C21_ Curriculum

DIPLOMA IN CIVIL ENGINEERING

OFFERED BY

STATE BOARD OF TECHNICAL EDUCATION & TRAINING,

TELANGANA: HYDERABAD

IV SEMESTER

Sl No	Course Code	Course Name	L	T	P	Total Periodp ersem ester	Credits	Mid Sem1	Mid Sem2	Internal evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
								Continuous internal evaluation			Semester end examination			
1	SC-401	Advanced Engineering Mathematics	4	1	0	75	3	20	20	20	40	14	100	35
2	CE-402	Strength of Materials	4	1	0	75	3	20	20	20	40	14	100	35
3	CE-403	Transportation Engineering	4	1	0	75	3	20	20	20	40	14	100	35
4	CE-404	Quantity Surveying	4	1	0	75	3	20	20	20	40	14	100	35
5	CE-405	Irrigation Engineering	4	1	0	75	3	20	20	20	40	14	100	35
6	CE-406	Civil Engineering Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50
7	CE-407	Civil CAD Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	CE-408	Modern Surveying Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	CE-409	Construction Technology Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	HU-410	Employability Skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11	CE-411	Skill Upgradation	0	0	8	120	2.5	0	0	Rubrics			--	-
		Activities: student performance is to be assessed through Rubrics												

<h1 style="text-align:center">SC-401 - ADVANCED ENGINEERING MATHEMATICS</h1>

Course Title	Advanced Engineering Mathematics	Course Code	SC-401
SEMESTER	IV	Course Group	Foundation
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:

This course requires the knowledge of Engineering Mathematics at Diploma first year level and Applied Engineering Mathematics at Diploma 3rd Semester level.

Course Outcomes:

At the end of the course, the student will have the ability to:

CO 1	Solve simple Homogeneous Linear Differential Equations
CO 2	Solve simple Non-Homogeneous Linear Differential Equations and apply them in solving engineering problems.
CO 3	Express f(x) as a Fourier series in the given interval $(c , c+2\pi)$
CO 4	Express f(x) as a Fourier Half-Range Cosine series and Sine series in $(0, \pi)$
CO 5	Find Laplace transforms of simple functions.
CO 6	Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations.

Course Contents:

Unit – I

Duration: 07 Periods (L: 5 – T: 2)

Homogeneous Linear Differential equations with constant coefficients

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

Unit – II

Duration: 16 Periods (L: 13 – T: 3)

Non-Homogeneous Linear Differential equations with constant coefficients

Non-homogenous linear differential equations with constant coefficients of the form (D)y = X, where X is in the form k(a constant) e^{ax}, sin(ax), cos(ax), x^n, (n= 1,2,3) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

Unit-III

Duration: 14 Periods (L: 11 – T: 3)

Fourier series

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c , c+2\pi)$, Euler's formulae, sufficient conditions for existence of Fourier series for a function f(x). Even, Odd functions and Fourier series over the Interval $(0, 2\pi)$ and $(-\pi, \pi)$

Unit – IV

Duration: 08 Periods (L: 7 – T:1)

Fourier Half-range series

Representation of a function f(x) as a Fourier Half-range Sine series and Cosine series over the interval $(0, \pi)$

Unit – V

Duration: 14 Periods (L: 11 – T: 3)

Laplace Transformations:

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem , multiplication by t^n, division by t, Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

Unit – VI

Duration: 16 Periods (L: 13 – T: 3)

Inverse Laplace transforms:

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by s^n and division by s –Inverse Laplace Transform using partial fractions – convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

Recommended Books:

1. Higher Engineering Mathematics, B.S. Grewal.

2. Laplace Transforms - Murray R. Spigel.

3. Ordinary Differential Equations – R. S. Aggarwal.

4. Fourier Series – A.R. Vasishtha and Gupta.

Suggested E-Learning references:

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html

2. E-books:www.mathebook.net

Suggested Learning Outcomes

At the end of the course, the student will have the ability to:

Unit-I

1.0 Solve Homogeneous linear differential equations with constant coefficients in engineering situations

 1.1 Solve Differential equations of the type $(aD^2 + bD + c) y = 0$ when the roots of the Auxiliary Equation (A.E) are real & different, real & repeated and complex.

 1.2 Solve the higher order homogeneous linear differential equations with constant coefficients.

Unit-II

2.0 Solve Non-Homogeneous linear differential equations with constant coefficients in engineering situations

 2.1 Apply the concept of complementary function, particular Integral to get general solution of a differential equation.

 2.2 Solve n^{th} order differential equation of the type $f(D) y = X$ where $f(D)$ is a polynomial of second order and X is a function of the form k, e^{ax}, $Sin(ax)$, $Cos(ax)$, x^n.

 2.3 Solve simple problems on the above types of 2.2

Unit-III

3.0 Understand the Fourier series expansion of functions
 3.1 Know the orthogonality of functions in an interval.

 3.2 Identify Fourier series of a function in the interval $(C, C+2\pi)$ and use the Euler's Formulae for determining the Fourier coefficients.

 3.3 Write sufficient conditions for the existence of Fourier series for a function.

 3.4 Expand Fourier series of simple functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$.

 3.5 Expand Fourier series for even and odd functions in the interval $(-\pi, \pi)$

 3.6 Solve simple problems on even and odd functions in the interval. $(0, 2\pi)$ and $(-\pi, \pi)$

Unit- IV

4.0 Understand the Half – Range Fourier series expansion of functions
 4.1 Expand Half – Range Cosine series of a function in the range $(0, \pi)$.

 4.2 Expand Half – Range Sine series of a function in the range $(0, \pi)$.

 4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval $(0, \pi)$

Unit-V

5.0   Understand Laplace transforms

5.1 Apply the definition of Laplace Transform and find Laplace transform of standard functions

5.2 Identify the sufficient conditions for existence of Laplace Transform.

5.3 Use the properties of Laplace Transform – Linearity property, First shifting theorem, Change of Scale property in solving simple problems.

5.4 Apply formulae for Laplace transform of $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u)du$ in terms of Laplace transform of f (t) to solve simple problems

5.5 Identify unit step function and write the Laplace Transform of unit step function

5.6 Apply Second shifting theorem in solving simple problems.

Unit-VI

6.0   Use Laplace transforms and Inverse Laplace transforms to solve differential equation in engineering problems

6.1 Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.

6.2 Solve simple problems on Inverse Laplace Transforms.

6.3 Write Shifting theorems and Change of scale property of inverse Laplace Transform.

6.4 Solve simple problems on 6.2

6.5 Write inverse Laplace Transforms corresponding to Laplace Transform of the functions

$$t^n f(t), \frac{f(t)}{t} , f^n(t) , \int_0^t f(u)du$$

6.6 Solve simple problems on 6.5

6.7 Define convolution of two functions and state convolution theorem.

6.8 Solve simple problems on Convolution theorem.

6.9 Use Laplace and inverse Laplace Transforms to solve simple differential equations of Second order.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz
3. Group discussion
4. Surprise tests
5. Seminars

6. Home Assignments.

7. Mathematics for preparing competitive exams and solving old question papers on Arithmetical ability.

CO-PO Mapping Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	Mapped POs
CO1	3	2					3	1,2, 7
CO2	3	2					3	1,2, 7
CO3	3	2					3	1,2, 7
CO4	3	2					3	1,2, 7
CO5	3	2					3	1,2, 7
CO6	3	2					3	1,2, 7

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1page and 2 pages respectively

Unit No	Questions to be set for SEE				
	R			U	A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8			8	8

<u>**TIME: 1: 00 Hour**</u>   **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions   04 X 01 = 04

                                      2 Each question carries **ONE** mark

1. Write the General solution of $(aD^2+bD+c)\ y = 0$, whose roots of auxiliary equation are real and distinct.

2. Find the roots of auxiliary equation of the differential equation $(D^2 + 2D + 1)y = 0$

3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^{8x}$

4. Find the P.I of $(D^2 - 9)y = cos3x$

PART-B

Instructions: 1. Answer **ALL** questions   02 X 03 = 06

                                      2. Each question carries **THREE** marks

5 a) Solve $(D^2 + 4D + 13)\ y = 0$

                     OR

5 b) Solve $(D^2 +16)\ y = 0$

6 a) Solve $(D^2 + 4D + 4)y = 5 + e^{-2x}$

                     OR

6 b) Find P.I of $(D^3 + D)y = sin2x$

PART- C

Instructions: 1. Answer **ALL** questions   02 X 05 = 10

                                      2. Each question carries **FIVE** marks

7 a) Solve $(D^3 - 2D^2 - 4D + 8)\ y = 0$

                     OR

7 b) Solve $(D^3 - 6D^2 +11\ D - 6)\ y = 0$

8 a) Solve $(D^2 + 36)y = sin^2x$

                     OR

8 b) Solve : $(D^2 - 3D + 2)y = x + x^2$

TIME: 1: 00 Hour   Max. Marks: 20

PART-A

Instructions: 1. Answer **ALL** questions   04 X 01 = 04

2 Each question carries **ONE** mark

1. Define periodic function and give one example
2. Define Fourier series of the function f(x) in the interval $(0, 2\pi)$
3. Write Half-range sine series of f(x) in the interval $(0,\pi)$
4. Find a_0 for f(x) $=e^x$ in $0< x < \pi$

PART-B

Instructions: 1. Answer **ALL** questions   02 X 03 = 06

2. Each question carries **THREE** marks

5 a) If f(x) = x^2 in $(0, 2\pi)$, then find the value of a_n in Fourier series of f(x)

OR

5 b) If f(x) =$|x|$ in $(-\pi, \pi)$, then find the value of a_1 in Fourier series of f(x)

6 a).Find the value of a_n in half-range Cosine series for the function f(x) = e^x in $(0,\pi)$

OR

6 b) Obtain the Fourier Half – Range Sine series for f(x) = $(\pi - x)$ in the interval $(0, \pi)$

PART- C

Instructions: 1. Answer **ALL** questions   02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Obtain the Fourier series for f(x) = x in the interval $0< x < 2\pi$

OR

7 b) Find the Fourier series for f(x) = $(x - x^2)$ in the interval $(-\pi, \pi)$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots\dots\dots + = \frac{\pi^2}{12}$$

8 a) Express f(x) = π x – x^2 as a half-range Sine series in $(0,\pi)$

OR

8 b) Find the half –range cosine series for the function f(x) =x^2 in the interval $(0,\pi)$

Time: 2 hours   **[Total Marks: 40]**

PART-A

Instructions: 1. Answer **ALL** questions   08 X 01 = 08

2 Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation $(D^2 + 4D)y = 0$.

2. Define Fourier Series for the function f(x) in the interval (c, c+2π)

3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^x$

4. Find $L(e^{2t} + Cos3t)$

5. Find $L(t + 5Cosht)$

6. State the First Shifting theorem of Laplace Transforms.

7. Find $L^{-1}\left(\frac{1}{s-3} + \frac{s}{s^2+4}\right)$

8. Find $L^{-1}\left(\frac{1}{2s+5}\right)$

PART-B

Instructions: 1. Answer **ALL** questions   04 X 03 = 12

2. Each question carries **THREE** marks

9a) Solve $(D^2+D + 1) y = 4e^{3x}$

OR

9 b) Find $L(tCos3t)$

10 a) Find Half Range Sine Series of f(x) = x in $(0, \pi)$

OR

10 b) Find $L^{-1}\left(\frac{s+1}{s^2+6s-7}\right)$

11 a) If $L\{f(t)\} = \frac{20-4s}{s^2-4s+20}$, find $L\{f(3t)\}$

OR

11 b) Find $\int_0^\infty t.e^{-2t}Sin3tdt$ using Laplace Transform Technique

12 a) Show that $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right) = \frac{1-\cos at}{a^2}$

OR

12 b) Find $L^{-1}\left(\frac{s}{(s+2)^2+4}\right)$

PART- C

Instructions:　　　1. Answer **ALL** questions　　　　　　　04 X 05 = 20

　　　　　　　　　　2. Each question carries **FIVE** marks

13 a) Solve: $(D^2 + D - 2)\, y = x + \text{Sin } x$

　　　　　　　OR

13 b) Find $L[te^t \sin 3t]$

14 a) Expand $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$

　　　　　OR

14 b) Find $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$

15 a) Find $L\left(\frac{Sin3t.Cost}{t}\right)$

　　　　OR

15 b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t}\, dt\right\}$

16 a) Find $L^{-1}\left(\frac{1}{(s+1)(s+2)}\right)$ using Convolution theorem.

　　　　　　OR

16 b) Solve the differential equation $y'' - 2y' - 8y = \text{Sin } t$, when $y(0) = 3$, $y'(0) = 6$ by Laplace Transform method.

CE-402- Strength of Materials

Course Title:	Strength of Materials	Course Code	CE-402
Semester	IV	Course Group	Core
Teaching Scheme in Periods (L:T:P)	4:1:0	Credits	3
Methodology	Lecture+Tutorials	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of Engineering Mechanics

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

CO1	Develop Shear Force and Bending Moment Diagrams for different types of beams
CO2	Apply Euler's formula and Rankine's formula for columns to arrive at critical load over the column
CO3	Discuss geometrical properties of beam to calculate strength parameters like flexural stress and shear stress in beams for different loading conditions.
CO4	Determine the capacity of circular shafts in generating Power according to sectional properties.
CO5	Calculate the deformation (Slope &deflection) of Beams by Double Integration Method
CO6	Analyse the beams to calculate slope and deflection using Macaulay's method and Moment area method.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
				R	U	A
I	Shear force and Bending Moment	15	Q4	Q1	Q9(a)	Q13(a)
II	Columns and Struts	10				
III	Theory of simple bending	12		Q2	Q10(a)	Q14(a)
IV	A) Shear stress in beams	07				
	B) Torsion	06				
V	Deflection of beams-I	10		Q3 Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
VI	Deflection of beams-II	15		Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)
	Total	75		8	8	8

Course Contents

UNIT - 1: Shear Force and Bending Moment

Duration: 15 Periods (L: 12 – T:3)

Concepts of S.F. and B.M.-Sign Convention - Relation between Rate of Loading, S.F. and B.M -S.F. and B.M. diagrams for Cantilevers, Simply Supported beams, Overhanging beams subjected to point loads and uniformly distributed loads - Maximum B.M and maximum S.F in beams for various loads- position and significance of points of contra flexure

UNIT - 2: Columns and struts

Duration: 10 Periods(L:10 – T:2)

Importance and Calculation   of Least Moment of Inertia, radius of gyration and slenderness ratio for Solid circular, Hollow circular, Rectangular, I sections and Built up sections – Compression Members-Types and Classification - Short and Long columns, failures - Different end conditions - Effective length - calculation of safe load on columns with axial load only by Euler's and Rankine's formula - Limitation of Euler's formula

UNIT - 3: Theory of Simple Bending   **Duration: 12 Periods(L:10 – T:2)**

Bending stress in beams: Introduction –Simple Bending Stress in beams – Bending Equation (Derivation not required) – Neutral Axis - Section Modulus, Flexural Rigidity, Modulus of Section, Radius of curvature, Moment of Resistance – Calculation of bending stresses in Symmetrical and Unsymmetrical sections-practical applications.

UNIT – 4(A):Shear stress in beams   **Duration: 7 Periods (L:5– T:2)**

Shear Stress distribution diagrams for various symmetrical beam sections such as rectangular, solid circular and I & T sections - Calculation of shear stress in different layers of a beam for rectangular and I section (Derivation of formula not required) – Calculation of Maximum shear stress in rectangular, circular and I sections-problems

UNIT- 4(B): Torsion

Duration: 06 Periods (L:4 – T:2)

Introduction – Theory of torsion – Assumptions – Torsion formula (Derivation not required) – Solid and hollow circular shafts subjected to pure torsion – Simple problems– Shear stress distribution in shafts - Power transmitted by circular shafts – Problems

UNIT - 5:Deflection of beams - Introduction

Duration: 10 Periods(L:8– T:2)

Introduction – Deflected profiles of beams with different support conditions – Strength and stiffness of beams – Relation between curvature, slope and deflection - Slope and deflection for simply supported beams under symmetrical loading – Slope and deflection

in cantilever beams under point load and udl- Double integration method – Derivation of standard cases –Problems.

UNIT - 6:Deflection of beams –Macaulay's method & Mohr's theorem

Duration: 15 Periods(L:12 – T:3)

a) Macaulay's method for slope and deflection–Simply supported beams under concentrated and uniformly distributed loads –Problems.
b) Mohr's theorems for slope and deflection – Cantilevers and simply supported beams with symmetrical loading – Problems.

Reference Books

1. Strength of Materials   by   S. Ramamurtham.
2. S.M and T.S   by   B.C. Punmia.
3. S.M and T.S   by   N. Srinivasulu.
4. Introduction to Strength of Materials   by   D.S. Prakash Rao.
5. Strength of Materials (A practical approach) Vol–I by   D.S. PrakashRao.
6. Strength of Materials   by   R.K. Bansal
7. S.M. and T.S.   by   Y. Ram Mohan Rao
8. Strength of Materials   by   L.S. Negi
9. Mechanics of Solids   by   E P Popov
10. Elements of strength of materials   by   Timoshenko

Suggested E-learning references

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

Suggested Learning Outcomes
Upon completion of the course, the student shall be able to

1.1 Explain terms: a) Shear Force b) Bending Moment

1.2 Explain the sign conventions used to calculate Shear Force and Bending Moment Reference Books Suggested E-learning references Suggested Learning Outcomes

1.3 Explain the relationship between the rate of loading, shear force and bending moment

1.4 Determine Shear Force and Bending Moment on Cantilevers, Simply Supported Beams and Overhanging beams for simple cases of loading (Point Load, Uniformly distributed load) analytically Determine maximum SF and maximum BM for various loading conditions in beams.

1.5 Describe the procedures for sketching the Shear Force Diagrams (SFD) and Bending Moment Diagrams (BMD)

1.6   Sketch Shear Force Diagrams (SFD) and Bending Moment Diagrams (BMD) for Cantilever and Simply Supported Beams

1.7   Determine point of contraflexure and explain its significance

2.1   List different types of compression members

2.2   Define :

i) Buckling/Critical/Crippling Load

ii) Actual length

iii) Slenderness ratio

iv) Least radius of gyration

v) Safe load

vi) Factor of safety

2.3   State the classification of columns based on slenderness ratio OR length and lateral dimensions

2.4   Calculate least radius of gyration for solid circular, hollow circular, square, rectangular sections, I-sections and built up sections

2.5   List different end conditions for a column

2.6   Find the effective lengths of columns for different end conditions

2.7   Calculate the slenderness ratio for a given column

2.8   State Euler's formula for crippling load of a column (derivation not required)

2.9   Solve problems on limitations of Euler's formula

2.10 Calculate crippling and safe loads on a column with simple and built up sections using Euler's formula

2.11 Explain the validity of Rankine's formula for short and long columns using basic Rankine's empirical formula

2.12 Calculate crippling or safe loads on a column with simple and built up section using Rankine' formula

2.13 Calculate the ratio of strengths of hollow and solid circular columns loaded under same conditions

2.14 Design a hollow circular cross section of a column for the given data

2.15 Calculate the ratio of strengths of a section using Euler's and Rankine'sformulae under same conditions

3.1 Explain simple / pure bending

3.2 Define terms a) Neutral layer b) Neutral axis c) Radius of curvature d) Moment of Resistance e) Modulus of section f) Flexural rigidity

3.3 State the assumptions made in the theory of simple bending.

3.4 Sketch and explain bending stress distribution across the depth of the beam for any cross section

3.5 Obtain the formula for section modulus of (solid and hollow sections): a) Square Section b) Rectangular Section c) Circular Section

3.6 Calculate section modulus based on above formulae

3.7 Solve problems on theory of simple bending for symmetrical and unsymmetrical sections to calculate Moment of Resistance, Design of cross section.

