain any two methods.

(OR)

16(b) Explain 'Rent Fixation'

CE-506B - GREEN BUILDINGS AND ENERGY CONSERVATION

Course Title:	**Green Buildings and Energy Conservation**	Course Code :	**CE506B**
Semester:	**V Semester**	Course Group :	**Elective**
Teaching Scheme in Periods (L:T:P):	**60:15:0**	Credits :	**2.5**
Methodology :	**Lecture+Tutorials**	Total Contact Periods :	**75**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This course requires the knowledge of building materials and construction practice

Course Outcomes

Upon the completion of the course, the student shall be able to

CO1	Acquire the concept of Green Buildings and Efficiency
CO2	Apply the Design features of Green Buildings
CO3	Comprehend Energy Audit and Environmental Impact Assessment
CO4	Differentiate Renewable and NonRenewable Energy Sources and Apply Energy Conservation Techniques
CO5	Explain the design strategies and materials used in Green Building construction
CO6	Discuss different Energy Rating Systems

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Introduction to Green Buildings	10	Q4	Q1		Q9(a)	Q13(a)
2	Design of Green Buildings	15					
3	Energy Audit and Environmental Impact Assessment	10		Q2		Q10(a)	Q14(a)
4	Energy Resources and Energy Conservation	15					
5	Strategies and Materials in Green Buildings	15		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Rating System	10			Q7,Q8	Q10(b), Q12(a),Q12(b)	Q14(b), Q16(a),Q16(b)
	Total	75	8			8	8

Course Contents

Unit 1: Introduction to Green Building Duration: 10 Periods (L: 8 – T: 2)

a) Definition of Green Building
b) Benefits of Green building
c) Components/features of Green Building
d) Definition of Efficiency, Water efficiency, Material Efficiency,
e) Indoor Air Quality.

Unit 2: Design Features of Green buildings

Duration: 15Periods (L: 12 – T: 3)

a) Site selection strategies
b) Landscaping, building form, orientation, building envelope and fenestration, roofs, walls, fenestration passive heating and cooling techniques, waste reduction during construction

Unit–3 Energy Audit and Environmental Impact Assessment (EIA)

Duration: 10 Periods (L: 8 – T: 2)

a) Energy Audit:Meaning,Necessity,Procedures,Types,EnergyManagementPrograms
b) Environmental Impact Assessment (EIA): Introduction, EIA regulations, Steps in environmental impact assessment process, Benefits of EIA, Limitations of EIA, Environmental clearance for the civil engineering projects.

Unit–4 Energy Resources and Energy conservation

Duration: 15Periods (L: 12 – T: 3)

a) Renewable Energy Resources: Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Bio-mass Energy
b) Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Bio fuels.
c) Energy conservation: Introduction, Specific objectives, present scenario, Need of energy conservation, LEED India Rating System and Energy Efficiency.

Unit–5 Strategies and Materials in Green Building

Duration: 15Periods (L:12 – T: 3)

a) Principles and planning of Green building
b) Environmental design(ED) strategies for building construction.
c) Process of Improvement in environmental quality in civil structure
d) Green building materials and products- Bamboo, Rice husk, ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. reuse of waste material-Plastic, rubber, News paper, wood, Non toxic paint, Green roofing.

Unit – 6 Rating System

Duration: 10 Periods (L:8 – T: 2)

a) Introduction to Leadership in Energy and Environment Design (LEED) criteria,
b) Indian Green Building council (IGBC) Green rating,
c) Green Rating for Integrated Habitat Assessment(GRIHA)criteria
d) Heating Ventilation Air Conditioning(HVAC) unit in green Building
e) FunctionsofGovernmentorganizationworkingforEnergyconservationandAudit(ECA)
f) National Productivity council(NPC)
g) Ministry of New and Renewable Energy (MNRE)
h) Bureau of Energy efficiency(BEE)

Reference Books

1. Kibert, C.J., Sustainable construction: Green Building design and Delivery, John Wiley Hobouken, New Jersey.
2. Chauhan,DS.Sreevasthava,SK.,Non-conventionalEnergyResources,NewAgeInternationalPublishers, New Delhi.
3. O.P.Gupta, Energy Technology, Khanna Publishing House, NewDelhi
4. Jagadeesh, KS, Reddy VenkattaRama&NanjundaRao,KS.,AlternativeBuildingMaterialsandTechnologies, New Age International Publishers, Delhi.
5. Sam Kubba., Hand book of Green Building Design and Construction, Butterworth-Heinemann.
6. MeansRS,GreenBuilding-ProjectPlanningandCostEstimating,JohnWiley&Sons
7. Sharma KV, Venkataseshaiah P., Energy Management and Conservation, IK International.
8.

1. **Suggested E-learning references**

1. www.elearning.com/green buildings
2. http://nptel.ac.in

Suggested Learning Outcomes

On completion of the subject the student shall be able to

CO1 - Acquire the concept of Green Buildings and Efficiency

1.1. Define Green Building
1.2. List the components of Green Building
1.3. List the Benefits of Green Building
1.4. Define efficiency and define different efficiencies
1.5. DefineIndoor Air qualityand its improvement methods

CO2 - Apply the Design features of Green Buildings

2.1. State the importance and explain the procedure for landscaping.
2.2. Gain knowledge about site selection for construction of Green buildings
2.3. Gain Knowledge about building envelope and Fenestration
2.4. Gain Knowledge about construction techniques used in green buildings
2.5. Explain the means of waste reduction during construction of green buildings
2.6. Suggest advanced passive heating and cooling techniques used in green buildings.

CO3 - Comprehend Energy Audit and Environmental Impact Assessment

3.1. Define Energy Audit.
3.2. State the necessity of Energy Audit and explain the process of Energy Auditing in a green building.
3.3. Gain knowledge about Environmental Impact Assessment
3.4. Give information related to EIA regulations, Benefits and Limitations
3.5. Gain Knowledge aboutenvironmental clearance for civil engineering projects.

CO4 - Differentiate Renewable and NonRenewable Energy Sources and Apply Energy Conservation Techniques

4.1 Define Renewable sources of energy and their advantages and disadvantages.
4.2 List different renewable energy Resources.
4.3 List different Non Renewable energy Resources.
4.4 State the advantages and disadvantages of different non-renewable sources of energy.
4.5 Explain the need of energy conservation and the present scenario
4.6 Give the objectives of Energy conservation and the present scenario
4.7 Define energy efficiency and LEED rating system

CO5 - Explain the design strategies and materials used in Green Building construction

5.1 Explain the Principles involved in planning and construction of Green Buildings
5.2 Suggest the environmental design strategies for construction of green building
5.3 List different Green materials
5.4 State the advantages of different green materials, their strength and life cycle

CO6 - Discuss different Energy Rating Systems

6.1 Define Energy rating system
6.2 Give information related to different green rating organizations, their functions and importance of green rating
6.3 State the importance principles in HVAC design of green buildings
6.4 State the criteria used for getting a green rating using GRIHA
6.5 List the various government organizations working for energy conservation
6.6 State the functions and use of various organizations such as MNRE,BEE,NPC in green buildings

Suggested Student Activities

1. Collect the information of Green building concepts from internet
2. Collect the information related to construction practices of Green Buildings.
3. Collect the details of innovated materials used in construction of Green Buildings.
4. Compare cost and life of Green buildings with respect t to conventional buildings
5. Prepare a list of various Green building materials along with price.
6. Prepare collection of photographs showing various types Green buildings
7. Do a case study regarding efficiency of Green Buildings
8. Collect information regarding variousIGBC certified Buildings.