4.1 State formula for calculation of Shear Stress in any layer of a cross section

4.2 Draw shear distribution diagram across:

   i) Rectangular section

   ii) Solid circular section

   iii) Symmetrical I – section

   iv) T – section

4.3 Determine shear stress at any layer and draw shear stress distribution diagram across:

   i) Rectangular section

   ii) Symmetrical I - section

4.4 Determine the maximum shear stress in circular, rectangular and square and I sections

4.5 State pure Torsion

4.6 State the assumptions made in the pure Torsion

4.7 State the formula for pure Torsion of a circular shaft

4.8 Solve the problems on Torsion applying Torsion formula

4.9 Explain terms: i) Polar modulus ii) Torsional rigidity

4.10 State the formula for power transmitted by the circular shaft

4.11 Solve the problems on power transmitted by the solid and hollow circular shafts

4.12 Computes the dimensions of a solid / hollow circular shaft based on strength

5.1 Draw the deflected shapes of different beams

5.2 Define:

i. Elastic curve

    ii. Slope

    iii. Deflection

5.3   Distinguish between strength and stiffness of a beam.

5.4   Derive relation between slope, deflection and radius of curvature

5.5   Derive the equations for maximum slope and deflection by double integration method for:

    (i) Cantilever beams with point loads and uniformly distributed loads (standard cases).

    (ii) Simply supported beams with central point load, uniformly distributed load throughout and their combination.

    (iii)Calculate the maximum slope and deflection in simply supported and cantilever beams using the above formulae

6.1   Explain Macaulay's method (for Simply supported beams) to find the slope and deflections

6.2   Compute the maximum slope and deflection for Simply supported beam carrying point loads and uniformly distributed loads by Macaulay's method

6.3   Define:

    i) Mohr's theorem-I

    ii) Mohr's theorem-II

6.4   Derive formulae for maximum slope and deflection in standard cases (simply supported and cantilever beams) by moment area method using Mohr's theorems

6.5   Compute the maximum slope and deflections for Cantilever and Simply Supported Beams by Mohr's theorem-I and Mohr's theorem-II (moment area method)

Suggested Student Activities

1.   Visit the Institute's Library / internet center and list the books/journals/ e-books and any other resources available on the topics suggested by the teacher.

2.   Prepare references consisting name of the author, title of the book/paper, publication and place of publication, volume No's, page numbers and year of publication on the following topics
    i) Beam column joints.
    ii) Mohr's theorem
    iii)Bending Test on Wood and Mild steel.

CO-PO Mapping Matrix

CO	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
	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	2					2	1,2,7
CO2	2	3	3				2	1.2.3.7
CO3	2	3	3				2	1,2,3,7
CO4	2	3	3	1	1		2	1,2,3,4,5,7
CO5	3	2	2				2	1,2,3,7
CO6	3	2	2				2	1,2,3,7

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
				Total Marks		40 Marks

Unit No	Questions to be set for SEE				
	R		U	A	
I	Q4	Q1	Q9(a)	Q13(a)	
II					
III		Q2	Q10(a)	Q14(a)	
IV					
V		Q3 — Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)	
VI		Q3 — Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)	
Total Questions	8		8	8	

Course Code: CE-402   **Duration:1 hour**
Course Name: STRENGTH OF MATERIALS   **Max.Marks:20 Marks**

PART-A

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

1.   Show the SFD and BMD for a cantilever beam of span 'l' with a point load of 'W' at the end indicating Maximum values.

2.   Show the SFD and BMD for a simply supported beam of span 'l' with a UDL of 'w kN/m' throughout the span indicating Maximum values.

3.   State any three assumptions made in Euler's theory of columns.

4.   State different end conditions of columns.

PART-B

Answer **TWO** questions. Each question carries **THREE** marks**2x3 = 6 Marks**

5(a).   A simply supported beam of span 6m is carrying a point load of 30kN at a distance of 4m from LHS and a UDL of12kN/m over entire span. Calculate maximum Bending moment and draw BMD.

                                        (OR)

5(b).   A cantilever of span 6m carries two point loads of 10kN and 20kN at a distance of 1m and 4m from fixed support. Draw BMD

6(a).   A rectangular column of cross section 200mm x 300mm, 5m long is fixed at one end and hinged at the other. Determine the Euler's critical load on the column if $E = 200 \text{ kN/mm}^2$.

                                        (OR)

6(b).   A solid circular section of diameter 150mm is used as a column of length 4m. It is fixed on both ends. Determine the Rankine's buckling load. Given fc = 500 N/mm^2 and a = 1/1600

PART-C

7(a). A cantilever beam of span 6m is subjected to 2 point loads 10kN, 15kN at a distance of 2m, 6m from fixed end. In addition to them it carries a udl of 5kN/m throughout the span. Draw SFD and BMD.

(OR)

7(b). A 7m span beam is simply supported between 5m and is over hanged for a length of 2m on right side. It carries 2 point loads 25kN and 18kN acting at 3m and 7m from LHS. Draw SFD and BMD.

8(a). A solid circular cast iron column whose diameter is 200mm is 4m long. It is fixed at both ends. Calculate the ratio of Euler's and Rankine's critical load. fc = 500N/mm^2 and a = 1/1600

(OR)

8(b) A straight bar 3m long is used as a strut with both ends fixed. When an axial load of 8 kN is applied the bar is found to buckle. What should be the diameter of rod. Take fc = 330 N/mm^2 and a = 1/1750

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

Course Code: CE-402   **Duration:1 hour**
Course Name: STRENGTH OF MATERIALS   **Max.Marks:20 Marks**

PART-A

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

1.   Define Neutral axis of the section and state where it lies for any section.

2.   Define Section Modulus and state its units.

3.   Define pure torsion and write the units for twisting moment.

4.   Define torsion and write any three practical examples of application of torsion.

PART-B

Answer **TWO** questions. Each question carries **THREE** marks.   **2x3 = 6 Marks**

5(a).   A steel rod 100mm diameter is to be bent to a circular shape. Find the minimum radius of curvature to which it should be bent so that stress in the steel may not exceed 120 N/mm^2. Take E = 2 x 10^5 N/mm^2.

(OR)

5(b).   A steel flat of size 120mm wide and 25mm thick is bent into a circular arc of radius 5m. Find the maximum stress induced and the bending moment which can produce this stress. Take E = 2 x 10^5 N/mm^2.

6(a).   A steel shaft having a modulus of rigidity as 80 kN/mm^2 is twisted by 1 degree 30 minutes in a length of 2m. The shaft is solid circular with diameter 80mm. Determine the Torque required.

(OR)

6(b).   A hollow steel shaft has 120mm outer diameter and 15mm thickness. When transmitting power at 150 r.p.m the angle of twist per metre length was one degree. Find the power transmitted by the shaft. Take G = 80 kN/mm^2.

PART-C

7(a). A rectangular beam 300mm deep is simply supported over a span of 3m. What "udl" the beam can carry, if the bending stress is not to exceed 120 MPa? Take I = 80 x 10^6 mm^4.

(OR)

7(b). A cast iron beam of symmetrical I-section with top flange 150mm x 10mm, bottom flange 150mm x 10mm and web 280mm x 10mm is simply supported over a span of 6m. If the permissible bending stress is 110 N/mm^2, what uniformly distributed load can be safely applied on the beam?

8(a). A solid steel shaft is to transmit a torque of $1x10^8$ N.mm. If the shearing stress does not exceed 45 N/mm^2, Find the minimum diameter of the shaft.

(OR)

8(b). A hollow circular shaft 120mm external diameter has to transmit 120 kW power at 200 r.p.m. The angle of twist on a length of 3m was observed to be 0.85 degree. Find the thickness of the shaft. Take G = 80 kN/mm^2

Course Code: CE-402   **Duration:2 hours**
Course Name: STRENGTH OF MATERIALS   **Max.Marks: 40 Marks**

PART-A

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

1.   What are the sign conventions to calculate Shear Force and Bending Moment in beams.
2.   Define Section Modulus and state its units.
3.   Write the equations for max. Slope and max. Deflection of a simply supported beam subjected to a total u.d.l of **W** over its whole span.
4.   Differentiate between Short column and Long column.
5.   Define slope and deflection.
6.   Define Elastic curve of a beam and show the deflected shapes of
                (i) Simply supported and
                (ii) Cantilever beams.
7.   State the relation between curvature, slope and deflection of a loaded beam and explain the terms.
8.   Differentiate between strength and stiffness of a beam.

PART-B

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

9(a).   A cantilever beam of span 6m is subjected to 2 point loads 20kN and 30kN at a distance of 3m and 6m from fixed end. Draw SFD and BMD for the beam and summarize maximum values.

(OR)

9(b).   A cantilever beam of span 5m carries a u.d.l at the rate of w/m. The section of the beam is 100mm x 200mm and the value of E of the beam material is 2×10^4 mm^4. Determine the value of 'w' if the maximum deflection is 8mm.

10(a). A simply supported beam of symmetrical section 300mm deep and I = 120×10^6 mm^4 carries a UDL of 15 kN/m throughout the span. Calculate maximum span of the beam if the maximum bending stress is not to exceed 160 N/mm^2

(OR)

10(b). A cantilever beam of span 3m carries a point load of 30kN at its free end. Calculate the slope and deflection at the free ends using Mohr's theorems. Take EI = 4000 kN-m^2.

11(a). A simply supported beam is 6m long, 200mm wide and 350mm deep. Calculate the maximum central point load the beam can carry so that the maximum deflection does not exceed 10mm.

(OR)

11(b). A cantilever of span 3m carries a UDL of 10kN/m over a length of 2m from fixed support. Calculate the deflection at the free end.

12(a). A simply supported beam of span 'L' carries a point load of 'W' at the centre of beam. Derive a formula to calculate the maximum slope in the beam. Use Moment Area method.

(OR)

12(b). Write the boundary conditions to attain maximum slope and maximum deflection for the following cases.

        a) Simply supported beam with a UDL of 'w' kN/m acting throughout the span 'L'.
        b) Cantilever beam of span 'L'with a point load 'W' at the free end.

PART-C

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

13(a) A simply supported beam of span 5m is carrying a point load of 40kN at a distance of 2m from LHS and a UDL of 10 kN/m over entire span. Calculate maximum Bending moment and draw BMD.

(OR)

13(b) Derive a formula to calculate maximum slope for a simply supported beam with concentrated load at the centre, using Double integration method.

14(a) A symmetrical I-section with flange dimensions 180mm x 10mm and web 12 x 250mm is used as a beam having overall depth 270mm, to resist a Shear Force of 60kN. Find the maximum Shear stress developed in the beam.

(OR)

14(b) A RSJ is freely supported over a span of 5m carrying central concentrated load of 20 kN. Find the position and magnitude of maximum deflection. Use Maculay's method. E = 200 kN/mm^2,   I = 73.3 x 10^6 mm^4.

15(a) Derive a formula to calculate maximum slope for a simply supported beam with a udl of 'w' kN/m throughout the span, using Double integration method.

(OR)

15(b) Derive a formula to calculate maximum slope and maximum deflection for a cantilever beam with a point load 'W' at the free end, using Double integration method.

16(a) A cantilever of span 6m carries a UDL of 10kN/m for a length of 4m from fixed end and a point load of 12 kN at the free end. Determine maximum slope and deflection at the free end by Moment area method. Given E = 200 kN/mm^2, Ixx = 32 x 10^6 mm^4.

(OR)

16(b) A I-section is used as a simply supported beam of span 5m to carry two point loads of 20kN each at a distance of 1.5m from both the supports. Find the position and magnitude of maximum deflection. Take E= 2 x 10^5 N/mm^2, I=73.33 x 106 mm^4. Use Maculay's method.

CE-403- Transportation Engineering

Course Title	Transportation Engineering	Course Code	CE-403
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture+Tutorials	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre-requisites

This course requires the knowledge of Surveying and Construction materials.

Course outcomes

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

CO1	Classify roads as per Indian Road Congress and describe the principles of highway alignment.
CO2	Identify the highway geometric elements.
CO3	Realize the significance of road safety by incorporating the concepts of traffic engineering.
CO4	Describe the procedures of Highway construction and maintenance
CO5	Differentiate between types of pavements, their construction and design principles.
CO6	Examine the functions of components of highway and permanent way of Railways

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 Transportation Engineering, Highway Alignment and Surveys	12	Q4	Q1		Q9(a)	Q13(a)
2	Highway Geometrics	13					
3	Traffic Engineering	12		Q2		Q10(a)	Q14(a)
4	Principles of Pavement Design	13					
5	Highway construction and maintenance	12		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
6	Introduction to permanent way in Railways	13			Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)
	Total	60		8		8	8

Course Contents

UNIT 1: Introduction to Transportation Engineering, Highway Alignment and Surveys:
Duration 12 Periods(L: 10– T:2)
  a)   Importance of transportation engineering –Different modes of transportation – Characteristics of Road Transport.
  b)   Highway development in India: Jayakar committee Recommendations – Functions of I.R.C. – Classification of roads as per I.R.C - Twenty year Road plans, their targets and achievements.
  c)   Alignment – Factors influencing alignment of road in plain and hilly areas – Highway surveys – Reconnaissance, preliminary and final location surveys.

UNIT 2: Highway Geometrics
Duration 13 Periods (L:10 – T:3)
  a)   Highway cross-section in embankment and cutting - Width of pavement, shoulder, formation width, right of way, road boundaries – road widths for different classification of roads, traffic lane widths-camber – recommended I.R.C values of camber for different roads.
  b)   Gradients – Ruling gradient, limiting and exceptional gradients – Recommended I.R.C values of gradients.
  c)   Super elevation – Necessity – Curves – necessity of curves in roads –transition curves – details of alignment for horizontal and vertical curves.
  d)   Sight distance – Stopping sight distance –Overtaking sight distance – formula for calculation of Stopping sight distance - simple problems.

UNIT 3: Traffic Engineering
Duration 12 Periods (L: 10 – T:2)
  a)   Traffic studies and its importance.
  b)   Road intersections – grade intersections-Types–Traffic islands –Channelizing islands – Round about – Interchange – Fly over – Diamond Intersections – Clover Leaf junction.
  c)   Pavement marking and Kerb markings.
  d)   Traffic signs – Informatory signs – Mandatory signs – Cautionary signs

UNIT 4: Principles of Pavement Design:

Duration 13 Periods (L: 10 – T:3)

a) Pavement – Types of pavement –Functions of different components of pavements - White topping roads and its Merits.

b) IRC –Codes for design of various types of pavements

c) Methods for design of flexible and rigid pavements – CBR test

d) Design principles of flexible pavement by CBR method.

UNIT 5: Highway construction and Maintenance

Duration 12 Periods (L: 10 – T:2)

a) Typical cross section of highway in cutting and embankment.

b) Conventional and non-conventional road materials

c) Non-conventional road materials like reclaimed asphalt pavement and reclaimed concrete aggregate– sources of non-conventional road materials

d) List the tests on road materials(aggregates and bitumen)- and their significance

e) Water bound macadam roads – Materials used – Machinery used in the construction – Construction procedure – Maintenance of W.B.M road.

f) Bitumen roads-Different types – Surface dressing –interface treatments-seal coat, tack coat, prime coat, premix – Full grout and semi-grout – methods – Construction procedure.

g) Cement concrete roads-Longitudinal joints–Transverse joints –Construction joints – Construction of cement concrete roads – Machinery used for construction.

UNIT 6: Introduction to permanent way in Railways

Duration 13 Periods (L:10 – T:3)

a) Importance of Railways – Gauge – Types of gauges.

b) Structure of permanent way-Different types of rails- requirements of a good rail.

c) Rail joints – Types of joints – Requirements of good rail joint – Fixtures and fastenings of rails – coning of wheels.

d) Sleepers – Functions –-Types of sleepers–characteristics of a good sleeper – Spacing of sleepers – Sleeper density.

e) Ballast – Definition – Function – Characteristics of good ballast.

f) General description and sketches for turnout – General layout of a simple left hand and right hand turnout and different crossings.

Reference Books

1. Highway Engineering – S.K. Khanna & C.E.G. Justo
2. Principles of Transportation Engineering – Chakraborty
3. Principles & practices of Highway Engineering – L.R.Kadiyali
4. Introduction to Transportation Engineering – J.H.Banks
5. Text book of Highway & Traffic Engineering – Subhash C Saxena
6. Railway Engineering - Satish Chandra and M.M Agarwal

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes
Upon completion of the course, the student shall be able to

1.1. State the importance and characteristics of transportation engineering.

1.2. List the different modes of transportation.

1.3. State the Jayakar committee Recommendation for Road development in India.

1.4. State the importance and functions of I.R.C

1.5. State the classification of roads as per I.R.C

1.6. State the highlights of first, second and third twenty-year Road development plans.

1.7. Define the term alignment of road.

1.8. State the factors influencing selection of alignment for a road in plain and hilly areas.

1.9. Explain various engineering surveys conducted to fix the alignment of a road.

2.1 Sketch the Highway cross-section in embankment and cutting and label its elements.

2.2 Define the terms: width of pavement, shoulder, formation width, right of way, camber, gradient, super elevation, sight distance, stopping sight distance and over taking sight distance.

2.3 Calculate the Stopping sight distance (calculation of sight distances at slopes not required)

2.4 State the different types of gradients and their recommended values.

2.5 State the necessity of providing super elevation and write the formula.

2.6 Solve simple problems on super elevation.

2.7 State the necessity of curves in highways.

2.8 State the different types of horizontal and vertical curves adopted in road

3.1. List the various traffic surveys.

3.2. State the importance of each traffic survey.

3.3. Explain with neat sketches traffic islands and Interchanges.

3.4. State the functions and types of pavement markings with sketches.

3.5. State the types of traffic signs and their purpose and give sketches.

4.1. State the types of pavement.

4.2. Distinguish between flexible pavement and rigid pavement.

4.3. State the advantages of White topping roads over Black toping roads (Bituminous roads).

4.4. Sketch the Cross section of a flexible and rigid pavement.

4.5. State the functions of components of a pavement.

4.6. State the factors affecting pavement design.

4.7. List the methods for design of flexible pavements and rigid pavements.

4.8. Explain the California Bearing Ratio (CBR) test.

4.9. Explain the design principle of flexible pavement by California Bearing Ratio (CBR) method.

5.1 State the necessity of road drainage.

5.2 Explain the methods of providing surface and sub-surface drainage.

5.3 State the materials used in construction of different types of roads

5.4 Define conventional and non-conventional road materials

5.5 List different non-conventional road materials (waste materials) like reclaimed asphalt pavement and reclaimed concrete aggregate which are in use

5.6 State the source of non-conventional road materials

5.7 Specify the significance of the different tests on road aggregates like crushing strength test, Impact test, Elongation and flakiness Index test(shape test), water absorption test and tests on bitumen like penetration test, ductility test, softening point test, viscosity test, flash and fire test and float test (Test procedure for aggregates and bitumen not required)

5.8 State the equipment/machinery used in construction of different roads.

5.9 Explain the methods of construction of different types of roads.

5.10 Explain the maintenance of WBM roads.

5.11 Explain the different types of joints used in C.C roads with sketches.

5.12 State the need for joints in C.C roads.

6.1 State the advantages of Railways.

6.2 Define gauge and state the classification of gauges.

6.3 State the component parts of a permanent way and functions of each component.

6.4 State the requirements of good rail, rail joint, sleeper and ballast.

6.5 State the different types of rails, joints, rail fittings, sleepers, ballast, used in Indian Railways with sketches.

6.6 Describe the coning of wheels.

6.7 Describe different types of turnouts and crossings with sketches.

Suggested Student Activities

1. Prepare a comparative chart showing various types of roads such as WBM Bituminous roads, Concrete roads.

2. Visit a highway construction site, identify various types of soils, the test procedures as per relevant IS codes and inference based on the test results.

3. Draw the cross-sectional details of Village roads, MDR, SH, NH using AUTO CAD and prepare achart.

4. Collect the parameters of road intersection in the locality and prepare a model.

5. Prepare a model showing the cross-sectional details of various types of roads such asbituminous and concrete roads.

6. Prepare a chart showing the various road signs used by collecting the information from nearby RTO and prepare a report.

7. Collect information regarding various types of railway gauges used in India and other countries, prepare a chart and present it.

8. Collect videos showing the various forces acting on a railway track and present in the class.

9. Collect photographs and videos of crossings and prepare a presentation on it.

10. Collect videos related to track laying procedure and give seminar in the class.

11. Give a presentation on production of railway sleepers.

12. Collect different IRC codes pertaining to highway geometric design and prepare a chart.

13. Prepare a model of a typical railway track.

14. Collect the information regarding various railway divisions in India and their functions.

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

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
				Total Marks		40 Marks

Unit No	Questions to be set for SEE				
	R		U	A	
I	Q4	Q1	Q9(a)	Q13(a)	
II					
III		Q2	Q10(a)	Q14(a)	
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8		8	8	

Course Code: CE-403   **Duration :1 hour**
Course Name: Transportation Engineering   **Max.Marks:20 Marks**

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

1) List any two recommendation of jayakar committee for road development in India.

2) Define term alignment of road.

3) Define a) gradient b) shoulders

4) Define over taking sight distance

PART-B

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

5(a) Compare targets and achievements of the road development plans in India.

OR

5(b) State the classification of roads as per I.R.C

6(a) State the necessity of curves in highways.

OR

6(b) Calculate the value of stopping sight distance for a highway with a design speed of65
    kmph. Assume suitably all the data required.

PART-C

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

7(a)Explain briefly engineering surveys conducted to fix the alignment of highway.

OR

7(b) List any five factors that are influencing selection of alignment of road in hilly areas.

8(a) State the necessity of providing transition curve in highways.

OR

8(b) The radius of horizontal circular curve is 100m. The design speed is 50 kmph and the design coefficient of lateral friction is 0.15.

i) Calculate the super elevation required if full friction is assumed to develop.

 ii) Calculate the coefficient of friction needed if no super elevation is provided.

Course Code: CE-403   **Duration: 1 hour**
Course Name: Transportation Engineering   **Max.Marks:20 Marks**

PART-A

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

1) List any four traffic studies.

2) List any four types of pavement markings.

3) State the materials used for construction of W.B.M roads.

4) List any four machineries required for construction of roads.

PART-B

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

5(a) State the purposes of traffic signs.

            OR

5(b) State any three functions of pavement markings.

6(a) State the necessity of road drainage.

            OR

6(b) State the need for providing joints C.C roads.

PART-C

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

7(a) Explain briefly about round about.

            OR

7(b) Explain briefly about clover leaf intersection with sketch.

8(a) Explain the construction procedure for bituminous surface dressing.

            OR

8(b) Enumerate the steps in the construction of cement concrete pavements

Model Question paper
DCE IV semester End Examination

Course Code: CE-403   **Duration: 2 hours**
Course Name: Transportation Engineering   Max.Marks:40 Marks

PART-A

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

1. What are the different modes of transportation?
2. List the different types of horizontals curves used in road construction.
3. List any two advantages of white topping roads.
4. List any four traffic surveys.
5. State any two functions of sub-grade in road structure.
6. List any two types of pavements.
7. List any four advantages of railways.
8. Define term gauge in railways.

PART-B

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

9 (a) State the importance of Transportation engineering.

        OR

9 (b) State any three factors which are affecting the pavement design.

10(a) State the importance of any three traffic surveys.

        OR

10 (b)State any three characteristics of good ballast.

11(a) State any three merits of white topping roads over black toping roads.

        OR

11(b) Sketch the cross section of a pavement structure and label each layer.

12(a) Sketch the cross section of a permanent way and label the components.

        OR

12(b) Write a short notes on coning of wheel.

PART-C

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

13(a) State any five factors that are influencing alignment of a roads in plain area.

OR

13(b) State the design principles of flexible pavement by CBR method.

14(a) Explain the procedure for construction of W.B.M roads.

OR

14(b) Describe the diamond crossing with neat sketch.

15(a) Explain the California Bearing Ratio (CBR) test.

OR

15(b) Compare flexible pavement and rigid pavements in any five aspects.

16(a) Explain about different types of rail joints with sketch.

OR

16(b) Describe right hand turnout with the help of a neat sketch.

CE-404- Quantity Surveying

Course Title	Quantity Surveying	Course Code	CE-404
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
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 drawings and plans.

Course Outcomes

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

CO1	Identify different items of works and their units and specifications.
CO2	Prepare approximate and detailed estimates, estimate of quantities of different items of works.
CO3	Discuss and prepare data sheets for different items of works and abstract estimate.
CO4	Evaluate and prepare leads statement, and determine the quantity of earth work by various methods.
CO5	Assess and prepare detailed estimates for Roads and Culverts.
CO6	Devise and prepare detailed estimate for irrigation works.

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, Units of measurements and Specifications	10	Q4	Q1	Q9(a)	Q13(a)
2	Estimates of buildings	15				
3	Analysis of Rates and Abstract Estimates	12		Q2	Q10(a)	Q14(a)
4	Earth work calculations	13				
5	Detailed estimates of Roads and Culverts	12		Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
6	Detailed estimates of Public Health Engineering works and Estimation of steel in RCC elements.	13		Q3 Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)
	TOTAL	75	8		8	8

Course Contents

UNIT 1: Introduction, Unit of measurements and Specifications

Duration: 10Periods(L:8 – T:2)

a) Quantity surveying – Definition of estimate – Need for estimation – Types of estimates – Approximate estimate – Detailed estimate – Abstract estimate – Duties of Quantity Surveyor – Elements of a structure – Item of Work – Materials of construction – Line diagram for preparation of abstract estimate

b) Units of measurements for various items of civil engineering works as per IS :1200

c) Degree of accuracy in measurement – Deductions for openings in masonry, RCC and Plastering – Painting coefficients

d) Specifications – Necessity – Types of specifications – General specifications of:
   i. Earth works
   ii. Brick / Stone Masonry with C.M
   iii. Reinforced Cement Concrete
   iv. Plastering with C.M
   v. Floor finishes with ceramic tiles and marbles
   vi. White washing / Colour washing

e) Types of estimates – Preliminary or Approximate Estimate – Detailed Estimate– Abstract Estimate – Definitions – Formats for detailed and abstract estimates.

f) Preliminary or Approximate Estimate – Plinth area method – Cubic rate method – Service Unit method

g) Problems in Preliminary estimate

UNIT 2: Estimates of Buildings

Duration: 15Periods(L:12– T:3)

Different Methods of taking out quantities – Centre Line Method – Long and Short Wall Method- Quantities of items in different components of buildings- Preparation of detailed estimates for buildings with load bearing walls and framed structure.

   a) Single Room Building
   b) Single Room with Verandah
   c) Single storied Residential building with two bed rooms (2 BHK)
   d) Two storied residential building
   e) Buildings with Sloped roofs like pitched roof, lean to roof, hipped & valley roof

UNIT 3: Analysis of Rates and Abstract Estimates

Duration: 12Periods(L:10– T:2)

a) Analysis of Rates-Definition and Purpose
b) Standard Data Book, SSR, Standard data sheet
c) Cost of materials at source and at site
d) Standard Schedule of Rates of different materials in buildings works
e) Types of labour – Wages as per S S R
f) Lead and Lift – Preparation of Lead Statement

g) Data Sheets – Standard data for materials and labour components for different items of work
h) Preparation of unit rates for finished items of works using Standard data and S S R
i) Methods of calculating quantities of ingredients of various proportions of cement concrete.
j) Provisions for different building services and other overhead charges
k) Prepare abstract estimate for:
    a. Single bedroom building (1 BHK)
    b. Two bedroom building with veranda (2 BHK)

UNIT 4: Earth Work Calculations

Duration: 13 Periods(L:10– T:3)

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

UNIT 5: Detailed Estimates of Roads and Culverts

Duration: 12 Periods(L:10 – T:2)

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

UNIT 6: Detailed Estimates of Public Health Engineering works and Estimation of quantity steel in RC elements.

Duration: 13Periods(L:10– T:3)

Detailed Estimates of Public Health Engineering works
a) Open well with masonry staining
b) R C Overhead water tank
c) Septic tank and soak pit
Bar bending schedule for the following RC elements.
d) Simply supported singly reinforced R.C.C beams / Lintel
e) Simply supported one- way slab.
f) R.C.C column with square footing.

Reference Books

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

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

1.1   Define:

   a) Quantity Surveying

   b) Estimate

1.2   State the need for quantity surveying

1.3   Identify different types of estimates

1.4   Explain the need for different estimates

1.5   Distinguish among element of structure, item of a work & materials of Construction

1.6   List the duties of Quantity Surveyor

1.7   State the units of measurements, data and payment for different items of work and materials using IS : 1200

1.8   State the types of taking out measurement.

1.9   Explain the process of taking measurements for different works and tolerances

1.10   Define specifications

1.11   State the need for specifications

1.12   State different types of specifications

1.13   Give the general specifications for important items of work

1.14   State different types of estimates

1.15   Explain:

   a)   Approximate or preliminary estimate

   b)   Detailed estimate

   c)   Abstract estimate

1.16   State the methods of preparing approximate estimates

1.17   Explain:

   a) Plinth area method

   b) Cubic content method

   c) Service unit method or unit cost method

1.18 Prepare approximate estimates for residential and non-residential buildings with given data of size / capacity and rates considering Cost of building services and other over heads

2.1 Differentiate between detailed estimate and abstract estimate

2.2 Write formats of detailed estimate and abstract estimate

2.3 State the information required for preparation of detailed estimates of a building

2.4 State and explain different methods of taking out quantities

2.5 Explain Centre Line Method-Long and short wall method

2.6 Prepare the detailed estimates for various buildings (load bearing and framed) from the given Drawings, specifications and site conditions:

    a) Single Room Building

    b) Single Room with Verandah

    c) Single storied Residential building with two bed rooms (2 BHK)

    d) Two storied residential building

    e) Buildings with Sloped roofs like pitched roof, lean to roof, hipped & valley roof

3.1 Define analysis of rates

3.2 Explain the purpose of analysis of rates

3.3 Explain the following in rate analysis:

    a) Standard data book

    b) Standard schedule of rates

    c) Standard data sheet

3.4 Explain cost of material at source

3.5 Explain cost of material at site

3.6 Explain the following terms:

    a) Blasting charges

    b) Seinorage charges

    c) Cess charges

    d) Stacking charges

    e) Water charges

    f) Crushing charges

    g) Lead charges

3.7 Compute rate of an item of work

3.8 Explain different types of labor wages as per latest SSR

3.9   Define lead statement

3.10   Prepare the format for Lead Statement

3.11   Prepare Lead Statement and data for different items of work

3.12   Prepare the unit rates for finished items of works using standard data and SSR

3.13   Tabulate the material requirement of mortars and concrete of different proportions

3.14   Prepare abstract estimate for the following buildings:

   a)   Single bedroom building (1 BHK)

   b)   Two bedroom building with veranda (2 BHK)

4.1 Explain terms: embankment, cutting

4.2 Define: lead and lift

4.3 State the standard values of. Leadand Lift

4.4 Calculate the lead and lift for a given section

4.5 List different methods of computing the areas and volumes

4.6 Explain:

   a)   Mean sectional area method

   b)   Mid sectional area method

   c)   Trapezoidal rule

   d)   Prismoidal rule

4.7 State the limitations of prismoidal rule

4.8 Determine the areas of an embankment for a given data

4.9 Determine the areas of a cutting for a given data

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

4.11 Compute gross and effective capacity of a reservoir from the areas of different contours

5.1 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.

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

6.1 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.

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

6.3 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.

Suggested Student Activities

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

2) Prepare Check list for different items of following type of Civil Engineering works.

    a. Load Bearing Building Structure.

    b. Framed structure type of building

    c. W.B.M.Road

    d. Septic Tank

    e. Community well

3) Writing the rules of deduction of openings for below mentioned items of work as per IS1200.

    a. Brick / Stone masonry

    b. Plastering / Pointing

4) Preparing detailed estimate of a RCC single & two storied existing residential building for all items of work.

5) Prepare the lead statement for earth work excavation for a Road.

6) Prepare the lead and lift statement for a building.

7) Collect the market data for cost of construction materials and implement in rate analysis and compare it with the SR book.

8) Rate analysis to be done for construction activities by using alternate materials like M-sand for River sand and analyze the difference of rates.

9) Rate analysis for works under Lump sum (LS) head to be studied in detail and compared with present SR.

10) Reconciliation of materials for a particular item need to done for an ongoing project.

11) Detailed estimate for any two or more residential buildings to be compared and rate per unit area to be find out which will help in present market survey.

CO-PO Mapping Matrix

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

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
				Total Marks		40 Marks

Unit No	Questions to be set for SEE				
	R		U	A
I	Q4	Q1	Q9(a)	Q13(a)
II				
III		Q2	Q10(a)	Q14(a)
IV				
V		Q3 / Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI		Q3 / Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8		8	8

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-I 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. What is estimation?
2. write the units for the quantities of a) brick masonry.b) plastering.
3. Write the methods of taking out quantities for buildings.
4. Write the table form for detailed estimate.

PART- B

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

5.(a). Write the duties of a quantity surveyor.

(OR)

5.(b) Write different types of estimates.

6(a). A single roomed building is having 3.6m x 6.0 m internal dimensions with 300mm thick wall and height of the room is 2.3 m. Calculate quantity of brick work without deductions.

(OR)

6(b)A compound wall of 1m height and 300mm thick has a foundation of 50mm projection on both sides and 150mm thick. Find the quantity of foundation material for 1m length.

PART-C

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

7(a) Prepare a plinth area estimate of a building with a total plinth area of 240m^2.from the following data
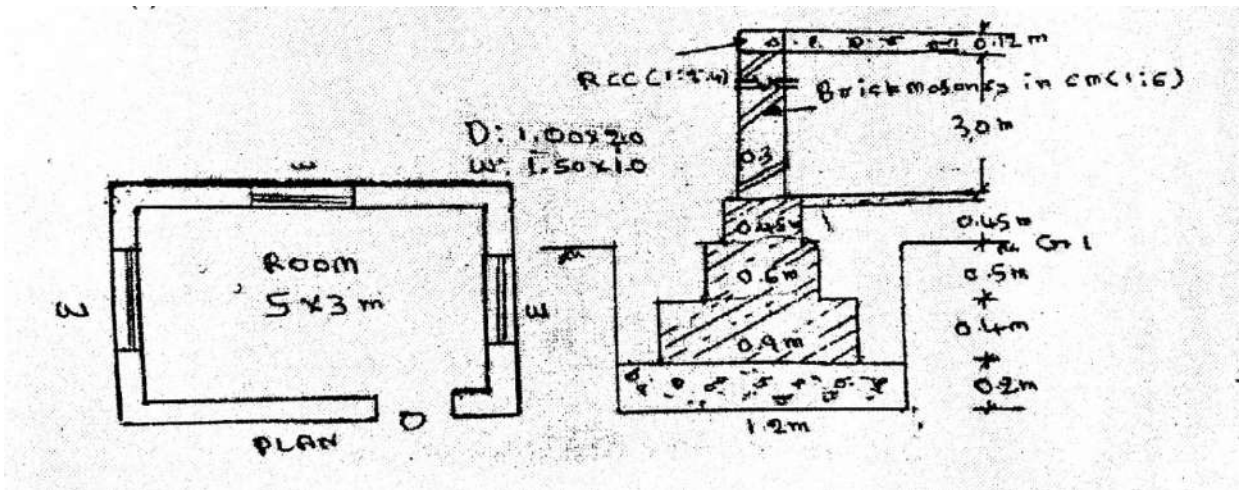
- i)   Plinth are rate Rs 9000/m^2.
- ii)   Electrical installations = 14% of the building cost
- iii) water supply and sanitary installations =5%
- iv)   contingencies = 3%

(OR)

7(b). Explain different methods of approximate estimate.

8(a) Prepare the detailed estimate the following items of works for the fig.
   a) Earth work excavation
   b) CC bed for the foundation

RCC (1:3:4)

Brick masonry in cm (1:6)

D: 1.00 × 2.0
w. 1.50 × 1.0

3.0 m

0.12 m

0.03

0.45 m

0.6 m

0.9 m

1.2 m

0.45 m

Gr 1

0.5 m

0.4 m

0.2 m

ROOM
5 × 3 m

3

W

W

PLAN

(OR)

8(b). Prepare the detailed estimate for the following items of works for above fig
  a) brick masonry for the basement
  b) brick masonry for super structure with deductions

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. Write the format for lead statement.

2. What is cost of material at source and cost of material at site.

3. Define the terms lead and lift .

4. State any two methods of calculation of volume of earth work.

PART- B

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

5.(a) Calculate the cement quantity in concrete 1:1.5:3 for 10 m^3.