NOTE: Students should select any one of the above or other topics relevant to the subject approvedby the concerned faculty, individually or in a group.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	1	3	3	1	3	2	3	1,2,3,4,5,6,7
CO2	2		3	2	2			1,3,4,5
CO3	1	3	3	1	3		2	1,2,3,4,5,7
CO4	3	1			3		3	1,2,5,7
CO5	2	1	2	3	3	1	3	1,2,3,4,5,6,7
CO6	1	3		2	2	2		1,2,4,5,6

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V semester Mid Semester-I Examination

Course Code:CE-506(B) **Duration:1 Hour**
Course Name: Green Buildings and Energy Conservation **Max.Marks:20**

PART – A Marks**: 4 X 1M = 4 M**

NOTE: 1) Answer **all** questions and each question carries **one** mark.

1.Define Green Building.
2.Define Energy efficiency.
3.Define.fenestration.
4.Define.Building Envelope.

PART – B Marks**: 2 X 3M= 6M**

Answer **two** questions and each question carries **three** marks

5(a).List any Three.benefits of Green buildings.

(OR)

5(b).List any Three.advantages of green buildings.

6(a) State any three features of site selection for Green Buildings.

(OR)

6(b)Write any three objectives of landscaping for green buildings.

PART – C

Answer **two** questions and each question carries **five** marks. **Marks : 2 X 5 M = 10 M**

7(a) Explain about water management in Green Buildings.

(OR)

7(b) Write short note on indoor air quality.

8(a) Explain five main parameters of green buildings.

(OR)

8(b)Define energy efficiency,water efficiency,material efficiency and Indoor Air quality.

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V semester Mid Semester-II Examination

Course Code:CE-506(B) **Duration:1 Hour**
Course Name: Green Buildings and Energy Conservation **Max.Marks:20**

PART – A **Marks: 4 X 1 M =4 M**

NOTE: 1) Answer **all** questions and each question carries **one** mark.

1. State any two Renewable sources of Energy.
2. State any two Non Renewable sources of Energy.
3. State any two sources of Energy
4. Define Environmental Impact Assessment.

PART – B **Marks : 2 X 3 M= 6 M**

NOTE: 1) Answer **two** questions and each question carries **three** marks

5(a)What are Renewable and Non Renewable Sources of Energy.

(OR)

5 (b) List any three specific objectives of Energy conservation.

6(a) What is the need for Energy conservation.

(OR)

6(b) What do you mean by LEED India Rating System.

PART – C

Answer **two** questions and each question carries **five** marks **Marks: 2 X 5 M= 10 M**

7(a) Differentiate between Renewable and Non Renewable sources of Energy.

(OR)

7(b) Write the advantages and disadvantages of EIA

8(a) List 5 needs of Energy conservation.

(OR)

8(b) Explain LEED India rating system

State Board of Technical Education and Training,Telangana
Model Question paper
DCE V Semester
Semester End Examination

Course Code:CE-506(B) **Duration:2 Hours**
Course Name: Green Buildings and Energy Conservation **Max. Marks: 40**

PART – A Marks: 8 X 1 M = 8M

*NOTE : 1)*Answer **all** questions and each question carries **one** mark.

1. Define Green Building
2. What does EIA stand for?
3.What is Energy Efficiency?
4. List four Renewable sources of Energy
5. List four Green building materials.
6. Give the principle of Green building
7. What does LEED mean?
8.What is Green Rating?

PART – B

Answer **four** questions.

Each question carries **three** marks **4x 3 M = 12M**

9(a)Write any three site selection strategies of Green Buildings.

(OR)

9(b) What are Green building materials?

10(a) Write any three Limitations of EIA?

(OR)

10(b)What is HVAC system in Building and What is Green HVAC?

11(a) What is Green roofing?

(**OR**)

11(b)What is insulated concrete form?

12(a)List variousGreen Building rating systems in India.

(OR)

12(b)Write about IGBC rating system.

PART – C

Answer **four** questions. Each question carries **five** marks

4x 5 M = 20 M

13 (a) What are the components of Green Buildings

(OR)

13 (b) How can we reduce the impact of construction on Environment?

14 (a)List any five benefits of EIA.

(OR)

14 (b)What are the benefits of LEED certification?

15 (a) Write about any five renewable resources of Energy

(OR)

15 (b)State theobjectives of Green Buildings

16(a) Explain about IGBC.

(OR)

16(b) List energy conservation organisations.

CE-507 STRUCTURAL ENGINEERING DRAWING

Course Title:	**Structural Engineering Drawing**	Course Code :	**CE-507**
Semester:	**V Semester**	Course Group :	**Practical**
Teaching Scheme in Periods(L:T:P):	**15:0:30**	Credits :	**1.25**
Methodology :	**Lecture+ Practical**	Total Contact Periods :	**45**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

Basic knowledge of Engineering Drawing and Design principles of RCC , ability to visualize 2D and 3D.

Course Outcomes

CO1	Explain structural planning of building and marking of frame components
CO2	Prepare detailed structural drawings of Beams and Lintels
CO3	Prepare detailed structural drawings of one way and two way R.C.C Slabs
CO4	Prepare detailed structural drawings of one way continuous R.C.C Slabs and T-beam
CO5	Prepare detailed structural drawings of Column with square footing
CO6	Prepare detailed structural drawings of stair cases

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE		
			R	U	A
1	Structural Planning And marking of Frame Components	15	1		1
	R.C.C Drawings- Beams and Lintels			1	
2	R.C.C Drawings – Slabs	15			
3	R.C.C Drawings- Columns with footing, Stair cases and Earthquake resistant structures	15		1	1
	Reading and interpretation of drawings			1	
	Total	45	1	3	2

Course Contents

UNIT 1: Structural planning of a building and marking of Frame components and R.C.C Drawings- Beams and Lintels

Duration: 15 Periods.(L:5-P:10)

a) Draws the position of columns, beams, slabs, stairs and footing in a given line diagram of building-guidelines and space standards for barrier free built environment
b) Prepare member reference scheme of given building following Column reference scheme & Grid reference scheme as per IS: 5525 – (recommendations for detailing of reinforced concrete works). & SP:34
c) Singly reinforced simply supported rectangular beam
d) Lintel cum sunshade

UNIT 2:R.C.C Drawings- Slabs **Duration: 15 Periods.(L:5-P:10)**

a) Simply supported one-way slab.
b) Two-way slab simply supported corners not held down.
c) Two-way slab simply supported corners held down.
d) One-way continuous slab and T-beam (with details of slab and T-beam)

UNIT 3:R.C.C Drawings -Columns with footing, Stair cases and Earthquake resistant structures and Read and interpret the drawings

Duration: 15 Periods.(L:5-P:10)

a) Column with square footing of uniform thickness.
b) Stair case – stairs spanning longitudinally (Dog legged stair case)
c) Frame showing the details of reinforcement for earth quake resistant structures
d) Take the details of reinforcement from the given drawings
e) Preparation of Schedule of reinforcement for a given structural drawing.

Recommended Books

1. Hand book on Concrete reinforcement and detailing (IS CODE – SP 34) IS 5525: Recommendations for detailing of reinforcement in reinforced concrete worksby Bureau of Indian Standards

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes

Upon completion of the subject the student shall be able to

CO1 - Explain structural planning of building and marking of frame components

CO2 - Prepare detailed structural drawings of Beams and Lintels

2.1 Understand Positioning and Orientation of beams and column base upon the guidelines and space standards for barrier free built environment.