(OR)

5.(b). Find the cost of material at site for the following.

S no	materials	Rate at source	lead	Conveyance charges
1	40 mm HBG metal	Rs 300/m^3	10 km	15/ km/m^3
2	sand	Rs 75/m^3	20 km	10/km/m^3
3	Rough stone	Rs 250/m^3	8 km	12/km/m^3

6.(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)

6(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.

PART-C

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

7(a). Calculate the quantity of materials required to prepare the following items of works

      i.   12 m^3 of cc 1:3:6.

     ii.   20m^3 of brick masonry CM 1:6.

(OR)

7.(b).

Prepare the data sheet and calculate the cost of the items given below :

(a) C.C. (1:5:10) using 40 mm HBG metal - unit 1 cu.m.

0.92 m³	40 mm HBG metal
0.46	Sand
0.23	Cement
0.06 Nos.	Mason I
0.14 Nos.	Mason II class
1.80 Nos.	Man Mazdoor
1.40 Nos.	Women Mazdoor
L.S.	Sundries

(b) R.R. Stone masonry in C.M. (1:6) - 1 cu.m.

1.05 cu.m.	Rough stone
0.05 cu.m.	Bond stone
0.34 cu.m.	C.M. (1:6)
0.54 cu.m.	Mason Ist class
1.20 Nos.	Mason 2nd class
1.40 Nos.	Man Mazdoor
1.40 Nos.	Women Mazdoor
LS	Sundries

Rates of labour and materials at site :

HBG 40 mm size	=	Rs. 440.00 / 1 cu.m.
Sand	=	Rs. 200.00 / 1 cu.m.
Cement	=	Rs. 3400.00 / 1 cu.m.
Rough stone	=	Rs. 280.00 / 1 cu.m.
Bond stone	=	Rs. 700.00 / cu.m.
Mason 1st Class	=	Rs. 160.00
Mason 2nd Class	=	Rs. 140.00
Man Mazdoor	=	Rs. 110.00
Women Mazdoor	=	Rs. 110.00
Mixing charges for C.M.	=	Rs. 20.00 / cu.m.
Mixing charges for C.C.	=	Rs. 30.00 / cu.m.

8(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 level is0.9m,0.7m,1.20m,3.4m,2.90m,3.10m,3.40m,2.60m,2.40m respectively. Use Trapezoidal method.

(OR)

8.b) .For the above problem find the quantity of earthwork in Prismoidal method.

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 units for the following items a) plain CC in foundation) b) plastering
2. Write the purpose of rate analysis.
3. Write the formula for finding the quantity of RCC for Trapezoidal portion of a column foundation.
4. A room internal dimensions are 4mx3m the wall thickness in super structure is 300mm.calculate the centre line length.
5. Cement concrete pavement 100mm thick and 7.5m wide is laid over a base course 75 mm for a length of 5m.find the quantity of CC required for pavement.
6. Write the units for the measurement of a) Dry stone pitching b) plastering for abutment wall.
7. How do you calculate the quantity of earthwork refilling in open well.
8. What are the deductions that you will make while calculating quantity for plastering in a septic tank.
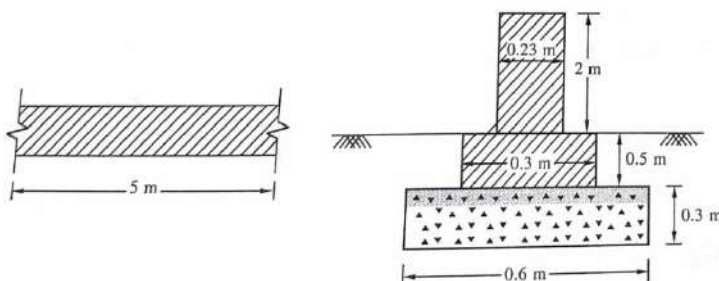
PART-B

Answer four questions. Each question carries three marks   4x3=12 marks
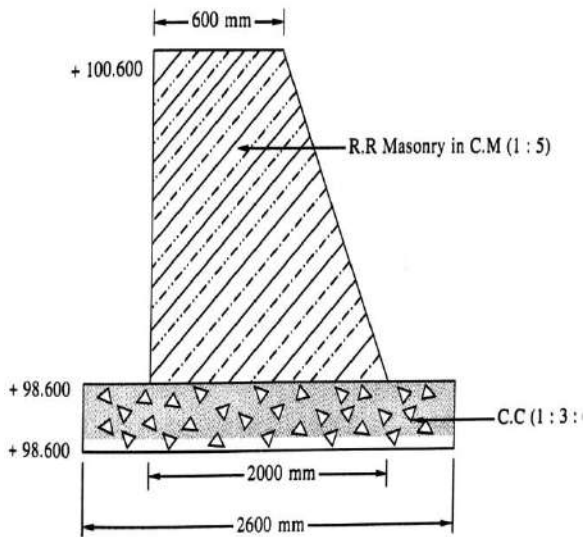
9.a).

Fig. 4.5, shows the plan and section of a part of a compound wall calculate the quantity of

(a) Cement concrete required for foundations

(b) Brick masonry required for footing & wall

(OR)

9.b). Calculate the following quantities for an abutment wall shown in fig. take the length of wall as 5m.
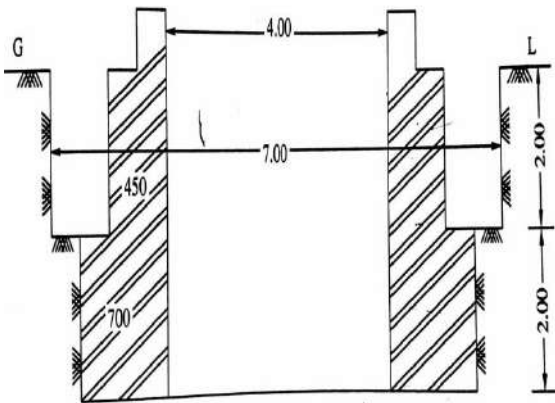
    a) CC bed under abutment
    b) Masonry used in abutment.

10(a). Write the formulas for trapezoidal rule and prismoidal rule for finding earth work quantities.

(OR)

10(b). The cross section of a circular well is shown in the fig. Calculate the quantity of earth work excavation.
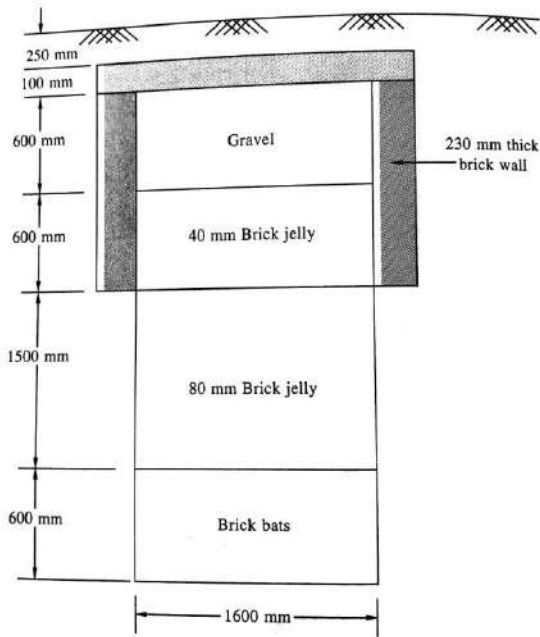

11(a).Find the area of embankment, if the top width of the road is 6m and depth is 3m. The side slopes are 2:1.

(OR)

11(b)write the items of works and their units in the estimation of a WBM road.

12(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.

12(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.

PART-C

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

13.a).

Prepare an approximate of building project with total plinth area of building is 600 m². From the following data calculate the total cost of the project.

(a) *Plinth area rate Rs. 12000/- per Sq. m*

(b) *Cost of water supply @ 7½ of cost of building.*

(c) *Cost of sanitary and electrical installations each 7½ of cost of building.*

(d) *Cost of architectural features 1 % of building cost.*

(e) *Cost of roads and lawns @ 5 % of building cost.*

(f) *Cost of P.S and contingencies @ 4 % of building cost.*

(OR)

13(b) For an embankment 60m long of uniform gradient when the height of bank is 3m at one end and 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.

14.(a). Calculate the quantity of cement required in bags for following items of works:
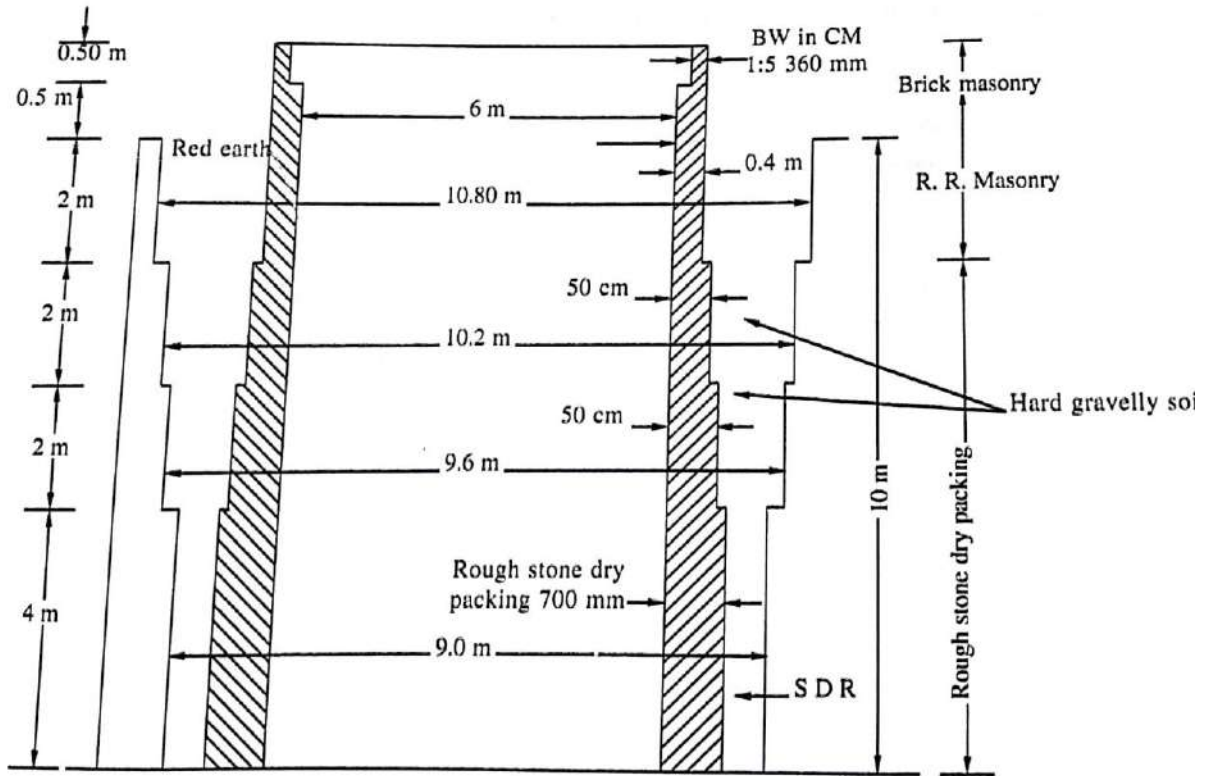   a) CRS masonry in CM 1:6 using granite stone for 15 m^3 of work if 0.32 m^3 CM is required for 1 m^3.
   b) Plastering with CM 1:4 12mm thick for 100 m^2 of work if 0.15 m^3 of CM is required for 10m^2 of plastering.

(OR)

14.b).

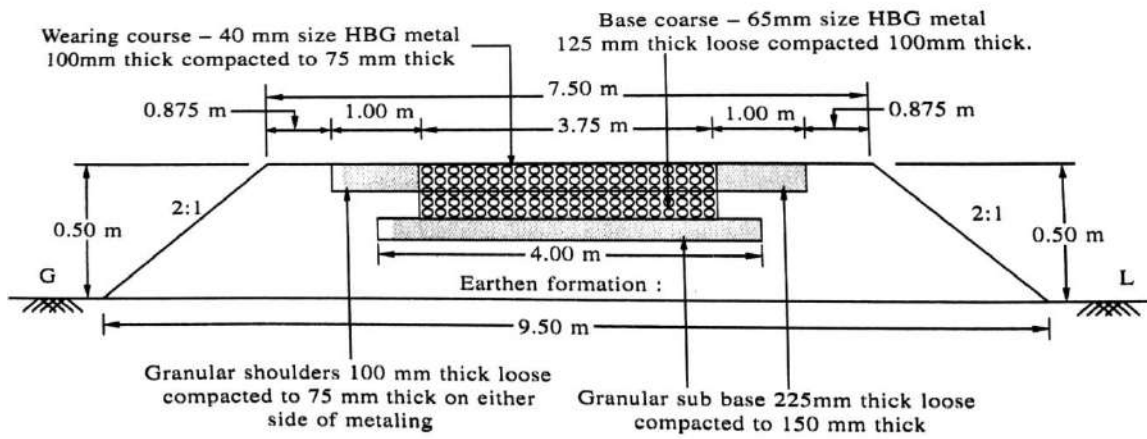Prepare detailed estimate of open well of drawing

(i) Earth work excavation

(ii) Rough stone dry packing

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

15.a).

Prepare the detailed estimate for the water bound macadam (WBM) road of length 1.50 Km with the details shown in Fig. 8.6 for the following items of work.

(a) *Earth work for formation*

(b) *Granular sub base*

(c) *Base course with 65 mm size HBG metal.*

Wearing course – 40 mm size HBG metal 100mm thick compacted to 75 mm thick

Base coarse – 65mm size HBG metal 125 mm thick loose compacted 100mm thick.

7.50 m

0.875 m   1.00 m

3.75 m

1.00 m   0.875 m

2:1

0.50 m

2:1

0.50 m

4.00 m

Earthen formation :

G

L

9.50 m

Granular shoulders 100 mm thick loose compacted to 75 mm thick on either side of metaling

Granular sub base 225mm thick loose compacted to 150 mm thick

(OR)

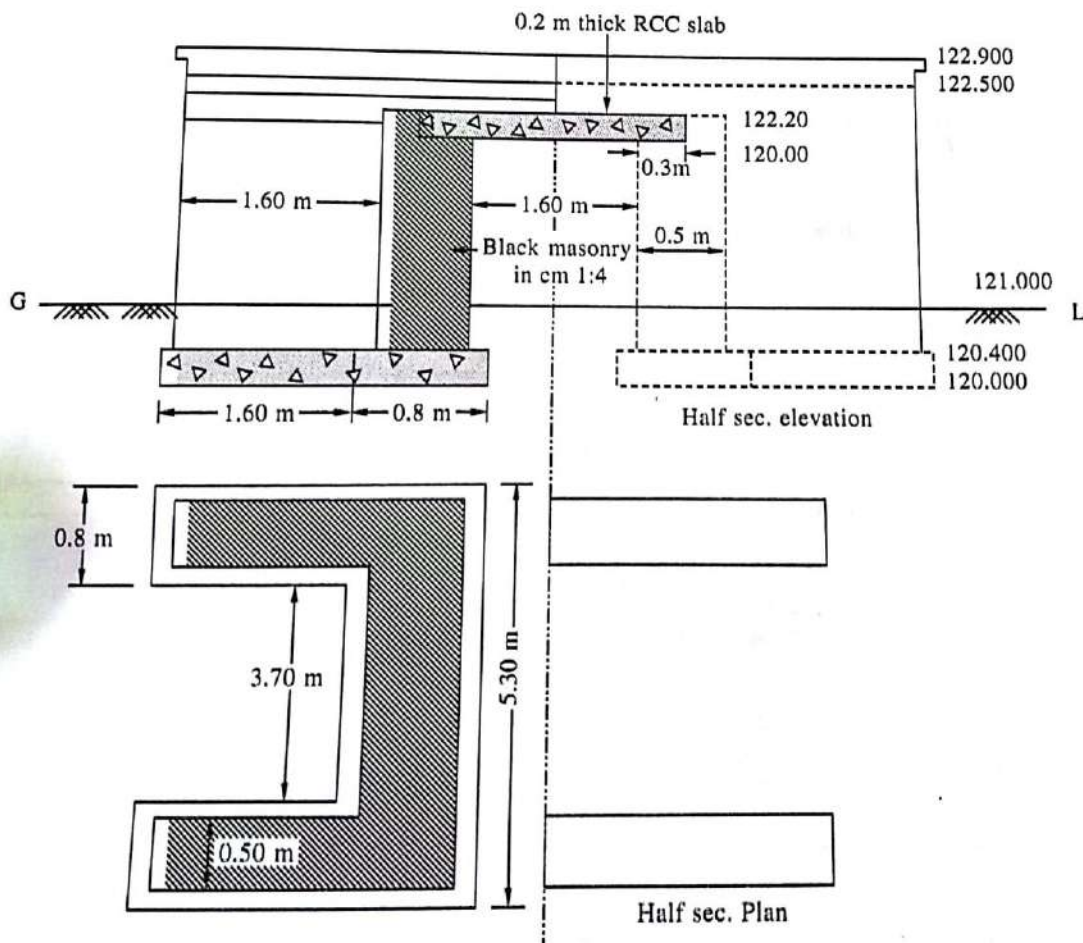**15.b).**

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.

0.2 m thick RCC slab

122.900
122.500
122.20
120.00
0.3m
1.60 m
1.60 m
0.5 m
Black masonry
in cm 1:4
121.000
120.400
120.000
1.60 m
0.8 m
Half sec. elevation

G ─── L

0.8 m
3.70 m
5.30 m
0.50 m
Half sec. Plan

16.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.

Cross section
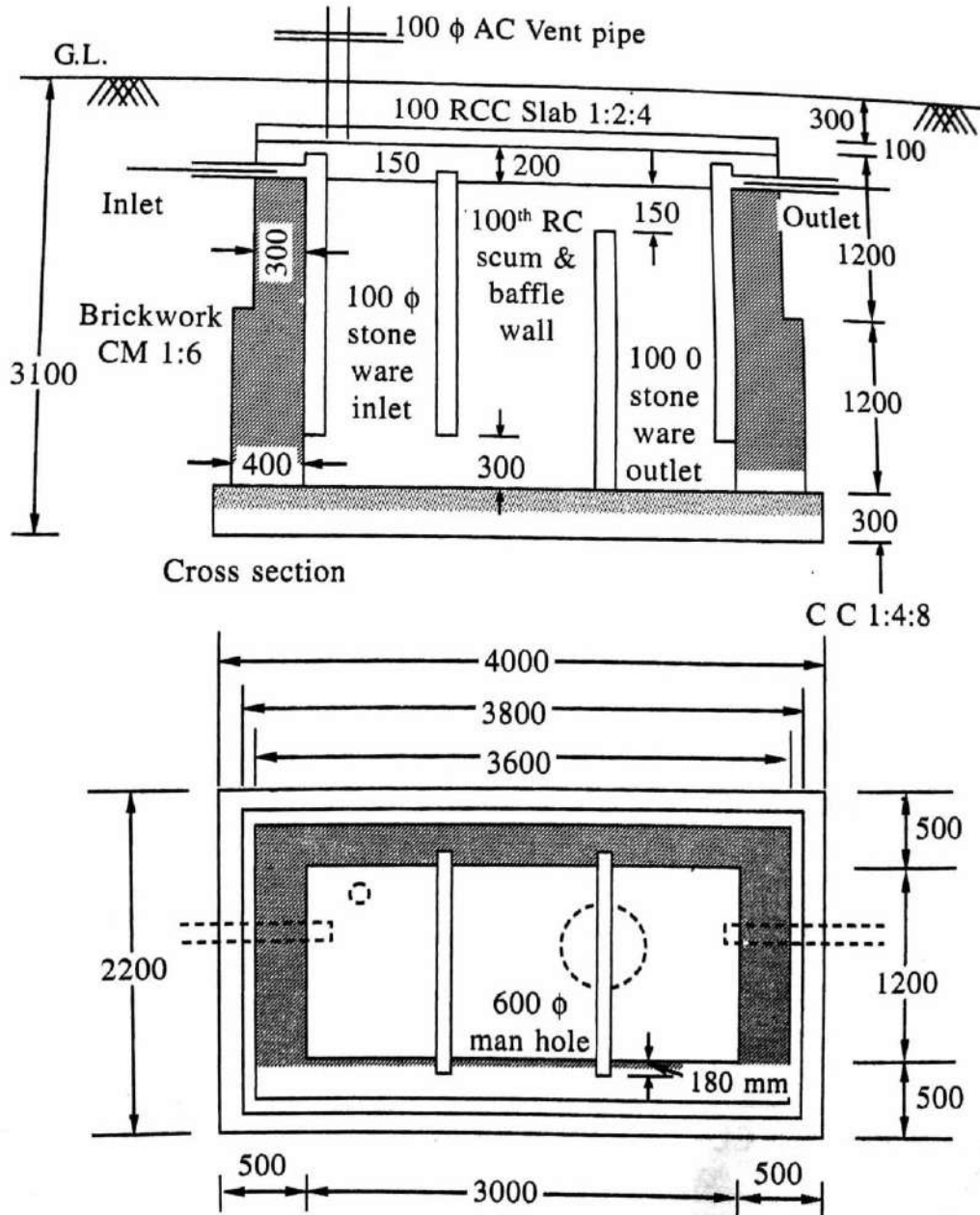
(OR)

16.b)

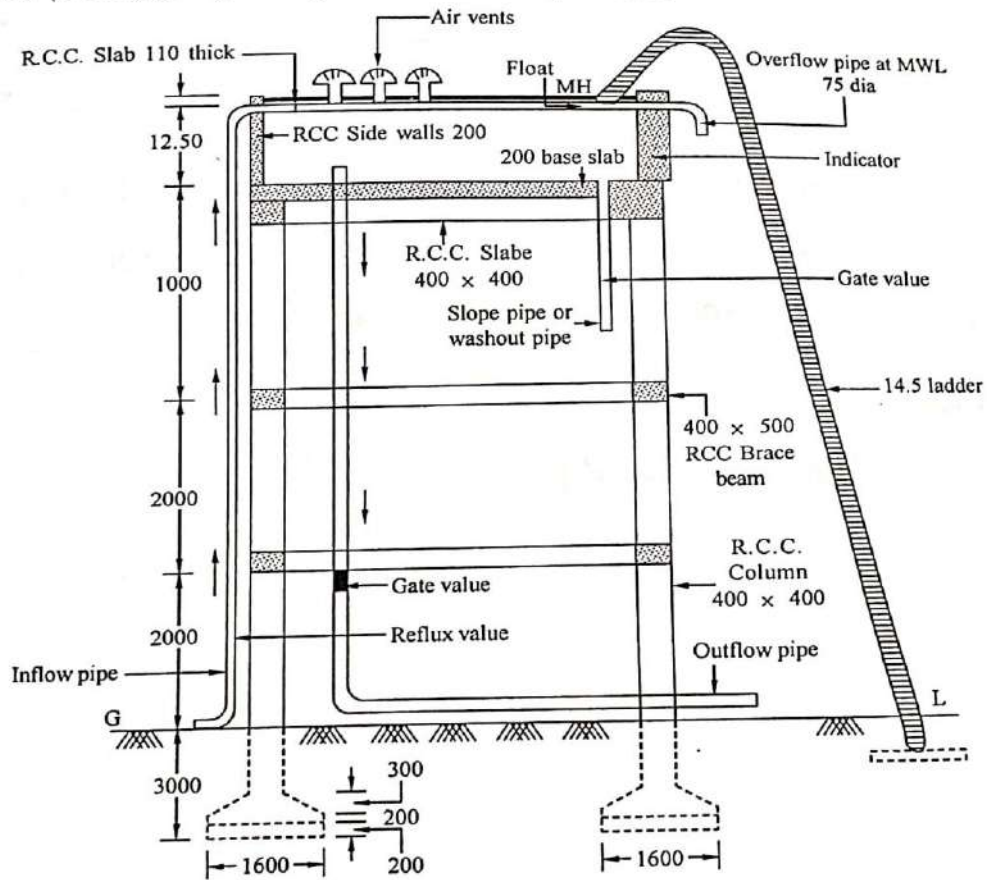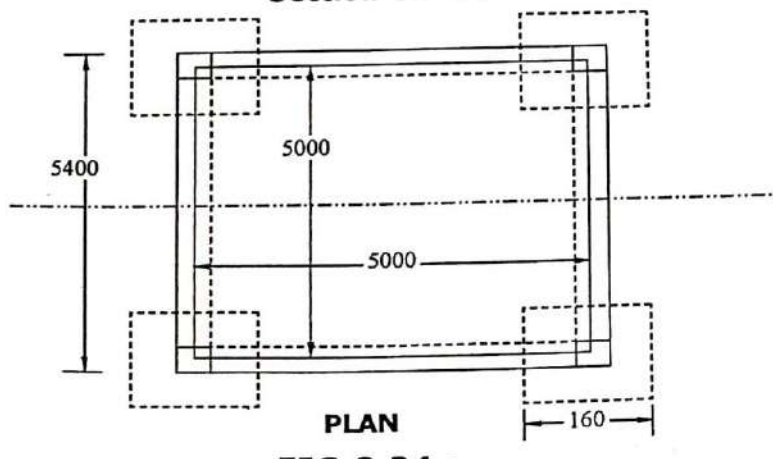Prepare a detailed estimate of following items of work for an over head tank shown in Fig. 8.24.

(a) Earth work excavation for foundation.

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

Section on X-X

PLAN

CE-405- Irrigation Engineering

Course Title	Irrigation Engineering	Course Code	CE-405
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Type of Course	Lecture+Tutorials	Total Contact periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites The student should know the basic knowledge about hydraulics and mechanics

Course Outcomes

On completion of this course, the student will be able to

CO1	Solve simple problems of irrigation by applying basic principles and methods.
CO2	Estimate rainfall over a catchment by various methods.
CO3	Explain different parts of head works and weirs and their functions.
CO4	Describe the structural details, construction and maintenance of gravity and earth dams.
CO5	Summarize the data of canals and maintenance of canals and design canals as per regime conditions.
CO6	Describe the concept of watershed, its objectives and maintenance.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Basics of Irrigation	12	Q4	Q1		Q9(a)	Q13(a)
2	Basics of Hydrology	13		Q1			
3	Head works and weirs	10		Q2		Q10(a)	Q14(a)
4	Gravity dams and Earth dams	15		Q2			
5	Distribution works	13		Q3	Q5,Q6,	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Watershed 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: Basics of Irrigation

Duration: 12Periods(L:10– T:2)

a) Introduction-Definitions-necessity and scope of irrigation-advantages and disadvantages- perennial and inundation irrigation--direct and storage irrigation- flow and lift irrigation-Types of lift irrigation-Major lift irrigation- Minor lift irrigation-Kaleswaram project

b) Methods of irrigation- Border Strip, Furrow, Check basin, Sprinkler & Drip irrigation

c) Principal crop seasons-kharif and Rabi crops.

d) Definition of duty, delta, base period, crop period, k or period -different methods of expressing duty-relationship between duty and delta and base period-factors affecting duty –-duty figures for principal crops-simple problems.

UNIT - 2: Basics of hydrology　　　　**Duration: 13Periods(L:10 – T:3)**

a) Introduction-Definition of Precipitation, Runoff. Runoff classification-Rainfall-Catchment and its types-Factors affecting run off.- Maximum flood discharge measurement- yield and dependable yield of a catchment.

b) Types of rain gauges-Simon's rain gauge-float type automatic recording gauge-Precautions in setting and maintenance-rainfall records Hydrological cycle-average annual rainfall of an area – Theissen's polygon method.

c) River gauging-objects –selection of site-list the methods to measure the velocity.

UNIT - 3: Head Works and Weirs

Duration: 10 Periods(L:8 – T:2)

a) Introduction-Classification of head works-storage and diversion, head works- their suitability under different conditions-suitable site for diversion works-general layout of diversion works-brief description of component parts of diversion works,

b) Barrages and Weirs - Brief description of component parts of a weir-percolation-uplift-creep-scour-effect of percolation-list the protective works for a river weir-failure of weirs.

UNIT – 4: Gravity dams and Earth dams

Duration: 15Periods (L:12 – T:3)

a) Introduction-Reservoirs and its types-Dams and its functions-types -Factors influencing selection of site for reservoirs and dams.

b) gravity dams- Definition of various terms such as FRL, MWL, TBL, free board, Dead Storage, Live Storage, Gravity Dam, Spillway-profile of a dam-forces acting - Causes of Failures and remedial measures -Elementary profile -low dam and high dam - free board and top width –sketch the practical profile.

c) Uplift pressure - drainage gallery-spillway-types of spillways and their suitability.

d) Earth dams – locations suitable for Earth Dams, types of earth dams- saturation gradient and phreatic line-Causes of failure of earth dams and remedial measures.

UNIT 5: Distribution works   **Duration: 13Periods (L:7.8– T:5.2)**

a) Introduction-Canals-importance of Irrigation canals- classification-different methods of canal alignment-typical cross section of canal in cutting embankment, partial cutting and embankment – balancing depth of cutting-functions of head regulator and cross regulator -canal lining-necessity- types –advantages and disadvantages-maintenance of canals.

b) Design of Channels-Kennedy's theory-Regime conditions-Lacey's theory

c) Cross drainage works-necessity and suitability –general description of aqueducts – super passage -siphon-level crossing.

UNIT – 6: Watershed Management

                        Duration: 12 Periods (L:7.2 – T:4.8)

a) Introduction, concept of watershed development, objectives of watershed Management, need for watershed development in India-Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics-factors affecting watershed management - causes of watershed deterioration and their result-watershed management practices

b) Water Harvesting: Rainwater harvesting, soil moisture conservation, check dams, artificial recharge, and percolation tanks.

c) Soil erosion-Types and causes of erosion, factors affecting erosion, measures to control erosion,-ploughing-trenching-bunding-terracing-check dams-rock fill dams.

Reference Books

1. Punmia, B.C., Pande, B, Lal, Irrigation and water power engineering, Laxmi Publications

2. Irrigation Engineering by B.R.Gupta.

3. Irrigation Engineering and water power engineering by Birdie.

4. Watershed Management by JVS Murthy, - New Age International

5. Land and Water Management by VVN Murthy, -Kalyani Publications

6. Subramanayan, Engineering Hydrology, McGraw Hill.

7. Mutreja K N, Applied Hydrology, McGraw Hill

8. Sharma, R.K. and Sharma, T.K., Irrigation Engineering, S.Chand and Company

9. Basak, N.N., Irrigation Engineering, McGraw Hill Education India Pvt. Ltd.

10. Asawa, G.L., Irrigation and water resource Engineering, New Age International(P)

11. Dahigaonkar, J.G., Irrigation Engineering, Asian Book Pvt. Ltd., New Delhi.

12. Garg, S K, Irrigation and Hydraulic structures, Khanna Publishers, Delhi.

13. Priyani V.B., Irrigation Engineering, Charotar Book Stall, Anand.

Suggested E-learning references

1. https://nptel.ac.in/courses/105/104/105104103/
2. https://nptel.ac.in/courses/105/105/105105110/

Suggested Learning Outcomes
Upon completion of the course, the student shall be able to

    1.1   Define Irrigation

    1.2   State the necessity of irrigation.

    1.3   List advantages and disadvantages of irrigation.

    1.4   Distinguish between

        i)   Perennial and inundation irrigation.

        ii)   Flow and Lift irrigation.

        iii)   Storage and direct irrigation.

    1.5   Types of Lift irrigations as per commanding area and height of lift.

    1.6   Distinguish the Major lift irrigation project and Minor Lift irrigation projects with a few examples in the state of the Telangana and the India.

    1.7   State the advantages and disadvantages of Major Lift irrigations projects.

    1.8   Discuss about the Kaleswaram project in the engineering point of view

    1.9   Briefly describe various methods of Irrigation

    1.10   State Principal crops in India and their seasons.

    1.11   State different methods of expressing duty.

    1.12   State the relationship between duty and delta.

    1.13   State the factors affecting duty.

    2.1   Define terms Catchment, intercepted catchment, free   catchment, runoff, max flood discharge (and simple numerical problems only)

    2.2   Define yield and dependable yield of a catchment and Calculation of dependable yield of a catchment (simple numerical problems only).

    2.3   State the methods of measuring rainfall with Simon's rain gauge.

    2.4   State the characteristics of good, average and bad catchments.

    2.5   State the factors affecting run-off.

    2.6   State the objectives for river gauging.

    2.7   List the factors for selecting suitable site for a gauging station

2.8   List the methods to measure the velocity

3.1   State the classification of head works and their suitability under different conditions.

3.2   List the factors suitable for selection of site of Diversion works.

3.3   Describe with sketch the component parts of Diversion works.

3.4   Distinguish between barrages and Weirs

3.5   Describes with sketch the component parts of a weir and their functions.

3.6   Explain the terms percolation, uplift, creep and scour.

3.7   Explain the failure of weirs (Theory only)

4.1   State the classification of Reservoirs and Dams.

4.2   State factors influencing selection of site for reservoirs and dams.

4.3   Define the terms: Full reservoir level. Maximum water level, top bund level,dead storage, livestorage, free board, gravity dam, spillway.

4.4   Briefly explain the causes of failure of gravity dams and their remedies.

4.5   Distinguish between low and high dams.

4.6   Draw the elementary profile of a gravity dam for a given height

4.7   Draw the practical profile of a low dam.

4.8   State the need of drainage galleries

4.9   State the different types of spillways and their suitability and draw sketches

4.10   State the situations in which earth dams are suitable.

4.11   Define saturation gradient, phreatic line.

4.12   State the three types of earth dams with sketches of typical cross sections.

4.13   Briefly explain the causes of failure of earth dams and states the remedial measures.

5.1   Explain the importance of Irrigation canals.

5.2   State classifications of canals.

5.3   State the different methods of canal alignment and the situations in which each is suitable.

5.4   Sketch typical cross sections of canals in cutting, embankment and partial cutting.

5.5   Define terms: balancing depth of cutting.

5.6   State the functions of Head Regulator and cross regulator.

5.7   Design of channels according to kennedy's theory (simple numerical problems only).

5.8   Design of channels according to Lacey's theory (simple numerical problems only).

5.9 Distinguish between Kennedy's theory and Lacey's theory including limitations.

5.10 State the need and draws the sketches of different cross drainage structures.

5.11 State the necessity and types of canal linings, advantages and disadvantages of canal linings.

5.12 State the maintenance required for canals.

6.1 Define terms: watershed, watershed management.

6.2 State the necessity of watershed management.

6.3 List the objectives of watershed management

6.4 List the characteristics of watershed

6.5 List the factors affecting water shed management.

6.6 State the causes of watershed deterioration and their result.

6.7 Explain Watershed management practices

6.8 Explain rain water harvesting.

6.9 Explain soil moisture conservation methods

6.10 Explain various techniques to control soil erosion.

Suggested Student Activities

1. Tech fest/Srujana

2. Paper/Poster presentation

3. Quiz

4. Group discussion

5. Field visit to nearby irrigation structures and prepare notes.

6. Give a feasibility report on your home town of existing and proposed projects.

7. Observe watershed management system in your village and prepare presentation.

CO-PO Mapping Matrix

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

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State Board of Technical Education and Training,Telangana

Model Question paper
DCE IV semester
Mid Semester-I Examination

Course Code: CE-405   **Duration:1 hour**
Course Name: IRRIGATION ENGINEERING   **Max.Marks:20**

PART-A

Answer **all** questions. Each question carries **one** mark.**4x1 = 4 Marks**
1. Define irrigation.
2. Differentiate between flow irrigation and lift irrigation
3 .List the important components of Hydrological cycle.
4. Define the terms 1) catchment 2) intercepted catchment

PART –B

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

5(a). Write the necessity of irrigation.

(OR)

5(b) The base period of a crop is 140 days. The total depth of water required is 800 mm. Find the Duty.

6(a)What are the points to be considered for setting up of Rain gauge station at a place.

(OR)

6(b)What is runoff and write its types

PART-C

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

7(a)What are the advantages of Irrigation

(OR)

7(b)What are the factors that will affect the Duty of water.

8(a) With a neat sketch explain Hydrological cycle.

(OR)

8(b) With a neat sketch explain the working of Simon's Rain gauge.

State Board of Technical Education and Training, Telangana

Model Question paper
DCE IV semester
Mid Semester-II Examination

Course Code: CE-405   **Duration: 1 hour**
Course Name: IRRIGATION ENGINEERING   **Max.Marks:20 Marks**

PART-A
Answer **all** questions. Each question carries **one** mark.**4x1 = 4 Marks**
1. Define head works?
2. What is creep length.
3. Define full reservoir level and maximum water level
4. Define live storage and Dead storage.

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

5(a).Differentiate between barrage and a weir
                                    (OR)
5(b). List the component parts of a weir.

6(a).Differentiate between low and high dam
                                    (OR)
6(b). Draw the practical profile of a low dam.

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

7(a)Draw the layout of a Diversion headwork and list various parts.
                                    (OR)
7(b) Draw the cross section of a weir and name various parts.

8(a)What are the points to be considered for selection of site for a dam
                                    (OR)
8(b)What is Elementary Profile of a gravity dam. Find the minimum base width of elementary profile for reservoir full condition.

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

Course Code: CE-405   **Duration:2 hours**
Course Name: IRRIGATION ENGINEERING   **Max.Marks:40 Marks**
PART-A

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

1. Define Base period, Crop period.
2. What is a Diversion Headworks and Storage Headworks
3. Define the terms watershed and watershed management.
4. List different methods of estimating Average rain fall over an area.
5. Write the classification of canals based on carrying capacity of canal.
6. Define balancing depth of cutting.
7. What is rain water harvesting.
8. Define soil erosion.