2.2 Understand Spanning of slabs , layout of stairs

2.3 List types of footings

2.4 Prepare member reference scheme of given building following

a) Column reference scheme and

b) Grid reference scheme (Scheme recommended by IS:5525 –recommended for detailing of reinforced concrete works and SP-34)

2.5 Draw the longitudinal section and cross sections of singly reinforced simply supported rectangular beam.

2.6 Prepare schedule of reinforcement and quantity of steel for singly reinforced simply supported rectangular beam

2.7 Draw the longitudinal and cross section of lintel cum sunshade

2.8 Prepare schedule of reinforcement and quantity of steel for lintel cum sunshade

CO3 - Prepare detailed structural drawings of one way and two way R.C.C Slabs

CO4 - Prepare detailed structural drawings of one way continuous R.C.C Slabs and T-beam

4.1 Draw the plan and longitudinal section of one-way slab showing reinforcement details.

4.2 Prepare schedule of reinforcement and quantity of steel for one-way slab showing reinforcement details

4.3 Draw the details of reinforcement of two-way simply supported slab with corners not held down condition.

4.4 Draw top and bottom plan and section along short and long spans of two way simply supported slab with corners not held down condition

4.5 Draw the details of reinforcement of two-way simply supported slab with corners held down conditions.

4.6 Draw top and bottom plan and section along short and long spans have to be drawn (Scheduling of reinforcement is not necessary).

4.7 Draw the details of reinforcement of one-way continuous slab along with T- beam with details of slab and T-beam (plan and section of continuous slab and longitudinal section of T-beam have to be drawn). (Scheduling of steel is not necessary)

CO5 - Prepare detailed structural drawings of Column with square footing

CO6 - Prepare detailed structural drawings of stair cases

6.1 Draw the details of column and square footing (plan and sectional elevation) prepare schedule of reinforcement of column and footing and quantity of steel required.

6.2 Draw the reinforcement details of dog legged stair case (section only) prepare schedule of reinforcement for one flight including landing.

6.3 Understand the details of reinforcement from the given drawings

6.4 Fill in the details of reinforcement in a drawing.

Suggested Student Activities

1. Tech fest/Srujana
2. Paper/Poster presentation
3. Quiz
4. Group discussion
5. Surprise Test

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2	2		1		2	1,2,3,5,7
CO2	2	2			1		2	1,2,5,7
CO3	2	2			1		2	1,2,5,7
CO4	2	2	1		1		2	1,2,3,5,7
CO5	2	2			1		2	1,2,5,7
CO6	2	2	1		1		2	1,2,3,5,7

State Board of Technical Education and Training, Telangana

Model Question paper

DCE V Semester

Mid Semester-I Examination

Course Code: CE-507 **Duration: 1 Hour**

Course Name: Structural Engineering Drawing **Max.Marks: 20 Marks**

PART-A

Answer all questions. Each question carries **four** marks 2x4=8Marks

Instructions: (1) To be drawn not to scale.

(2) Assume suitable data, if necessary.

1. State any two guiding principles for positioning in a structural planning of a building for the following. a) Columns b) Beams.

2. Mark the position of columns in the given diagram and name them as per 'Grid Reference Scheme'

ROOM 4000 X 3600 MM	ROOM 2000 X 3600 MM

PART-B

Answer any one questions.Each question carries twelve marks 1 x 12=12 Marks

Instructions :

(1) Draw all questions to scale.

(2) Any missing data may be assumed suitably

3. A singly reinforced rectangular beam of width 230mm and gross depth 400mm is simply supported over a clear span of 3000 mm. Bearing on each side is 200 mm.It is reinforced with 4 nos 16mm dia bars with a clear cover of 40 mm and 2 anchor bars of 12 mm dia are provided.

   Middle bars of tension reinforcement are cranked through 45^0at a distance of 0.1 times the clear span from the face of the support.To resist shear two legged stirrups of 8 mm dia at 225 mm c/c are provided. The end covers are 40mm.The materials used were M20 grade concrete and deformed bars of grade Fe415.

   Draw the longitudinal section for the above specifications to a scale of 1:15

4. A RCC lintel with sunshade has the following specifications :

   Lintel

   Clear span of Lintel—1·50 m

   Width of wall—230 mm

   Size of Lintel—230 mm × 200 mm

   Bearing on walls—150 mm

   Reinforcement of Lintel

   Main reinforcement—4 Nos. of 12 mm dia (middle two bars cranked at 45° at 220 mm fromface of the support)

   Hanger bars—2 Nos. of 10 mm dia

   Stirrups—6 mm dia 2 legged at 180 mm c/c throughout

   Sun shade:

   Projection of sunshade from face of the wall—600 mm

   Thickness of sunshade—80 mm at fixed end. 60 mm at free end

   Reinforcement of sunshade:

   Main bars—10 mm dia bars at 150 mm c/c

   Distribution steel—8 mm dia @ 180 mm c/c

   Covers:

   Bottom clear cover in lintel:30 mm

   Top clear cover in sunshade:20 mm

   All the remaining covers :25 mm

Draw the cross section of lintel with sunshade with a suitable scale

State Board of Technical Education and Training, Telangana
Model Question paper
DCE V Semester
Mid Semester-IIExamination

Course Code: CE-507 **Duration: 1 Hour**
Course Name: Structural Engineering Drawing **Max.Marks: 20 Marks**

Answer all questions.

PART-B

Answer **any one** question. Each question carries **twelve** marks. 1 x 12 = 12 Marks

Instructions:
(1) Draw all questions to scale.
(2) Any missing data may be assumed suitably

1. Draw to scale of 1:20 the bottom plan of reinforcement of a simply supported Two way slab with the following specifications:

   Size of the room : 4.2 m x 5.0 m
   Edge conditions : simply supported, corners not held down
   Overall depth of the slab:140mm
   Bearing on walls :230mm

   Reinforcement:

   Steel for shorter span = #12 at 220mm c/c (alternate bars are cranked at a distance of 400mm from face of support)
   Steel for longer span = # 10 at 250mm c/c (alternate bars are cranked at a distance of 500mm from the face of the support)

   Covers:

   Bottom clear cover = 20mm
   Top clear cover = 20mm
   Side covers = 25mm

   Materials:

   Concrete : M20 grade
   Steel : Fe415

2. Draw the reinforcement details of a simply supported two way slab whose corners are held down with the following specifications.

Specifications:

Size of the room = 4.8 m x6.2 m
Edge conditions = simply supported, corners held down
Overall depth of the slab =160mm
Bearing on walls = 300mm
Reinforcement Along **shorter span:**
In middle strip = 12m dia. at 180mm c/c
In edge strip = 12mm dia. at 300mm c/c
(Alternate bars are cranked at a distance of 480 mm from the face of the support)
ReinforcementAlong longer span
In middle strip=12mm dia at 220 mm C/C
In edge strip=12mm dia at 300 mm C/C
(Alternate bars are cranked at a distance of 620mm from the face of the support)
Torsion reinforcement
In the form of mesh 990 mm x990 mm in four layers with 8mm dia. bars 10 nos in each layer at all four corners
Covers:
Bottom clear cover = 20mm
Top clear cover =20mm
Side covers =25mm
Materials;
Concrete: M20 grade concrete
Steel : Fe415 steel

Draw to a scale of 1:25 bottom plan of the reinforcement

State Board of Technical Education and Training, Telangana
Model Question paper
DCE V Semester
Semester EndExamination

Course Code: CE-507 **Duration: 2 Hour**
Course Name: Structural Engineering Drawing **Max.Marks: 40 Marks**

PART-A

Answer **all** questions. Each question carries **four** marks 4x4=16Marks

Instructions: (1) To be drawn not to scale.
(2) Assume suitable data, if necessary

1. State any five guiding principles for positioning of columns in a structural planning of a building.
2. A singly reinforced rectangular beam of width 230mm and gross depth 400mm is simply supported over a clear span of 3000 mm. Bearing on each side is 200 mm.It is reinforced with 4 nos 16mm dia bars with a clear cover of 40 mm and 2 anchor bars of 12 mm dia are provided.