PART-B

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

9(a). Define Duty, Delta, and Base period.

(OR)

9(b). Write the methods of canal alignment.

10(a) Write the purpose of diversion head works.

(OR)

10(b) Write any three methods of controlling soil erosion.

11(a). Draw the cross section of a canal in cutting.

(OR)

11(b). Write any three functions of a head regulator.

12(a). What is check dam and write its functions.

(OR)

12(b). What is water harvesting and write any 4 methods to improve ground water level.

PART-C

Answer **four** questions. Each Question carries **five** marks   **4x5=20 marks**

13(a) Explain Theissen's Polygon method for the estimation of average rainfall over an area.

(OR)

13(b)What is the necessity of canal lining List different types of canal linings

14(a)Draw the cross section of a weir state the functions of the component parts

(OR)

14(b)What are the objectives of watershed management.

15(a)Briefly explain about the maintenance works of a canal

(OR)

15(b) Draw a neat sketch of Siphon spillway and explain its working.

16(a) Explain about different soil conservation methods.

(OR)

16(b)Write the characteristics of watershed.

CE-406- Civil Engineering Drawing

Course Title	Civil Engineering Drawing	Course Code	CE-406
Semester	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture+ Practical	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Pre Requisites

Basic knowledge of Engineering Drawing, ability to visualise 2D and 3D views

Course Outcomes

On completion of the course the student will be able to

CO1	Draw and illustrate the plan, elevation and section of culverts drawings
CO2	Prepare the plan, elevation and section of Bridge drawings
CO3	Sketch and draw the plan, elevation and section of Earthen bunds and Tank surplus weirs drawings
CO4	Develop the plan, elevation and section of Tank sluice and Canal drop drawings
CO5	Illustrate and draw the plan, elevation and section of Sanitary block and Septic tank drawings
CO6	Draw the plan, elevation and section of R.C.C Overhead tank and Rain water harvesting pit drawings

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hours/Periods	Questions to be set for SEE		
			R	U	A
1	Culverts and Bridges	15	1	1	1
2.	Irrigation Engineering drawings	15		2	
3.	Public health Engineering drawings	15			1
	Total	45	1	3	2

Course Contents

UNIT 1: Culverts and Bridges   **Duration: 15 Periods (L:5 – P:10)**

    a) Pipe culvert (Single Pipe)

    b) R.C.C slab culvert with square return walls

    c) Two-Span R.C.C T-beam Bridge with square return walls.

    d) Two-Span R.C.C Bridge with splayed wing walls and Return walls.

UNIT 2: Irrigation engineering drawings   **Duration: 15 Periods (L:5 – P:10)**

    a) Earthen bunds – Two types.

       (i) Homogeneous type   (ii) Non Homogeneous type.

    b) Tank surplus weir with splayed wing walls.

    c) Tank sluice with tower head.

    d) Canal drop (notch type)

    e) Canal regulator

UNIT 3: Public health engineering drawings   **Duration: 15 Periods (L:5 – P:10)**

    a) Plan and cross section of a sanitary block showing internal water supply and sanitary fittings

    b) Septic tank and soak pit with details of connections

    c) R.C.C overhead square tank. (four columns with all accessories).

    d) Draw plan and cross section of a rain water harvesting pit for a residential building.

Recommended Books

1. Civil Engineering Drawing-II   by N.Srinivasulu.
2. Civil Engineering Drawing-II   by Chakravarthy

Suggested E-learning references

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

Suggested Learning Outcomes

After completion of the subject, the student will be able to

1.1. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Pipe culvert and identify the component   parts from the given set of specifications

1.2. Draw the plan, cross sectional elevation and longitudinal sectional elevation R.C.C –slab culvert   and identify the component   parts from the given set of specifications.

1.3. Draw the plan, sectional elevation and cross section of Two span R.C.C   T-beam bridge with square return walls from the set of given specifications.

1.4. Draw the sectional elevation, plan and cross section of Two span R.C.C bridge with splayed wing walls and return walls from the set of given specifications.

2.1. Draw the cross section view of Earthen bunds – Two types

(i) Homogeneous type   (ii) Non-Homogeneous type.

2.2. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Tank surplus weir with splayed wing walls.

2.3. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Tank sluice with tower head.

2.4. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Canal drop (notch type)

2.5. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Canal regulator

3.1. Draw plan and cross section of a sanitary block showing internal water supply and sanitary fittings

3.2. Draw the plan, cross-section elevation of Septic tank and soak pit with details of connections

3.3. Draw the plan, elevation of R.C.C overhead square tank. (four columns with accessories).

3.4. Draw plan and cross section of a rain water harvesting pit for a residential building.

Suggested Student Activities

1. Tech fest/Srujana
2. Paper/Poster presentation
3. Quiz
4. Group discussion
5. Surprise Test
6. Roof rainwater harvesting - a case study
7. Visit to a nearby canal, take the field data and draw the c/s of canal.
8. Identify and take the details of existing tank weir/tank sluice in the vicinity of your area and draw all the views.
9. Identify and take the details of existing culvert/highway bridge/railway bridgenearby and draw all the views.
10. For the given data prepare a model of any one of the following.

a. Tank sluice

b. Tank weir

c. Culvert

d) Railway/Highway bridge

11. Prepare a 3D model of Irrigation structure in CAD software

CO-PO Mapping Matrix

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

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R) and Understanding(U)	2	4	Nil	8 Marks
02	Part-B	Application(A)	2	12	1	12 Marks
				Total Marks		20 Marks

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R) and Understanding(U)	4	4	Nil	16 Marks
02	Part-B	Application(A)	2	24	1	24 Marks
				Total Marks		40 Marks

Course Code: CE-406	**Duration:1 hour**
Course Name: CIVIL ENGINEERING DRAWING	**Max.Marks:20 Marks**

PART-A

Answer **all** questions. Each question carries **four** marks   **2x 4 = 8 Marks**

1. Draw the cross section of pipe culvert for following particulars.

         Internal dia of pipe   = 1000mm
         External dia of pipe   = 1200mm
         Width of bedding   = 1600mm
         Thickness of bedding = 300mm
         Thickness of benching = 250mm

2. Draw the cross section of an abutment of slab culvert for the following data:

         Bottom level of CC bed   = +45.20m
         Top level of CC bed   = +45.80m
         Width of CC bed   = 2.2m
         Bed level   = +47.00m
         Masonry footings of abutments = Consists of two below B.L.
         Footings of equal depth and offsets on rear side only
         Width of first footing   = 1.8m,
         Width of second footing = 1.6m
         Top level of abutment = + 48.50m,
         Thickness of bed block flushing
         With of top abutment = 0.3 m
         Top width of abutment = 0.9 m having batter on rear face
         Thickness of slab = 200 mm,
         Thickness of wearing course = 60mm

PART-B

Answer any **one** question. Each question carries **twelve** marks   **1x12=12 Marks**

3. Draw the plan and the longitudinal section of a pipe culvert to scale 1:100 to the given Particulars:

i) Drain particulars
    Bed level   : +50.350
    Bed width near the pipe culvert: 1200mm
    Side slopes of drain   : 1:1

General G.L. near the drain   : +51.550

    Bed pitching and side slope revetment on both U/S and D/S = 200mm, rough

    Stone bed pitching to a length of 1200 mm shall be provided both on U/S and D/S.

    A toe of same width (200mm) shall be taken to a level of +50.00 at the end of bed pitching.

    Sides slope revetment shall be with 200mm size rough stone along the slopes to a length of 1200mm both on US/ and D/S from both B.L to general G.L.

ii) Pipes Details:

    Internal diameter of C.C. pipe   : 1000mm

    External diameter of C.C. pipe   : 1200mm

    Bedding for the Pipe   : 250mm CC

    Benching for the pipe   : 300mm CC

    Width of both bedding and pitching   : 1800 mm

    Bottom level of C.C. bedding   : +50.00m

    No. of pipes   : One

iii) Head walls:

    At the end of pipe, two head walls are provided with brick masonry with the

    Following details:

    Length of head wall   : 7200mm

    Bottom level of head wall   : +49.10

    Top level C.C. bed provided under head walls   : +49.10

    Bottom level of C.C. bed provided under head walls: +48.80

    Width of C.C. Bed   : 1800mm

    Bottom width of head wall   : 1200mm

    Profile of head wall = outer surface vertical and earth fill face having a batter so that the top width = 450mm.

    Top level of head wall   : +52.00

iv) Earth fill and Embankment:

    Formation width   : 10,000 mm

    Side slopes   : 2 horizontal to 1 vertical

    Formation level   : +54.00

    Height of earth fills   : top level of formation – top level of pipe = 54.00 - 51.450 =
                        2.550m

v) Guide stones on both the sides of formation:

    450mm x 450mm square guide stones are provided at distance of 450mm from extreme   edges of formation. These stones are taken t o a depth of 600mm below formation level and extended to a height of 700mm above formation level at 3000mm C.C.

4.Draw the following view of a small T-beam and deck slab bridge of two spans across a canal to a scale of 1: 50 from the given specifications. The type of structure is box type

    i) Half cross-section & half elevation along the road.

    Specifications:

i). General

    No. of spans   =2

    Clear width of each span   =3.5m

Bed level of canal   =+50.00

F.S.L   =+52.00

Free board   =1.0m

Road formation level   =+53.58

Side slopes of canal   =1:1

Road width between parapets   =4.40m

Road width between kerbs =4.10m

Kerb one either side   =150mmx150mm

Wing walls   =Return type

ii). Foundation:

The depth of foundation is same for abutments, wing walls and pier and is taken to level of + 49.30.

Depth of C.C bed below abutments, wing walls and pier is same and equal to 400mm; i.e. top level of C.C bed =+49.70 and bottom level of C.C bed =+49.30.

Width of CC bed:

a. For abutments   =1700mm

b. for wing walls   =1400mm

c. For pier   =1000mm

Bottom width of stone masonry abutment at +49.70 level = 1300mm: length = 5.9m. Bottom width of stone masonry wing walls at + 49.70 level = 1000mm Length

(as measured on outer side) = 3.9m

iii). Pier:

Width of stone masonry for pier is 600 mm and is same throughout its height

(up to bed block). Cut water sharp to 60⁰ and ease water semi-circular shape are provided.

iv).   Top width of abutments and wing walls:

The water face is vertical and rear side (earth retaining side) has a batter both forabutments and wing walls.

Top width of abutment = 700mm

Top width of wing wall =500mm

v).   T-beams:

Three no. of T-beams are provided one at the centre and one on either side at 2m c/c, having equal overhang of deck slab on both sides.

Width of rib =250 mm

Depth of rib =500 mm

Bearing for T-beams over abutments =500mm

vi). C.C bed blocks:

T-beams are laid over C.C bed blocks provided over the abutments and wing walls.

Size of bed block is 600mmx600mmx150mm and is laid below the ribs of T-beam.

vii).   R.C.C. deck slab:

200mm thick R.C.C (1:2:4) slab is provide with 20mm thick wearing course

(C.C 1: 1 ½:3) with 8mm size stone chips. Width of R.C.C deck slab = 4.9m.

viii).   Parapet:

Brick masonry parapet 300mm square pillars with 50mm projecting copings on eitherSide at top are provided, one at middle and one each at the ends.

R.C.C posts at 1m Clear spacing of size 100x 100 x 750mm with 25mm dia. Pipe, hand rails comprises theParapet.

ix.) Side revetment:

Canal sides which are at 1:1 slope are provided with rough stone revetment 300mm thick over a gravel bed of 150mm thick for sufficient length. The toe wall for revetment is taken to a level of +49.40 with its bottom width equal to 450mm.

Note: Any other data required may be assumed suitably.

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

Course Code: CE-406   **Duration:1 hour**
Course Name: CIVIL ENGINEERING DRAWING   **Max.Marks:20 Marks**

PART-A

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

1. Sketch the central section along the tank bund of the well of atower head sluice from the
    following :
       Internal dia = 1· m
       Height of well = 4·2 m
       Thickness of well staining = 0·45 m from top to a depth of2·0 m and 0·60 m for the
       remaining
       CC foundation = 0·5 m thick with 0·3 m offset
       Thickness of slab = 150 mm thick
       Wooden shutter = 0·70 m wide × 1·2 m deep
       Provide suitable rod and gearing rearrangement for the wooden shutter.
2. Draw the longitudinal section of a canal drop and name the component parts.

PART-B

Answer any **one** question   **1x12=12 Marks**

3. Draw the cross-section of a homogenous earthen bund with thefollowing specifications to a scale
    of 1 : 100.
       Top width of bund = 1·5 m
       TBL = +57·00
       General ground level = +50·00
       Stripped ground level = +49·70
       Side slopes = 1½ : 1 on U/S and 2 : 1 on D/S
       Key trenches = 1·2 m wide and 0·6 m deep at 4·0 m C/C
       Protection of upstream face of the bund :
       The upstream face of the bund is provided with 300 mm thick rough stone revetment
       over 15 mm thick gravel backing.
       This revetment is founded on rough stone wall 1·0 m wide1·0 m deep
       Protection of a downstream toe of the bund :
       A rock toe with 300 m rough stone boulders is provided with900 mm top width and top
       level being at +51·20.
       Side slopes of rock toe = 1 : 1
       Sand filter = 200 mm thick on rear side and at the bottom of the rock toe
       Toe drain = A longitudinal drain is provided with bottom width1·0 m and side slopes 1 :
       1. This is in line with the outer surface of rock toe and taken to a level of +49·00

Rough stones of 300 mm thick are used for side revetment and bed pitching of toe drain

4. Draw the longitudinal section of a tank sluice with tower head to a scale of 1: 50.

(a) Tank bund :

Top width = 1·8 m

TBL = +163·500 m

MWL = +162·000

FTL = +161·300

Bed level = +159·100

Side slopes = 1½ : 1 on U/s and 2 : 1 on D/s

(b)Tower head :

Internal diameter = 1·2 m

Top of RCC slab over well = +162·50

Thickness of well staining = 450 mm from top to a depth of 2 m and 600 mm for the remaining height

Opening = 600 mm dia opening is provided in the CC diaphragm 75 mm thick for allowing water into the barrel.

Shutter = Wooden shutter 750 mm wide, 1500 mm depth and 50 mm thick is provided for regulating water

Foundation for well = 3·0 m dia and 600 mm thick

(c) Sluice barrel :

Internal dimensions = 750 mm wide × 1·0 m height

Roof for barrel = RCC roof slab 150 mm thick

Side walls of the barrel = 450 mm thick at top and600 mm thick at bottom with water face vertical

CC foundation = 450 mm thick and 2550 mm wide is laid under barrel

(d) Lead chamber :

Length of wing walls = 1·8 m (horizontal distance)

Distance between wing walls inside to inside at the receiving end = 2·0 m

Thickness of walls = 450 mm at top and 600 mm at bottom with water face vertical

Profile of wing walls = Wing walls start from +

(e) Stilling cistern :

Internal dimensions : 3·0 m × 3·0 m

Side walls = All the side walls including the outer 160·25(top of barrel slab) at the entrance of the barrel and slopes down to the bed level +159·10.

The slope from GL to bed level is 1½ : 1.

wall having an opening of 600 mm for discharging water into field channel are 600 mm thick at bottom and450 mm thick at top, having batter on rear side. These walls are taken to canal bund level +160·75

(f) Canal   particulars :

Bed width = 600 mm

Side slopes = 1:1 on water side and 1½:1 on rear side up to GL

Bed level = +159·10

Width of canal bund = 900 mm

Canal bund level = +160·750

(g) Rough stone revetment :

(i) 450 mm rough stone revetment is provided on U/s over150 mm thick gravel backing from bed level to TBL

(ii) Sides of canal are provided with 300 mm thick rough stone revetment over 150 mm thick gravel backing for a length of 1·5 m. Bed pitching is also provided in the canal to a length of 1·20 m with 300 mm size rough stone and a toe is provided at its end and taken to a depth of 600 mm below bed level of canal. Width of toe = 300 mm

(h) General ground level at the site = +159·50

Course Code: CE-406   **Duration:2 hours**
Course Name: CIVIL ENGINEERING DRAWING   **Max.Marks:40 Marks**

PART-A

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

1. Sketch the section at support of an RCC slab bridge showing bed block and abutment cross-
   section and name the parts.
2. Draw the longitudinal section of the body wall of a canal drop with the following data :
   - Length of body wall = 9·0 m
   - Top of notch pier = + 45·00 m
   - Top of body wall = + 44·00 m
   - Top of CC foundation = + 42·80 m
   - Bottom of CC foundation = + 42·20 m
   - Offset of CC foundation = 0·3 m on either side
   - Notch = Trapezoidal shape with bottom width 0·6 m and side slopes = 1 : 1
3. Draw the sectional plan of RCC overhead tank from the data given below :
   - Size of water tank = 4500 mm × 4500 mm
   - Thickness of sidewalls = 200 mm
   - Columns' size = 400 mm × 400 mm
   - Size of column footings = 1500 mm × 1500 mm
   - Size of brace beams = 300 mm × 300 mm
4. Draw the cross section of a water harvesting pit

PART-B

Answer any **one** question. Each question carries **twenty four** marks.   **1x24=24 Marks**

5. Draw the longitudinal section of a tank sluice with tower head to a scale of 1: 50.
   - (a) Tank bund :
   - Top width = 1·8 m
   - TBL = +163·500 m
   - MWL = +162·000
   - FTL = +161·300
   - Bed level = +159·100
   - Side slopes = 1½ : 1 on U/s and 2 : 1 on D/s
   - (b) Tower head :

Internal diameter = 1·2 m

Top of RCC slab over well = +162·50

Thickness of well staining = 450 mm from top to a depth of 2 m and 600 mm for the remaining height

Opening = 600 mm dia opening is provided in the CC diaphragm 75 mm thick for allowing water into the barrel.

Shutter = Wooden shutter 750 mm wide, 1500 mm depth and 50 mm thick is provided for regulating water

Foundation for well = 3·0 m dia and 600 mm thick

(c) Sluice barrel :

Internal dimensions = 750 mm wide × 1·0 m height

Roof for barrel = RCC roof slab 150 mm thick

Side walls of the barrel = 450 mm thick at top and600 mm thick at bottom with water face vertical

CC foundation = 450 mm thick and 2550 mm wide is laid under barrel

(d) Lead chamber :

Length of wing walls = 1·8 m (horizontal distance)

Distance between wing walls inside to inside at the receiving end = 2·0 m

Thickness of walls = 450 mm at top and 600 mm at bottom with water face vertical

Profile of wing walls = Wing walls start from +160·25

(top of barrel slab) at the entrance of the barrel and slopes down to the bed level +159·10. The slope from GL to bed level is 1½ : 1.