   Middle bars of tension reinforcement are cranked through 45^0at a distance of 0.1 times the clear span from the face of the support.To resist shear two legged stirrups of 8 mm dia at 225 mm c/c are provided. The end covers are 40mm.The materials used were M20 grade concrete and deformed bars of grade Fe415.

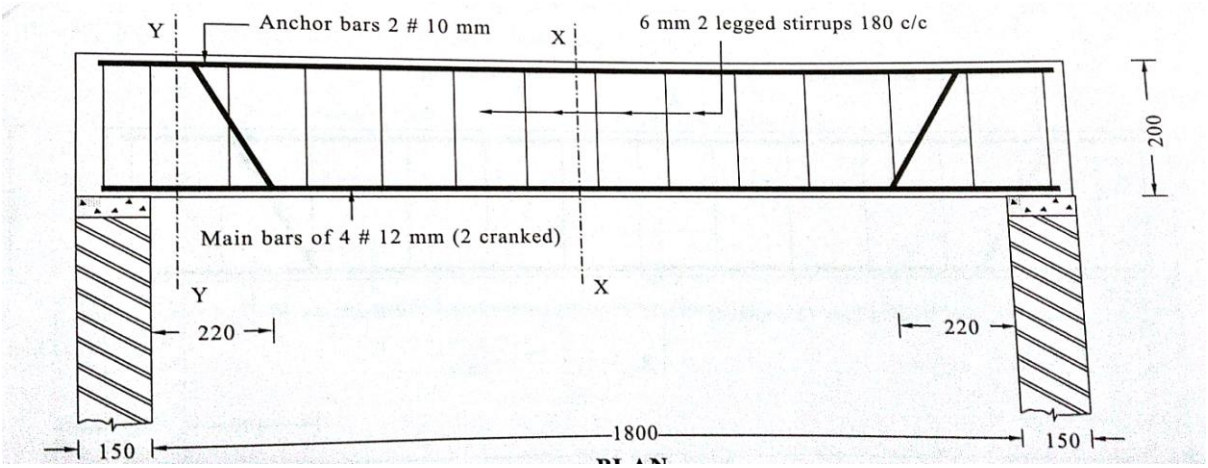
   Draw the cross section of the beam at middle span for the above specifications

3. Draw the longitudinal section of an isolated square footing for a column with the following specifications.

   Size of the column = 400x400mm
   Size of the footing=2100x2100mm
   Thickness of the footing=450mm
   Base course thickness: 150mm with P.C.C, 1:2:4
   Reinforcement for footing :
   12mm dia at 160 mm c/c in both the directions at bottom with a clear cover of 50mm. Thehorizontal lap length of the column reinforcing bar is 500mm each.
   Reinforcement for the column:
   Main bars: 16mm dia bars 4nos

Lateral ties: 8mm dia ties at 220mm c/c ,
All covers 50mm
Materials Used:
M20 Grade Concrete and Fe415 Steel

4. Prepare the bar bending schedule and find the quantity of steel required for the mainreinforcement for lintel shown in the figure below. Top and bottom covers are 25mm and all the remaining covers are 40mm



PART-B

Answer **any one** question. Each question carries **Twenty four** marks

1 x 24= 24 Marks

Instructions :
(1) Draw all questions to scale.
(2) Any missing data may be assumed suitably

4. Draw the reinforcement details of a simply supported singly reinforced RCC beam with the following specifications:

Specifcations;

Clear span of the beam :3800mm
Bearing on either side :200mm
Width of the beam :300mm
Overall depth of the beam :500mm

Materials:

Concrete :M20 grade
Steel : Fe 415 steel

Reinforcement :

Bars in tension : 4 # 16,out of which 2 middle bars are cranked at a distance of 400mm from the face of the support at 45 °

Hanger bars :2#12

Stirrups: #8,two legged stirrups at 200mm c/c throughout .

Covers:

Top and bottom clear cover :25mm

Side clear cover:40mm

Draw the following views to a scale of 1:20

I. Longitudinal section of beam
II. Cross section at the mid span

6. Draw the reinforcement details of a longitudinally spanned doglegged stair case with the following specifications to a scale of 1:20.

Specifications:

Size of the stair case room: 2500x4000mm

Height of the floor : 3600mm

Tread(T) : 270mm

Rise(R) : 150mm

Thickness of the waist slab : 200mm

Bearing in the wall: 200mm

Thickness of the wall: 300mm

Projection into the basement :300x300mm

Width of the staircase:1200mm

Reinforcement:

Main bars:12mm dia bars at 160mm c/c (Alternate bars are cranked at L/7 from the bottom end)

Distribution bars: 8mm dia bars at170mm c/c

Additional bars of 12mm dia at 140mm c/c at the junction of landing slab with the waist slab. Project this bars through a distance of 1000mm from the junction point downwards parallel to the waist slab.

Covers:

Bottom clear cover= 20mm

All the remaining covers= 25mm

Materials used:

Concrete: M20 grade

Steel: Fe 415

CE-508 CIVIL ENGINEERING COMPUTER APPLICATIONS LAB

Course Title	**Civil Engineering Computer Applications Lab**	Course Code	**CE-508**
Semester:	**V Semester**	Course Group	**Practical**
Teaching Scheme in Periods(L:T:P)	**1:0:2**	Credits	**1.25**
Methodology	**Lecture+ Practical**	Total Contact Periods	**45**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of Civil Engineering Computer Applications

Course Outcomes

On completion of the course, the student should be able to;

CO1	Create a model of the structure, apply properties, apply loads, give supports
CO2	Analyze and Design the Structure and summarize results
CO3	Prepare Schedules for resource allocation and networks for execution of projects
CO4	Calculate Duration and Critical Path of the Project
CO5	Practice software on Building information Model (BIM)
CO6	Prepare layout of various building services designs for multistoried structures

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE		
			R	U	A
1	Structural analysis and Design using latest version of STAAD PRO	15	1	3	
2	Practice on Project Management software.	15			1
3	Practice on Software for Building Services	15			1
	Total	45	1	3	2

Course Contents

UNIT 1: Structural analysis and Design using latest version of STAAD PRO

Duration: 15Periods (L: 5 – P: 10)

a) Model Generation – Navigating the STAAD.Pro Graphical User Interface, Creating Structure Geometry, Editing Structure Geometry, Viewing Structure Geometry

b) Property Assignment – Creating groups to quickly select groups of elements, assigning materials, sections and beta angles to structural members, Assigning specifications to nodes and members, Assigning supports to nodes

c) Model Loading and Analysis – Defining primary load cases in STAAD.Pro and load the structure, generating load combinations, defining load envelopes and reference loads, Analyzing a model

d) Concrete Design and Post-Processing – Specifying the appropriate Concrete design code and associated design parameters, Issuing the Concrete design commands and perform a code check, Using the Post-Processor to review and verify analysis and design results.

e) Steel Design and Post-Processing, Specifying the appropriate steel design code and associated design parameters, issuing the steel design commands and perform a code check, using the Post-Processor to review and verify analysis and design results

UNIT 2: Practice on Project Management software.