(e) Stilling cistern :

Internal dimensions : 3·0 m × 3·0 m

Side walls = All the side walls including the outer wall having an opening of 600 mm for discharging water into field channel are 600 mm thick at bottom and450 mm thick at top, having batter on rear side. These walls are taken to canal bund level +160·75

(f) Canal particulars :

Bed width = 600 mm

Side slopes = 1:1 on water side and 1½:1 on rear side up to GL

Bed level = +159·10

Width of canal bund = 900 mm

Canal bund level = +160·750

(g) Rough stone revetment :

(i) 450 mm rough stone revetment is provided on U/s over150 mm thick gravel backing from bed level to TBL

(ii) Sides of canal are provided with 300 mm thick rough stone revetment over 150 mm thick gravel backing for a length of 1·5 m. Bed pitching is also provided in the canal to a length of 1·20 m with 300 mm size rough stone and a toe is provided at its end and taken to a depth of 600 mm below bed level of canal.

Width of toe = 300 mm

(h) General ground level at the site = +159·50

6. Draw the sectional elevation and plan of a square RCC overhead tank with the following data to a scale of 1: 50 :

Height of the tank (from GL to bottom of the tank, i.e., top
of floor slab or base slab) = 9·0 m
Size of tank = 5·0 m×5·0 m×1·75 m
Thickness of RCC side walls = 200 mm
Thickness of RCC base/floor slab = 200 mm
Thickness of RCC roof slab = 110 mm
Size of RCC column = 400 mm×400 mm
No. of RCC column = 4 no. (one at each corner)
Size of RCC brace beams = 400 mm×350 mm
Spacing of brace beams = 3·0 m c/c
Depth of RCC footing below ground level = 2·0 m
Size of footing at base = 1·6 m×1·6 m
Thickness of footing at column face = 500 mm
Thickness of footing at the end = 200 mm
Thickness of levelling course below the footing = 200 mm,(1: 4 : 8) plain concrete
Size of ring beam below base slab = 400 mm×450 mm
Dia. of inflow pipe = 100 mm
Dia. of outflow pipe = 75 mm
Size of manhole cover = 600 mm×450 mm
Show the pipe connections; ladder, water level indicator, ventilating arrangements
etc. Assume any other data suitably if needed.

CE-407- Civil CAD Lab

Course Title	Civil CAD Lab	Course Code	CE-407
Semester:	IV	Course Group	Practical
Teaching Scheme in Periods (L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture+ Practical	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of basic CAD and advanced CAD (CAD 2D & 3D) and knowledge of Building drawing and Building services.

Course Outcomes

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

CO1	and window, Load bearing wall and isolated column footing using CAD Develop 2D drawings for Panelled door
CO2	Prepare 2D drawings for Civil engineering School and Hospital building drawings using CAD
CO3	Apply the concept of layers to show various building services
CO4	Create 2D drawings for various building services using CAD
CO5	Draw and develop 3D drawings and models for Load bearing wall and isolated column footing drawings using CAD
CO6	Plan and develop 3D drawings and models for single/double room building using CAD using CAD

Course Content

Unit No	Unit Name	Periods
1	2-D drawings using CAD Software	15
2	Service drawings using CAD Software	15
3	3-D drawings using CAD Software	15
Total		45

Course Contents

UNIT 1:2-D Drawings using CAD Software

Duration: 15 Periods(L: 5 – P: 10)

Draw conventional signs & symbols used in civil engineering drawing –Elevation of fully panelled door, partly glazed and partly panelled door/window shutter –Section of a load bearing wall, isolated column footing–Plan and sectional elevation of a dog-legged stair case –Building Drawings 2BHK building with site plan –Plan of Primary school building –Plan of Rural Hospital building –Typical floor plan of Apartment consisting G+5 floors

UNIT 2: Service drawings using CAD Software

Duration: 15 Periods(L: 5 – P: 10)

Introduction to layers, – Preparation of a simple water supply and sanitary layout –Preparation of Fire fighting layout for college building –Preparation of foundation plan for a residential building and framed structure –Preparation of Plan and Section of a Manhole and Septic tank with soak pit – Shallow well Rain water harvesting &Solar water heater for terrace

UNIT 3: 3-D Drawings using CAD Software

Duration: 15 Periods(L: 5 – P: 10)

Draw the Isolated Column footing in 3D – load bearing wall foundation in 3D– Single bed roomed building in 3D– double bed roomed building in 3D.

Reference Books

1) Learn AUTOCAD in a easy way by Sunil K. Pandey,Unitech books

2) Mastering AUTOCAD by George Omura and Brain C.Benton

3) Online manuals and tutorials-AUTODESK

Suggested E-learning references

1. http://nptel.ac.in
2. www.sketchup.com
3. www.autodesk.in/products/3ds-max/overview

Suggested Learning Outcomes

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

1.1   Draw conventional signs used in civil engineering using CAD

1.2   Draw cross section of Load bearing wall using CAD

1.3   Draw isolated column footing showing different components using CAD

1.4   Draw Plan and section elevation of a dog-legged stair case using CAD

1.5   Prepare drawing Plan, Elevation, section and site plan of 2BHK building using CAD

1.6   Draw a plan of a primary school using CAD

1.7   Create drawing Plan of Rural Hospital using CAD

1.8   Practice drawing typical floor Plan of Apartment consisting G+5 floors using CAD

2.1   Create various layers with different properties in CAD

2.2   Create a layer of a simple water supply and sanitary layoutof a building using CAD

2.3   Create a layer showing fire fighting arrangements in a buildingusing CAD

2.4   Create a layer showing the foundation plan for a residential buildingusing CAD

2.5   Draw plan and section of a manhole and septic tank with a soak pitusing CAD

2.6   Draw shallow well rain water harvesting structureusing CAD

2.7   Draw solar water heater using CAD

3.1   Create 3D model of isolated column footing using CAD

3.2   Develop3D drawing of load bearing wall foundation using CAD

3.3   Prepare the3Ddrawing of a single bed roomed building using CAD

3.4   Prepare the 3D drawing of a double bed roomed building in using CAD

Suggested Student Activities

1. Collect information regarding various CAD software available 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.
3. Collect videos showing 3D models of various buildings.
4. Visit a construction site of a building and match drawings with the execution of work and give a seminar based on the observations made.
5. Tech fest/Srujana
6. Paper/Poster presentation
7. Quiz
8. Group discussion
9. Surprise test

CO-PO Mapping Matrix

CO	Basic and Discipline Specific Knowledge PO1	Problem Analysis PO2	Design/Development of Solutions PO3	Engineering Tools, Experimentation and Testing PO4	Engineering Practices Society, for Sustainability and Environment PO5	Project Management PO6	Lifelong Learning PO 7	Linked PO
CO1	2	2	1	3	1	2	2	1,2,4,6,7
CO2	2	2	2	3	2	2	2	1,2,3,4,6,7
CO3	2	2	2	3	2	2	2	1,2,3,4,6,7
CO4	2	2	2	3	1	2	2	1.2.3.4.6.7
CO5	2	2	2	3	2	2	2	1,2,3,4,6,7
CO6	2	2	2	3	1	2	2	1.2.3.4.6.7

Course Code: CE-407   **Duration:1 Hour**
Course Name: Civil CAD Lab   **Max.Marks:20**

Instructions to the Candidate:

(i)Pick and Answer any __One__ of the following Questions from given lot.

                                                                                                                          1x20=20M

1) Prepare a drawing showing the section and elevation of a doglegged stair case in CAD
2) Prepare drawing Plan, Elevation, section and site plan of 2BHK building in CAD
3) Create drawing Plan of Rural Hospital in CAD
4) Draw a typical floor plan of Primary School in CAD
5) Draw the typical floor Plan of Apartment (consisting of 4flats for G+5 floors)in CAD

Course Code: CE-407   **Duration:1Hour**
Course Name: Civil CAD Lab   **Max.Marks:20**

Instructions to the Candidate:

(i)Pick and Answer any __One__ of the following Questions from given lot.

                                                                                                                          1x20=20M

1) Draw Plan, Elevation, section and site plan of given 2BHK building in CAD
2) Create a layer showing the water supply and sanitary layout for the given plan of a building in CAD
3) Create a layer showing the Firefighting layout for college building in CAD
4) Prepare the foundation plan for the given framed structure in another layer in CAD
5) Using layer show the Plan and Section of a Manhole and Septic tank with soak pit for the given building in CAD
6) Create another layer showing Shallow well rain water harvesting &Solar water heater on terrace for the given building in CAD

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

Course Code: CE-407   **Duration:2 hours**
Course Name: Civil CAD Lab   **Max.Marks:40**

Instructions to the Candidate:

*(i)Pick and Answer any **One** of the following Questions from given lot.*

1x40=40M

1) Prepare a drawing showing the section and elevation of a doglegged stair case in CAD

2) Prepare drawing Plan, Elevation, section and site plan of 2BHK building in CAD

3) Create drawing Plan of Rural Hospital in CAD

4) Draw a typical floor plan of Primary School in CAD

5) Draw the typical floor Plan of Apartment (consisting of 4flats for G+5 floors)in CAD

6) Draw Plan, Elevation, section and site plan of given 2BHK building in CAD

7) Create a layer showing the water supply and sanitary layout for the given plan of a building in CAD

8) Create a layer showing the Firefighting layout for college building in CAD

9) Prepare the foundation plan for the given framed structure in another layer in CAD

10) Using layer show the Plan and Section of a Manhole and Septic tank with soak pit for the given building in CAD

11) Create another layer showing Shallow well rain water harvesting &Solar water heater on terrace for the given building in CAD

12) Create drawing of isolated column footing in 3D with given dimensions in CAD

13) Develop drawing of load bearing wall foundation in 3D with given dimensions in CAD

Course Title	Modern Surveying Lab	Course Code	CE-408
Semester	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P):	1:0:2	Credits	1.5
Methodology	Lecture+ Practical	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Basic knowledge of Theodolite surveying, Tacheometric surveying, working principles of Electronic Theodolite , EDM, Total station and GPS.

Course Outcomes

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

CO1	Use Electronic Theodolite in the fields to measure horizontal angle between two stations
CO2	Operate Electronic Theodolite in the fields for traversing with Electronic theodolite
CO3	Practice operation of Total station in the field for measurement of Horizontal distance, slope distance and difference in Height between two points.
CO4	Practice operation of Total station in the field for setting out plan of a building on the ground and for calculation of area
CO5	Employ GPS in the field for measurement of coordinates of given point on the earth
CO6	Perform GPS operations in the field for linking GPS data with total station

Course Content

Unit No	Unit Name	Periods
1	Electronic Theodolite and Electronic Distance meter	15
2	Total Station	15
3	Global Positioning System	15
	Total	45

Course Contents
UNIT 1:
Electronic Theodolite and Electronic Distance meter

Duration:15Periods (L:5.0-P:10.0)

Demonstration of Electronic Theodolite- parts and functions-instrument preparation and setting-horizontal angle between two stations-vertical angle between two stations.- traversing with Electronic theodolite.

Demonstration of Electronic Distance measurement instrument-parts and functions-instrument preparation and setting-horizontal distance of a point from the instrument station by EDM

UNIT 2: Total Station

Duration:15Periods (L:5.0-P:10.0)

Demonstration of Total Station–parts and functions- adjustments of total station for taking observations- measurement of Horizontal distance, slope distance, difference in Height between two points-Elevation of a point- horizontal angle and distance between two stations- setting out right angles at different points on a base line- setting out plan of a building on the ground-prolonging a straight-line Calculation of area-earth work calculations

UNIT 3: Global Positioning System

Duration:15Periods (L:5.0-P:10.0)

Study of hand held G.P.S. – measurement of coordinates (latitude, longitude and Altitude) of given point on the earth- selection and marking of routings (Way points) -navigation to any fixed point on the earth- calculation of area-linking GPS data with total station

KEY Competencies to be achieved by the student

S.NO.	Experiment Title	Key Competency
1.	Exercises on Electronic Theodolite	- Identify the parts of Electronic Theodolite - Place Electronic theodolite on tripod, checks batteries and switches - Set initial settings in Electronic theodolite - Centering of Electronic Theodolite - Measure horizontal angle/vertical angle - Conduct traverse survey
2	Exercises on Electronic distance meter	- Identify the parts of Electronic distance meter - Places EDM on tripod, checks batteries and switches on EDM - Set initial values in EDM - Centering of EDM over a given point and sighting reflecting prism to measure distance
3	Field Exercises using Total Station	- Places total station on tripod, checks batteries and switches on total station - Centering of total station over a given point and sighting reflecting prism to measure distance - Measure area of given field - Conduct traversing survey (closed Traverse) and gets plotting - Finds Height and width of an elevated object - Finds the elevation of Instrument point by making observation to point with known elevation - Knows station setup on a known point by making observations to one or more back sight points - Establish the position of an occupied point relative to a base line or a boundary line - Establish points, Lines and Arcs on the ground - Locates Centre line of a building on the ground - Collects data for L.S and C.S of proposed road/canal/pipe line on the ground - Calculate the quantity of earth work
4	Global Positioning System	- Determine the Co-ordinates (latitude, longitude and Altitude) of various points on the ground - Navigate to any fixed point on the earth using G.P.S - Selection and marking of route (Way points) using G.P.S - Calculate the area of a given land using G.P.S - Link the G.P.S data with Total Station

Reference Books

1. Course material on G.I.S.,G.P.S. by NITTTR, Chennai.
2. Computer applications in Civil Engineering by NITTTR, Chennai.
3. Course material on Modern surveying instruments by NITTTR, Chennai.
4. Alfred Leick, "GPS satellite surveying ",John Wiley & Sons Inc., 3rd Edition, 2004.
5. Guocheng Xu,"GPS Theory, Algorithms and Applications", SpringerBerlin,2003.
6. Satheesh Gopi, R. Sathish Kumar, N. Madhu,"Advanced Surveying, Total Station, GPS and Remote Sensing" Pearson education , 2007

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes

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

1.1 Demonstrate Electronic Theodolite, list component parts of Electronic Theodolite and their functions

1.2 Prepare and do the temporary settings for taking observations to Electronic Theodolite

1.3 Determine the horizontal angle between two stations

1.4 Determine the vertical angle between two stations

1.5 Demonstrate of Electronic Distance meter

1.6 List component parts of Electronic Distance meter and their functions

1.7 Prepare and do the temporary settings for taking observations to EDM

1.8 Determine the horizontal distance of a point from the instrument station by EDM

2.1 Demonstrate of Total Station, list the component parts of Total Station and functions

2.2 Prepare and do the temporary settings for taking observations to Total Station

2.3 Determine the Horizontal distance from instrument station to any point using Total Station

2.4 Determine the slope distance from instrument station to any point using Total Station

2.5 Determine the difference in Height between two points using Total Station

2.6 Determine the Elevation of a point using Total Station

2.7 Determine the horizontal angle and distance between two stations using Total Station

2.8 Set out right angles at different points on a base line using Total Station

2.9 Give Marking plan of a building on the ground using Total Station

2.10 Prolong a straight line using Total Station

2.11 Calculate of area of a given land using Total Station

3.1 Identifies the parts and the functions of GPS

3.2 Determines the Co-ordinates (latitude, longitude and altitude) of various points on the ground

3.3 Navigate to any fixed point on the earth using G.P.S

3.4 Select and mark of routings (Way points) using G.P.S

3.5 Calculate the area of a given land using G.P.S

3.6 Link the G.P.S data with Total Station

Suggested Student Activities

1. Locate a permanent structure using GPS in your locality and prepare a map.
2. Prepare a topographical map by using total station.
3. To set out two parallel lines along both the sides of an obstacle by using total station.
4. To find the distance between two inaccessible points by using total station.
5. Prepare a report on any one of the following; Arial survey, photogrammetric survey, hydrographic survey, military survey and mine survey.

CO-PO Mapping Matrix

CO	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices Society, for Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2	2	2	1	2	2	1.2.3.4.5,6.7
CO2	2	2	2	2	1	2	2	1.2.3.4.5,6.7
CO3	2	2	2	2	1	2	2	1.2.3.4.5,6.7
CO4	2	2	2	2	1	2	2	1.2.3.4.5,6.7
CO5	2	2	2	2	1	2	2	1.2.3.4.5,6.7
C06	2	2	2	2	1	2	2	1.2.3.4.5,6.7

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

Course Code: CE-408   **Duration:1 hour**
Course Name: Modern Surveying Lab   **Max.Marks:20 Marks**

Instructions to the Candidate:

*Pick and Answer any **One** of the following Questions from given list*

Each question carries 20 Marks.