Duration: 15Periods (L: 5 – P: 10)

a) Various Menus available in MS-Project, identify various activities for a given project, Input data required for the given project, Prepare schedules using MS-Project for resources like men, material,machinery, money.

b) Calculate duration of project and Critical Path, Generate various reports for the supervision of the project.

UNIT 3: Practice on Software for Building Services

Duration: 15 Periods (L: 5 – P: 10)

a) Components of Building information Model (BIM) like 4M software.
For Heat, Ventilation and Air conditioning design, For Water supply and sewage design, For Electrical design, For Design of lifts, For design of Firefighting System, For Gas supply pipes design.

b) Preparing Layout of HVAC design for a given multistoried building plan, Layout of water supply and sewerage design for a given multistoried building plan, Layout of Electrical design for a given multistoried building plan, Layout of Lift design for a given multistoried building plan, layout of firefighting design for a given multistoried building plan

Reference Books

1. Online manuals and tutorials-Staad Pro
2. Online manuals and tutorials-MS Project
3. Online manuals and tutorials -4M software

Suggested E-learning references

1.

1.http://nptel.ac.in

2.http://www.comp-engineering.com/ETABManE.html

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1 - Create a model of the structure, apply properties, apply loads, give supports

CO2 - Analyze and Design the Structure and summarize results

1.1 Navigate through the STAAD Pro Graphical User Interface
1.2 Create, Edit and view Structure Geometry
1.3 Create groups of elements, Assign the materials, sections and beta angles to structural members
1.4 Assign specifications to nodes and members
1.5 Assign supports to nodes
1.6 Define primary load cases, load the structure, generate load combinations
1.7 Define load envelopes and reference loads, analyze a model
1.8 Specify the appropriate Concrete and steel design code and associated design parameters,issue the Concrete design commands and perform a code check.
1.9 Make use of the Post-Processor to review and verify analysis and design results.

CO3 - Prepare Schedules for resource allocation and networks for execution of projects.

CO4 - Calculate Duration and Critical Path of the Project

2.1 Identify and Make use of various menus available in MS-Project.
2.2 List and enter the input data required for the Project
2.3 Identify various activities in the project
2.4 Identify and make use of various commands to execute the given input data.
2.5 Prepares schedules for resource allocation.
2.6 Prepares networks for execution of projects
2.7 Calculate duration of project and Critical Path
2.8 Show and summarize various reports for the supervision of the project

CO5 - Practice software on Building information Model (BIM)

CO6 - Prepare layout of various building services designs for multistoried structures

3.1 Identify and Make use various menus available in 4M-IDEA-BIM software.
3.2 Prepare Layout of HVAC design for a given multistoried building plan 3.3 using 4M-IDEAsoftware.
3.4 Develop Layout of water supply and sewerage design for a given multi storied buildingusing 4M-IDEA software.
3.5 Prepare Layout of Electrical design for a given multistoried building plan using 4M-IDEAsoftware.
3.6 Develop Layout of Lift design for a given multistoried building plan using 4M-IDEAsoftware.
3.7 Prepare Layout of firefighting design for a given multistoried building plan using 4M-IDEAsoftware.

Suggested Student Activities

1. Collect information regarding various software available on computer applications in civil engineering and give a presentation on them.
2. Visit an Engineering consultancy which deals with building design and drafting and prepare a report based on the observations made regarding use of computer applications in civil engineering
3. Collect videos showing Staad –Pro models of various buildings.
4. Visit a construction site of a building observe the execution of services work and model them using BIM software
5. Tech fest/Srujana
6. Paper/Poster presentation
7. Quiz
8. Group discussion
9. Surprise Test

CO-PO Mapping Matrix

	Basic knowledge and Discipline Knowledge	Problem analysis	Design/development of solutions	Engineering tools, experimentation & testing	Engineering practices for society,	Project management	Life long learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	
CO1	1	1	1	2	-	-	1	1,2,3,4,7
CO2	1	2	3	2	2	-	1	1,2,3,4,5,7
CO3	-	-	2	3	1	1	2	3,4,5,6,7
CO4	1	-	-	-	1	1	1	1,4,5,6,7
CO5	1	-	2	3	3	-	1	1,3,4,5,7
CO6	1	-	2	3	3	-	1	1,3,4,5,7

State Board of Technical Education and Training, Telangana

MID SEM-I Examination

Model Question paper

DCE V Semester practical

Course Code: CE-508 **Duration:1 Hour**

Course Name: Civil Engineering Computer Applications Lab **Max.Marks:20 Marks**

Instructions to the Candidate:

(i) Pick and Answer any One of the following Questions from given list. **1x20=20M**

1. Create, Edit and view Structure Geometry, Assign the materials, sections and beta angles to structural members, Assign specifications to nodes and members, Assign supports to nodes as per the given details
2. Define primary load cases, load the structure, generate load combinations, Define load envelopes and reference loads, analyze a model for the given model
3. Specify the appropriate Concrete and steel design code and associated design parameters, issue the Concrete design commands and perform a code check. Make use of the Post-Processor to review and verify analysis and design results for the given model

State Board of Technical Education and Training, Telangana

MID SEM-II Examination

Model Question paper

DCE V Semester practical

Course Code: CE-508 **Duration:1 Hour**

Course Name: Civil Engineering Computer Applications Lab **Max.Marks:20 Marks**

Instructions to the Candidate:

(i) Pick and Answer any One of the following Questions from given list. **1x20=20M**

1. List and enter the input data required for the Project, execute the given input data for the given project
2. Prepares schedules for resource allocation, Prepares networks for execution of projects for the given project
3. Calculate duration of project and Critical Path, Show and summarize various reports for the supervision of the project for the given project

State Board of Technical Education and Training, Telangana

Semester End Examination

Model Question paper

DCE V Semester

Course Code: CE-508 **Duration: 2Hours**

Course Name: Civil Engineering Computer Applications Lab **Max.Marks:40 Marks**

Instructions to the Candidate:

(i) Pick and Answer any One of the following Questions from given lot. **1x40=40M**

1. Create, Edit and view Structure Geometry, Assign the materials, sections and beta angles to structural members, Assign specifications to nodes and members, Assign supports to nodes as per the given details
2. Define primary load cases, load the structure, generate load combinations, Define load envelopes and reference loads, analyze a model for the given model
3. Specify the appropriate Concrete and steel design code and associated design parameters, issue the Concrete design commands and perform a code check. Make use of the Post-Processor to review and verify analysis and design results for the given model
4. List and enter the input data required for the Project, execute the given input data for the given project
5. Prepares schedules for resource allocation, Prepares networks for execution of projects for the given project
6. Calculate duration of project and Critical Path, Show and summarize various reports for the supervision of the project for the given project
7. Prepare Layout of HVAC design for a given multistoried building plan using 4M-IDEA software.
8. Develop Layout of water supply and sewerage design for a given multi storied building using 4M-IDEA software.
9. Prepare Layout of Electrical design for a given multistoried building plan using 4M-IDEA software.
10. Prepare Layout of firefighting design for a given multistoried building plan using 4M-IDEA software.

CE-509 CONSTRUCTION TECHNOLOGY LAB

Course Title:	**Construction Technology Lab**	Course Code :	**CE-509**
Semester:	**V Semester**	Course Group :	**Practical**
Teaching Scheme in Periods(L:T:P):	**15:0:30**	Credits :	**1.25**
Methodology :	**Lecture+ Practical**	Total Contact Periods :	**45**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This course requires the knowledge of Construction Materials, Strength of materials, Reinforced Cement Concrete, Transportation Engineering, Soil mechanics and IS 383.

Course Outcomes

Upon the completion of the course, the student shall be able to

CO1	Adapt suitable sample of material and Identify standard equipment for conducting different tests based on standards of BIS
CO2	Examine the suitability of Coarse aggregates for use in different construction and pavement works as per standards of BIS
CO3	Analyze the data obtained from the tests of sieve analysis of soils and Field density of soils as per standards of BIS
CO4	Correlate the soil properties as per Atterberg limits and Proctor compaction test as per standards of BIS
CO5	Develop the concrete mix and examine the workability of fresh concrete as per standards of BIS
CO6	Prepare Concrete specimens (cubes and cylinders) and perform the split tensile strength, Compressive strength.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods
1	Tests on Aggregates	15
2	Tests on soils	15
3	Tests on Concrete	15
	Total	45

Course Contents

UNIT 1: Tests on Aggregates **Duration: 15 Periods (L:5 – P:10)**

a) Impact value of Coarse aggregate
b) Crushing value of Coarse aggregate
c) Abrasion Value of Coarse Aggregate
d) Flakiness index of Coarse aggregate
e) Elongation Index of Coarse aggregate

UNIT2: Tests on Soils **Duration: 15 Periods(L:5 – P:10)**

a) Sieve analysis of soil-Dry Method
b) Field density of soil by sand replacement method
c) Liquid Limit and Plastic Limit (Atterberg's Limits)
d) Proctor Compaction Test

UNIT 3: Tests on Concrete **Duration: 15 Periods(L:5-P:10)**

a) Workability by slump cone test.
b) Workability by compaction factor test
c) Casting and Testing of Cement concrete cubes for compressivestrength
d) Non-destructive test on hardened concrete-Rebound Hammer test only

KEY Competencies to be achieved by the student

S. No	Experiment Title	Key Competency
1	Impact Value of Coarse aggregate IS 2386 Part-IV clause 4	1.Preparation of sample
		2.Weighing sample accurately
		3.Application of load by number of strokes carefully
		4. Weighing residue accurately
2	Crushing value of Coarse aggregate IS 2386 Part-IV clause 2	1.Preparation of sample
		2.Weighing sample accurately
		3.Application of load at required rate to the required period accurately
		4. Weighing of residue
3	Abrasion value of coarse aggregate IS 2386 Part-IV clause 5	1. Adopt the required abrasive value as per sample chosen
		2. Weighing sample accurately
		3.Counting the required number of rotations
		4. Weighing the residue
4	Flakiness Index of coarse aggregate IS 2386 Part-I clause 4	1.Correct arrangement of sieves used for the sieve analysis of coarse aggregate
		2. Collect and measure the aggregate sample
		3.Weighing of aggregate passing through thickness gauge correctly
5	Elongation Index of coarse aggregate IS 2386 Part-I clause 5	1.Correct arrangement of sieves used for the sieve analysis of coarse aggregate
		2. Collect and measure the aggregate sample
		3.Weighing of aggregate retained through length gauge correctly
6	Sieve analysis of Soil IS 2386 Part-I clause 2	1.Correct arrangement of sieves used for the sieve analysis of soil
		2.Weighing of residue in each sieve accurately
		3. Draw the semi log graph of grain distribution
		4. Correlate the D_{10}, D_{30} and D_{60}

7	Field density of soil by Sand Replacement Method IS 2720 Part-28	1.Calibrate the apparatus accurately
		2. Weigh the samples accurately
		3.Calculate the density accurately
8	Attenbergs Limits IS 2720 Part-5 & IS 2720 Part- 6	1. Collecting required sample of soil
		2.Placing of required sample of soil in Casagrande's apparatus in correct position
		3.Recording the number of drops to close the grove
		4. Removing sample for determining water content
		5.Rolling the sample on a glass plate to required diameter
		6. Collecting the sample for determining water content
9	Proctor's Compaction Test IS 2720 Part-7	1.Weigh the soil accurately
		2.determine the water content accurately
		3. Apply required number of blows of compaction accurately
		4. correlate the observations to obtain the maximum dry density and optimum moisture content
10	Workability by Slump Cone Test IS 7320, IS1199 part 2& IS 456	1. Weigh the material accurately and mix the sample materials
		2. Placing in the slump cone
		3.Apply required number of tamping's for each layer of concrete
		4. Measure the slump accurately
11	Compaction Factor test on Concrete IS 5515, 1199 part 2 & IS 456	1. Weigh the material accurately
		2.Weigh the mould and concrete accurately
		3. Calculate the compaction factor correctly
12	Casting of Cement Concrete Cubes IS 516 & IS 10086	1.Weigh the material accuratelyand mix the sample materials
		2.Vibrate the concrete filled in moulds to the required time correctly
		3. Cure the demoulded cubes to the required period
13	Testing of cement concrete cubes for compressive strength IS 516 clause 5	1.Apply the load at required rate correctly
		2. Record the load at failure correctly
		3. Calculate the compressive strength accurately
14	Non-Destructive test (Rebound Hammer Test)	1.Place the rebound hammer in the correct direction
		2.Calculate the strength from the corresponding graph

Recommended Books

1. Laboratory manual on Testing of Engineering Materials by HemantSood,New Age International Publishers,New Delhi
2. Building and Construction materials Testing and Quality Control by M.L.Gambhir and NehaJamwal,McgrawHill,India
3. Material Testing Laboratory manual by C.B.Kukreja, Kishore.K and Ravi Chawla,Standard Publishers Distributors
4. Concrete technology by M.S. Shettyand A. K. Jain
5. A Laboratory Manual on Soil Mechanics by Ravi Kumar Sharma
6. Highway materials and surface testing by B.L.Gupta&Amitgupta

Suggested E-learning references

1. http://nptel.ac.in
2. https://docslide.us/documents/som-bmt-lab-manual-final.html
3. http://www.nitttrchd.ac.in/sitenew1/nctel/civil.php
4. https://ts-nitk.vlabs.ac.in/List%20of%20experiments.html
5. https://smfe-iiith.vlabs.ac.in/List%20of%20experiments.html
6. https://cs-iitd.vlabs.ac.in/List%20of%20experiments.html

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1 -Adapt suitable sample of material and Identify standard equipment for conducting different tests based on standards of BIS

CO2 - Examine the suitability of Coarse aggregates for use in different construction and pavement works as per standards of BIS

1.1 Study the significance of impact value of aggregate used for road construction
1.2 State the standards on impact value of aggregate used for various civil engineering works
1.3 Use the apparatus required for conducting impact test on aggregate
1.4 State the procedure for preparing the sample and no of samples required for the given work
1.5 Explain the procedure for conducting impact test on aggregate
1.6 Perform impact test on agiven sample of coarse aggregate
1.7 Draw inferences by conducting impact test on different types of natural aggregate
1.8 Study the significance of thecrushing value of aggregate used for various civil engineering works
1.9 State the standards for crushing value of aggregate used for various civil engineering works
1.10 Use the apparatus required for conducting thecrushing test on aggregate

1.11 State the procedure for preparing the sample and no of samples required for the given work
1.12 Explain the procedure for conducting thecrushing test on aggregate
1.13 Perform crushing test on agiven sample of coarse aggregate
1.14 Draw inferences by conducting thecrushing test on different types of natural aggregate
1.15 Study the significance of theabrasion value of aggregate used for road construction
1.16 State the standards on theabrasion value of aggregate used for various civil engineering works
1.17 Use the apparatus required for conducting theabrasion test on aggregate
1.18 State the procedure for preparing the sample and no of samples required for the given work
1.19 Explain the procedure for conducting theabrasion test on aggregate
1.20 Perform abrasion test on given sample of coarse aggregate
1.21 Draw inferences by conducting abrasion test on different types of natural aggregate
1.22 State the significance of flakiness index of aggregate on strength and workability properties of concrete
1.23 State the standards of flakiness index of aggregates
1.24 Explain the procedure and calculate the flakiness index for given sample of coarse aggregate
1.25 State the significance of elongation index of aggregate on strength and workability properties of concrete
1.26 State the standards of elongation index of aggregate
1.27 Explain the procedure and calculate the elongation index of given sample of coarse aggregate

CO3 - Analyze the data obtained from the tests of sieve analysis of soils and Field density of soils as per standards of BIS

CO4 - Correlate the soil properties as per Atterberg limits and Proctor compaction test as per standards of BIS

2.1 Study the classifications of various types of soils
2.2 Use theapparatus required for conducting sieve analysis of soils
2.3 Explain the procedure for conducting sieve analysis of soils
2.4 Perform sieve analysis over a given soil sample
2.5 Study the significance of field density of soil
2.6 Use the apparatus required for conducting field density of soil
2.7 Explain the procedure for conducting field density test on thesoil by sand replacement method
2.8 Calculate the field density of agiven sample of soil by sand replacement method
2.9 Study the significance of Atterberg's limits of soil in Civil Engineering activities
2.10 Use apparatus required for conducting tests to determine Atterberg limits of soil
2.11 Explain the procedure for finding Atterberg's limits of soil

2.12 Perform tests to determine liquid the limit, Plastic limit and Shrinkage limit of a given soil sample
2.13 Calculate the values of Atterberg limits of a given soil sample from the observation of tests
2.14 Study the significance of the proctor compaction test
2.15 Use the apparatus required for conducting the proctor compaction test
2.16 Explain the procedure for conducting the proctor compaction test
2.17 Conduct the proctor compaction test for a given sample of soil
2.18 Compare the observations of tests conducted on different types of soils
2.19 Draw the graph for proctor's compaction test
2.20 Calculate the values of OMC and MDD of given soil sample from the observations of the test

CO5 - Develop the concrete mix and examine the workability of fresh concrete as per standards of BIS

CO6 - Prepare Concrete specimens (cubes and cylinders) and perform the split tensile strength, Compressive strength.

3.1 State the importance of workability on strength properties of concrete
3.2 State various types of tests used for measuring the workability of fresh concrete
3.3 State standards of workability of concrete used for different places of construction work
3.4 Explain and perform slump test of workability on fresh concrete for given ingredients
3.5 Draw inference from test results on slump test on workability of concrete made with Coarse aggregate having different elongation index
3.6 Draw inference from test results on slump test on workability of concrete made with Coarse aggregate having different flakiness index
3.7 Compare the slumps of concrete made with gap-graded coarse aggregate and well-graded coarse aggregate
3.8 State the purpose of compaction of concrete
3.9 Explain and Perform compaction factor test of workability on fresh concrete for given ingredients
3.10 Draw inference from test results on compaction factor test of workability of concrete made with coarse aggregate having different elongation index values
3.11 Draw inference from test results on compaction factor test of workability of concrete made with coarse aggregate having different flakiness index values
3.12 Compare the compaction factors of concrete made with gap-graded coarse aggregate and that made with well-graded coarse aggregate
3.13 Study the purpose of casting concrete cubes
3.14 Use equipment required for the casting of cement concrete cubes
3.15 Explain the procedure for casting concrete cubes
3.16 Cast the concrete cubes with given ingredients
3.17 State the importance of testing concrete cubes
3.18 Use equipment required for conducting compression test concrete cubes

3.19 State the precautions to be taken for testing concrete cubes

3.20 Explain the procedure for conducting compression test on concrete cubes

3.21 Draw inference from test results on compressive strength of concrete cubes Made with coarse aggregate having different elongation index values

3.22 Draw inference from test results on compressive strength of concrete cubes Made with coarse aggregate having different flakiness index values

3.23 Compare the compressive strengths of concrete cubes of concrete made with gap graded coarse aggregate and those made with well graded coarse aggregate

3.24 Compare the compressive strengths of concrete cubes of concrete made with Potable water and concrete cubes made and cured with non-potable water

3.25 State the importance of conducting NDT on concrete

3.26 Use the equipment on cement cubes and cement flooring in the correct direction

3.27 Calculate the compressive strength of concrete by using a rebound hammer.

Suggested Student Activities

1. Collecting and study of various IS codes regarding testing of materials
2. Testing of coarse aggregate used in pavement works in nearby vicinity.
3. Tools and equipment used with pictorial presentation chart
4. Collecting of various materials and correlate with standards.
5. Study the methods of enhancing workability of concrete without using any admixtures.
6. Collect different soils and conduct test for their properties.
7. Study &Compare the compressive strength values of rebound hammer test and ultra-sonic pulse velocity tests
8. Tech fest/Srujana
9. Paper/Poster presentation
10. Prepare a report on comparison of Field density of soil by Sand Replacement Method with Core cutter method
11. Prepare a report on comparison of Proctor Compaction Test with modified proctor compaction te

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	-	-	2	1	2	2	1,4,5,6,7
CO2	3	-	2	2	1	2	2	1,3,4,5,6,7
CO3	3	-	2	2	1	2	2	1,3,4,5,6,7
CO4	3	1	2	2	1	2	2	1,2,3,4,5,6,7
CO5	3	1	2	2	1	2	2	1,2,3,4,5,6,7
CO6	3	1	2	2	1	2	2	1,2,3,4,5,6,7

State Board of Technical Education and Training,Telangana
Mid Sem-I Model Question paper
DCE V Semester

Course Code:CE-509 **Duration:1 hour**
Course Name: Construction Technology Lab **Max.Marks:20 Marks**

Instructions to the Candidate:

(i)Answer any One of the following Questions..Each question carries 20 marks
(ii) Check the suitability of the given construction material by drawing suitable inference

1) Calculate the impact value of given sample of coarse aggregate
2) Calculate the crushing value of given sample of coarse aggregate
3) Calculate the abrasion value of given sample of coarse aggregate
4) Calculate the flakiness index of given sample of aggregate
5) Calculate the elongation index of given sample of aggregate

State Board of Technical Education and Training,Telangana
Mid Sem-IIModel Question paper
DCE V Semester

Course Code:CE-509 **Duration:1 hour**
Course Name: Construction Technology Lab **Max.Marks:20 Marks**

Instructions to the Candidate:
(i)Answer any One of the following Questions.Each question carries 20 marks
(ii) Check the suitability of the given construction material by drawing suitable inference

1) Draw the grading cure for the given sample of soil
2) Calculate the field density of soil using sand replacement method
3) Determine the liquid limit of the given soil sample
4) Determine the plastic limit of the given soil sample
5) Calculate the optimum moisture content and maximum dry density for the given sample using Proctor's compaction test

State Board of Technical Education and Training,Telangana
Semester End Examination
Model Question paper
DCE Vsemester

Course Code:CE-509 **Duration:2 hours**
Course Name: Construction Technology Lab **Max.Marks:40 Marks**

Instructions to the Candidate:
(i)Answer any One of the following Questions.Each question carries 40 marks
(ii) Check the suitability of the given construction material by drawing suitable inference

1) Calculate the impact value of given sample of coarse aggregate
2) Calculate the crushing value of given sample of coarse aggregate
3) Calculate the abrasion value of given sample of coarse aggregate
4) Calculate the flakiness index of given sample of coarse aggregate
5) Calculate the elongation index of given sample of coarse aggregate
6) Calculate the field density of soil using sand replacement method
7) Draw the grading curve for the given sample of soil
8) Determine the liquid limit of the given soil sample
9) Determine the plastic limit of the given soil sample
10) Calculate the optimum moisture content and maximum dry density for the given sample using Proctor's compaction test
11) Determine workability of the fresh concrete prepared with the given mix proportion and water cement ratio using slump test
12) Determine the compaction factor of the fresh concrete prepared with the given mix proportion and water cement ratio using compaction factor test.
13) Prepare three sample concrete cubes with the given mix proportion and water cement ratio
14) Calculate the compressive strength of the given cement concrete cubes
15) Calculate the Strength of any concrete structure in your college, using Rebound Hammer method.

CE-510 PROJECT WORK

Course Title	Project Work	Course Code	CE-510
Semester	V Semester	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.25
Methodology :	Practical	Total Contact Periods	45
CIE	60	SEE	40

Pre requisites
Knowledge of Civil engineering Programme & Inter disciplinary courses

Course outcomes
Upon completion of Project Work, the student shall be able to

CO1	Reflect upon and explore problems in depth, to develop technical decisions to tackle them
CO2	Develop skills of curiosity, initiative, independence, reflection and knowledge transfer
CO3	Demonstrate ability to pursue new knowledge necessary to share their expertise in Civil engineering arena.
CO4	Appreciate the values of social, legal responsibility principles in real time projects
CO5	Analyze and discuss various ethical responsibility issues in Civil Engineering projects.
CO6	Prepare documents in team and enhance written and oral communication presentations

Course Content and Blue Print of Marks for CIE and SEE

Sl. No	Subject	Items	Max Marks
1	Project	**CIE**	
		1. Mid - I:Abstract submission– (Marks awarded by the Guide)	20
		2. Mid – II: Content development/ literature survey,data collection/prototype etc. - (Marks awarded by the Guide)	20
		3.Internal evaluation - (Marks awarded by the Guide)	20
		SEE	
		4.a) Final report Submission b) Seminar /Viva Voce (Marks awarded by the External Examiner, Headof Section (i.e. Internal Examiner)and Guide.	20 20
Total			**100**

Note:

1. The Project work carries 100 marks and pass marks are 50% and minimum of 50% in SEE. Internal assessment is done by guide and external assessment is conducted by guide, Head of section and external examiner.

2. A candidate failing to secure the minimum marks has to reappear for the project.

Course Contents

Project work is intended to provide training in the solution of field engineering problems involving Surveying, Planning, drawing plans, designing, estimating and marking out of a building/highway/irrigation/public health project. Project work will also include the preparation of the feasibility report for any one type of enterprise under self – employment schemes.

Students shall be divided into groups of five each and shall be assigned a problem that calls for application of the knowledge he/she acquired in the course and also which involves some extra study of reference materials.

Projects:

a) Planning and designing of a Building
b) Irrigation project.
c) Rural Water Supply Scheme.
d) Sanitary Engineering Scheme.
e) Culvert and Bridge project.
f) Low Cost Housing Scheme.
g) Design the framed structure of a Multi storied Building using STAAD.
h) Industrial complex
i) Set up of a small enterprise under self-employment scheme.

Every student should prepare a project report and submit the same for assessment. Every student puts his share to the work in all the operations of the project. The end examination in Project work shall consist of power point presentation and Viva-voce test to be assessed by a panel of examiners comprising of an External examiner, the Head of Section, and member of staff who guided the project as internal examiner.

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

CO1 - Reflect upon and explore problems in depth, to develop technical decisions to tackle them

CO2 - Develop skills of curiosity, initiative, independence, reflection and knowledge transfer

CO3 - Demonstrate ability to pursue new knowledge necessary to share their expertise in Civil engineering arena.

CO4 - Appreciate the values of social, legal responsibility principles in real time projects

CO5 - Analyze and discuss various ethical responsibility issues in Civil Engineering projects.

CO6 - Prepare documents in team and enhance written and oral communication presentations

1.1 Identify different works to be carried out in the Project.
1.2 Collect data relevant to the project.
1.3 Carry out Site Surveys.
1.4 Select the most efficient method from the available choices based on preliminary investigation.
1.5 Design the required elements of the project as per standard Practice.
1.6 Prepare working drawings for the project.
1.7 Estimate the cost of project, men, materials and equipment required.
1.8 Prepare schedule of time and sequence of operations.
1.9 Prepare project report.
1.10 Prepare C.P.M. Chart.
1.11 Collect the requirements to start a Small Enterprise/Industry under Self Employment Scheme.
1.12. Collect the necessary information to procure necessary finance, site and equipment.
1.13 Prepare the chart or model for each project.

The aim of the Project work 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.

Suggested Student Activities

1. Plan and work out an action plan in a team for completion of a civil engineering problem
2. Take up a task with skills of curiosity, initiative, independence, reflection and knowledge transfer which will allow them to manage new knowledge in their professional careers.
3. Assign 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.
7. Tech fest/Srujana
8. Paper/Poster presentation
9. Group discussion

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development ofSolutions	Engineering Tools, Experimentation andTesting	Engineering Practicesfor Society, and Sustainability Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	3	3	3			3	1,2,3,4,7
CO2	3			3		3	3	1,4,6,7
CO3	3			2	3	2	3	1,4,5,6,7
CO4	3			2		3	3	1,4,6,7
CO5	3			2	3	2	3	1,4,5,6,7
CO6	3			2		3	3	1,4,6,7

Project Work - I spell

RUBRICS 1:

	GOOD	AVERAGE	ACCEPTABLE	UNACCEPTABLE
Identification of problem	Good explanation of the purpose and need of the project	average explanation of the purpose and need of the project	Moderate explanation of the purpose and need of the project	Minimal explanation of the purpose and need of the project
Study the existing systems	Collects a great deal of information and good study of the existing systems	Collects some basic information	Limited information	Incomplete information
Objectives and methodology	Good justification to the objectives	Incomplete justification to the objectives	Only some objectives of the proposed	Objectives of the proposed work are either not identified or not well

Project Work- II spell

RUBRICS 2:

	GOOD	AVERAGE	ACCEPTABLE	UNACCEPTABLE
Incorporation of suggestions	Changes are made as per modification	All major changes are made as per modification	Few changes are made	Suggestions are not incorporated
Project demonstration	All defined objectives are achieved	All modules are achieved	Some of the defined objectives are achieved	Defined objectives are not achieved
Demonstration and presentation	Objectives achieved as per time frame	Objectives achieved as per time frame	Objectives achieved as per time frame	No Objectives achieved as per time frame