1. Determine the horizontal angle between two stations using electronic theodolite.
2. Determine the vertical angle between two stations using electronic theodolite.
3. Conduct traverse with Electronic theodolite.
4. Perform the temporary settings for taking observations to EDM
5. Determine the horizontal distance of a point from the instrument station by EDM

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

Course Code: CE-408   **Duration:1 hour**
Course Name: Modern Surveying Lab   **Max.Marks:20 Marks**

Instructions to the Candidate:

*Pick and Answer any **One** of the following Questions from given list*

Each question carries 20 Marks

1. Determine the Horizontal distance from Instrument station to any point using Total Station
2. Determine the slope distance from Instrument station to any point using Total Station
3. Determine the difference in Height between two points using Total Station
4. Determine the Elevation of a point using Total Station
5. Determine the horizontal angle and distance between two stations using Total Station
6. Set out right angles at different points on a base line using Total Station
7. Give Marking plan of a building on the ground using Total Station
8. Prolong a straight line using Total Station
9. Calculate of area of a given land using Total Station
10. Calculate the volume of earth work using Total Station

Course Code:CE-408   **Duration:2 hours**
Course Name: Modern Surveying Lab   **Max.Marks:40 Marks**

Instructions to the Candidate:

>   *Pick and Answer any <u>One</u> of the following Questions from given list.*
>   *Each question carries 40 Marks*

1. Perform Traversing with Electronic theodolite for the given stations.
2. Determine the horizontal distance of a point from the instrument station by EDM
3. Calculate of area of a given land using Total Station
4. Give Marking plan of a building on the ground using Total Station
5. Calculate the volume of earth work using Total Station
6. Determine the Co-ordinates (latitude, longitude and Altitude) for various points on the ground using G.P.S.
7. Navigate to given fixed point on the earth using G.P.S
8. Calculate the area of a given land using G.P.S
9. Perform the Digitization of any given contour map
10. Perform the Digitization of given town map and creating different layers for roads, railways, water supply lines and drainage lines

CE-409- Construction Technology Lab

Course Title	Construction Technology Lab	Course Code	CE-409
Semester:	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
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 and Soil mechanics

Course Outcomes

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

CO1	Select suitable sample of material and Use standard equipment for conducting different tests based on BIS
CO2	Check the suitability of aggregates for use in different works as per standards
CO3	Demonstrate the sieve analysis of soils and Field density of soils for use in a particular work as per IS standards
CO4	Evaluate the Atterberg limits and conduct Proctor compaction test of soils for use in a particular work as per IS standards
CO5	Test for workability of fresh concrete for use in a particular RCC work as per standards
CO6	Prepare Concrete cubes and cylinders as per standards to determine the Strength of concrete

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-Classification of soil

    b)   Field density of soil (sand replacement method)

    c)   Liquid Limit, Plastic Limit and Shrinkage 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 compression

    d)   Non destructive and Destructive tests on hardened concrete theory only

KEY Competencies to be achieved by the student

S. No	Experiment Title	Key Competency
1	Impact Value of Coarse aggregate	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	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	1. Weighing sample accurately 2. Counting the required number of rotations 3. Weighing the residue
4	Flakiness Index of coarse aggregate	1. Correct arrangement of sieves used for the sieve analysis of fine or coarse aggregate 2. Weighing of aggregate passing through thickness gauge correctly

5	Elongation Index of coarse aggregate	1. Correct arrangement of sieves used for the sieve analysis of fine or coarse aggregate
		2. Weighing of aggregate passing through length gauge correctly
6	Sieve analysis of Soil	1. Correct arrangement of sieves used for the sieve analysis of soil
		2. Weighing of residue in each sieve accurately
7	Field density of soil (Sand Replacement Method)	1. Calibrate the apparatus accurately
		2. Weigh the samples accurately
		3. Calculate the density accurately
8	Attenbergs Limits	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 dia
		6. Collecting the sample for determining water content
9	Proctor's Compaction Test	1. Weigh the soil accurately
		2. Determine the water content accurately
		3. Apply required number of blows of compaction accurately
		4. Record the observations correctly and draw the graph
10	Workability by Slump Cone Test	1. Weigh the material accurately
		2. Apply required number of tamping's for each layer of concrete
		3. Measure the subsidence accurately
11	Compaction Factor test on Concrete	1. Weigh the material accurately
		2. Weigh the mould and concrete accurately
		3. Calculate the compaction factor correctly
12	Casting of Cement Concrete Cubes	1. Weigh the material accurately
		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 compression	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 Hemant Sood, New Age International Publishers, New Delhi

2. Building and Construction materials Testing and Quality Control by M.L.Gambhir and Neha Jamwal, McgrawHill, India

3. Material Testing Laboratory manual by C.B.Kukreja, Kishore.K and Ravi Chawla, Standard Publishers Distributors

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

Suggested Learning Outcomes

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

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 as per IS:383

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 given sample of coarse aggregate

1.7 Draw inferences by conducting impact test on different types of natural aggregate

1.8 Study the significance of crushing value of aggregate used for various civil engineering works as per IS-383

1.9 State the standards on crushing value of aggregate used for various civil engineering works as per IS:383

1.10 Use the apparatus required for conducting crushing 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 crushing test on aggregate

1.13 Perform crushing test on given sample of coarse aggregate

1.14 Draw inferences by conducting crushing test on different types of natural aggregate

1.15 Study the significance of abrasion value of aggregate used for road construction

1.16 State the standards on abrasion value of aggregate used for various civil engineering works as per IS:383

1.17 Use the apparatus required for conducting abrasion 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 abrasion 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

2.1 Study the classifications of various types of soils

2.2 Use apparatus 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 soil by sand replacement method

2.8 Calculate the field density of given 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 limit, Plastic limit and Shrinkage limit of a given soil sample

2.13 Calculate the values of Atterberg limits of given soil sample from the observation of tests

2.14 Study the significance of proctor compaction test

2.15 Use the apparatus required for conducting proctor compaction test

2.16 Explain the procedure for conducting proctor compaction test

2.17 Conduct proctor compaction test over 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 OMC and MDD of given soil sample from the observations of test

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 of concrete cubes

3.14 Use equipment required for 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 of 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 that 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 on cement flooring in correct direction

3.27 Calculate compressive strength of concrete by using rebound hammer.

Suggested Student Activities

1. Collecting and study of various IS codes regarding testing of materials
2. Report on working principles of equipment
3. Tools and equipment used with pictorial presentation chart
4. Collecting Specifications 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 test for their properties in the lab
7. Collection of minimum compression strength values and water cement ratio of concrete used for different structural components from IS codes
8. Tech fest/Srujana
9. Paper/Poster presentation
10. Group discussion

CO-PO Mapping Matrix

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

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

Course Code: CE-409   **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-II Model Question paper
DCE IV semester

Course Code: CE-409   **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

Course Code: CE-409   **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 aggregate
5) Calculate the elongation index of given sample of aggregate
6) Calculate the field density of soil using sand replacement method
7) Determine the liquid limit of the given soil sample
8) Determine the plastic limit of the given soil sample
9) Calculate the optimum moisture content and maximum dry density for the given sample using Proctor's compaction test
10) Determine workability of the fresh concrete prepared with the given mix proportion and water cement ratio using slump test
11) Determine the compaction factor of the fresh concrete prepared with the given mix proportion and water cement ratio using compaction factor test.
12) Prepare three sample concrete cubes with the given mix proportion and water cement ratio
13) Calculate the compressive strength of the given cement concrete cubes

HU -410 – Employability Skills Lab

Course Title	Employability Skills Lab	Course Code	HU-410
Semester	IV	Course Group	Core
Teaching Scheme in Hrs (L:T:P)	1:0:2	Credits	1.5
Methodology	Pair Work, Group Work, Activities, Lecture, Self-Learning	Total Contact Hours	45 (3 contact hours per week)
CIE	60 Marks	SEE	40 Marks

Rationale:

The course is designed to impart employability skills to make the students of diploma get the initial employment, maintain the employment and get better employment, if they wish.

Prerequisites:

The course requires the basic knowledge of vocabulary, grammar, four language learning skills, viz. listening, speaking, reading and writing and life skills.

Course Outcomes

CO1	Comprehend the importance of employability skills and strategies to survive in a job.
CO2	Converse fluently and accurately accordingly in JAM sessions. Group Discussions will enhance the willingness to take the Initiative, accept adaptability in turn developing leadership qualities and Communication Skills.
CO3	Understand purpose and process of interview in turn knowing how to prepare and succeed in interview.
CO4	Making effective presentation, Develop Public speaking skills and learn to make visually attractive PPTs.
CO5	Learn various writing formats useful at workplace and to develop an ability to apply technical information in documentation.
CO6	Build strong workplace relationships by learning workplace etiquette, professional ethics and importance of gender sensitization.

Course Contents

Module 1: Introduction to Employability Skills

Duration: 6 Periods (L 2   P 4)

a. Filling the Curriculum gaps
    i. Attributes and values
    ii. Specific and general skills
    iii. Academic Knowledge and Aptitude Skills
    iv. Analytical skills / Data Analysis
b. How to get into a job?
    i. Good personal presentation and attitude
    ii. Core generic skills
    iii. Technical / Professional skills

    iv.   Good Communication skills

   c. How to survive in a job?

      i.   Learning skills needed for self-advocacy and networking

     ii.   Adaptability to cope with the changing circumstances.

    iii.   Reliability and Integrity

    iv.   Continuous Learning and Consistency in performance.

Module 2: JAM & Group Discussion

Duration: 9 Periods (L 3 P- 6)

      i.   What is JAM?

     ii.   Significance of JAM

    iii.   Enhancing Speaking skills, fluency, usage, coherence, spontaneity, voice modulation, eye contact, body language, Creativity, Sense of humor, Confidence and Time management.

    iv.   Learn avoiding hesitation, deviation and repetition

     v.   Purpose of Group Discussion

    vi.   Types of Group Discussion

   vii.   Different expressions and phases and their effective usage

     a. Opinion expression agrees and disagrees, partially agree or disagree, interrupt politely, add new information and conclusion

  viii.   Dos and Don'ts of a Group Discussion

    ix.   Importance of body language, Etiquettes and awareness of group dynamics

     x.   Practice.

Module 3: Interview Skills

Duration: 9 Periods (L 3 P 6)

      i.   Importance of interview skills

     ii.   Types of interviews

      a) Face to Face / One to One, Telephonic / Video, Panel Interview.

    iii.   Understanding the process of interview.

      a) Before the interview

      b) On the day of the interview

      c) After the interview

    iv.   FAQs, Common expressions of an interviewer and interviewee

     v.   Acceptable and unacceptable gestures. Body language, and Attire,

    vi.   Do's and Don'ts of an interview

   vii.   Mock Interviews

Module 4: Presentation Skills:

Duration: 9 Periods (L-3 P-6)

    a) Significance of presentation

    b) Types of presentations.

      i.   Informative, Instructional, Arousing, Persuasive and Decision-Making

    c) . What makes a good presentation?

      i.   Understand, Collect, Organize, Use presentational aids and Practice

d)   Tips for an effective presentation
- **i.** Good Beginning – Greeting, Confidence, Body Language, Opening Ideas (Funny Videos, Ridicule. Asking Questions, Quote someone/Proverb or telling a story/referring an historical event)
- ii. Unveiling – Develop systematically, usage of appropriate linkers or discourse markers. Eye contact and Effective usage of PPTs
- iii. Conclusion – Summarize - Giving time to the audience for queries and Time management

e) Guidelines for PPTs

f) Public Speaking Skills
- **i.** Benefits – Personal and Professionals.
- **ii.** Strategies to improve public speaking skills.
- iii. Obstacles to effective public speaking.
- iv. Overcoming the barriers of public speaking.

g) Prepare presentation template.

Module 5: Writing Skills at Workplace:

Duration: 6 Periods   **(L – 2 P – 4)**

a) Various writing formats useful at workplace
b) Skills involved in writing at workplace
c) Different templates for different purposes
d) Useful technical information in documentation

Module 6: Workplace Awareness

Duration 6 Periods   **(L – 2 P – 4)**

a) Workplace etiquette
b) Knowledge, skills and attributes useful at workplace
c) Workplace Relationships
d) Professional ethics
e) Importance of gender sensitization
f) Sense of responsibility towards the society

Suggested Student Activities:
- Paper Presentations
- Seminars
- Mock Interviews
- Telephonic Interviews
- Group Discussions
- Role Plays
- Creating advertisements
- Five-minute activities
- Creating a model of workplace

Course Outcomes

CO1	Comprehend the importance of employability skills and strategies to survive in a job.
CO2	Converse fluently and accurately accordingly in JAM sessions. Group Discussions will enhance the willingness to take the Initiative, accept adaptability in turn developing leadership qualities and Communication Skills
CO3	Understand purpose and process of interview in turn knowing how to prepare and succeed in interview.
CO4	Making effective presentation, develop public speaking skills and learn to make visually attractive PPTs.
CO5	Learn various writing formats useful at workplace and to develop an ability to apply technical information in documentation.
CO6	Build strong workplace relationships by learning workplace etiquette, professional ethics and importance of gender sensitization.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
410.1	-	-	-	-	3		3	5,7
410.2	-	-	-	-	3	2	3	5,6,7
410.3	-	-	-	-	3	3	3	5,6,7
410.4	-	-	-	-	2	2	3	5,6,7
410.5	-	-	-	-	2	2	3	5,6,7
410.6		-	--	--	2		3	5,7

Evaluation Pattern:

I. Continuous Internal Examination: **60 Marks**

    a. **Mid Sem - I**   20 marks

        Syllabus:
            i. Introduction to Employability skills
           ii. JAM & Group Discussion

    b. **Mid – II**   20 Marks

        Syllabus:
            i. Interview Skills
           ii. Presentation skills

    c. **Internal assessment**   20 marks

        i. Seminars: 10 marks
        ii. Assignments: 5 marks
        iii. Lab record submission: 5 marks

II. Semester End Examination: **40 Marks**

    a. Write an essay on a given topic or participate in an activity: 15 Marks
    b. Interview or Group Discussion: 15 Marks
    c. *Viva Voce*   10 marks

References:

Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.

Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.

Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.

Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.

Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D

Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

E-Learning Resources:

http://www.dailywritingtips.com/

http://www.englishdaily626.com/c-errors.php

http://www.owlnet.rice.edu/~cainproj/

http://www.thehumorsource.com/

http://www.indiabix.com/group-discussion/topics-with-answers/

http://networketiquette.net/

https://public.wsu.edu/~brians/errors

http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15

Unit No	Unit name	Periods	Questions for SEE			Marks weightage	%Weightage
			R	U	A		
1.	Introduction to Employability Skills	6			2	2	
2	JAM/ Group Discussions	9			2	2	
3	Interview Skills	9			2	2	
4.	Presentation Skills	9			2	2	
5.	Writing skills at work place	6			1	1	
6.	Workplace awareness	6			1	1	
	Total	**45**			**10**		**100**

MID SEMESTER EXAMINATION – I
HU-410- EMPLOYABILITY SKILLS LAB

<u>Time: 1 Hour</u>   <u>**Total Marks: 20**</u>

Part – A   **10 marks**

Instruction: Answer any one of the following questions.
1. Write a paragraph on the importance of employability skills.
2. List out the important employability skills.
3. Mention the different strategies to enhance the employability skills.

Part – B   **10 marks**

Instruction: Answer any one of the following questions.
4. What are the rules to be implemented in a JAM session?
5. What are the do's and don'ts of a group discussion.
6. List out the steps involved in a group discussion and mention some phrases and expressions commonly used.

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION - II
HU-410- EMPLOYABILITY SKILLS LAB

<u>Time : 1 Hour</u>   <u>**Total Marks: 20**</u>

Part – A   **10 marks**

Instruction: Answer any one of the following questions.
1. Write a list of frequently asked questions in an interview. Write the answers for the questions.
2. Mention the instructions to attend a telephonic interview.
3. What are the do's and don'ts for a formal interview?

Part – B   **10 marks**

Instruction: Answer any one of the following questions.
4. Write the various steps involved in making presentations effectively.
5. What are the do's don'ts of body language during a presentation?
6. List out a few audio-visual aids and explain their role in making an effective presentation.

<u>**Time: 3 Hours**</u>   <u>**Total Marks: 40**</u>

Part – A   **10 marks**

Instruction: *Pick any one question from the given lot.*

1. How are employability skills helpful to secure a good job?
2. Describe the steps involved in JAM and group discussion.
3. Write the guidelines involved in making a good presentation.
4. List few professional ethics useful at workplace.
5. Mention few skills involved in writing at workplace.

Part – B   **15 marks**

6. Interview / Group Discussion

Part – C   **15 marks**

7. *Viva Voce*

Course Title:	Skill Upgradation	Course Code	CE-411
Semester:	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	0:0:8	Credits	2.5
Type of Course	Practicals	Total Contact Periods	120

SKILL UPGRADATION ACTIVITIES

1. Calculate the Maximum Bending moment in the beams and loads transferred to each column of the famed structure in your class room and write a report.

2. Visit a highway construction site and prepare cross sectional drawings and topo sheets and prepare a power point presentation with photographs and videos.

3. Visit a nearest railway station and collect detailed information regarding railway track such as ballast, sleeper, gauge and signals and prepare a presentation and submit a report.

4. Make a visit to the construction site and study the requirement of labor for a particular item of work and compare it with the SSR by doing Rate analysis.

5. Prepare a detailed estimate for ongoing construction of hospital building to be compared during execution and after completion of project.

6. Prepare a detailed estimate of your dream house and present a report

7. Prepare a 3D model of various Irrigation structures such as Canal drop, Surplus Weir in CAD software

8. Visit to nearby lakes or irrigation tanks, study its present status, suggest restoration measures and prepare a report.

9. Visit nearby agricultural field where micro irrigation techniques are implemented and prepare a report on water requirements of various crops and increase in water use efficiency.

10. Develop an action plan for construction of rain water harvesting structures for ground water recharge in your institution.

11. Prepare a topographical map of the given area using Total Station and give presentation.

12. Prepare a presentation explaining the procedure of setting out centre lines of Column footings of a Framed Structure by using Total Station and Theodolite.

13. Prepare a report on any one of the following.
    a.   Arial survey
    b.   Photogrammetric survey
    c.   Hydrographic survey,
    d.   Military survey
    e.   Mine survey.
14. Prepare a residential layout in AUTOCAD for a colony taking into account the requirement of approach roads, tree plantations, water supply and sanitation.
15. Submit a detailed Case study report on Handling and Transporting of concrete for construction of Multi-storied buildings.
16. List out the methods to find complimentary function and explain to solve a homogeneous Linear Differential equation.
17. List out the methods to find Particular integrals and explain the solution of Non-homogeneous Linear Differential equations.
18. Write short notes on expansion of simple functions as a Fourier series.
19. Prepare a presentation on Laplace Transforms of simple functions.
20. Prepare a presentation on Inverse Laplace Transforms of simple functions.
21. List out different applications of Laplace Transforms.
22. Solve the Differential equation by applying Laplace Transformations.

Rubrics for Activity assessment (Mathematics)

CATEGORY	4	3	2	1
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Procedures	Typically, uses an efficient and effective procedure to solve the problem(s).	Typically, uses an effective procedure to solve the problem(s).	Sometimes uses an effective procedure to solve problems, but does not do it consistently.	Rarely uses an effective procedure to solve problems.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

Note:

1. **The above activities are indicative. The teacher may assign any other activity relevant to the course based on resources available.**

2. **Rubrics for student activities can be generated by subject teacher**

3. **The above student activities will be assessed using rubrics. A sample rubrics template is given below. The subject teacher can assess students using rubrics with atleast four relevant aspects.**

RUBRICS MODEL (For assessing Presentation skills)

Aspects	Needs improvement	Satisfactory	Good	Exemplary
Collection of data	Collects very limited information	Collect much Information with very limited relevance to the topic	Collects some basic information with little bit of irrelevance	Collects a great deal of information with relevance
Presentation of data	Clumsy presentation of data	Presents data well; but presentation needs to be more meaningful	Presents data well but need to improve clarity	Presents data in an understandable yet concise manner
Fulfill team's roles & duties	Performs very little duties but Unreliable.	Performs very little duties and is inactive	Performs nearly all duties	Performs all duties of assigned team roles
Shares work equally	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded
Interaction with other team mates	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening to others	Listens, but sometimes talks too much	Listens and speaks a fair amount
Audibility and clarity in speech	Hardly audible and unclear	Very little audibility and clarity	Audible most of the time with clarity	Audible and clear
Understanding content	Lacks content understanding and is clearly a work in progress	Little depth of content understanding	Some depth of content understanding is evident but needs improvement	Insight and depth of content understanding are evident
Content Presentation	Content is inaccurate and information is not presented in a logical order making it difficult to follow	Content is accurate and information is not presented in a logical order making it difficult to follow	Content is accurate but some information is not presented in a logical order but is still generally easy to follow	Content is accurate and information is presented in a logical order

Suggested additional aspects for assessing Leadership Qualities:

1. Carrying self
2. Punctuality
3. Team work abilities
4. Moral values
5. Communication skills
6. Ensures the work is done in time

Suggested additional aspects for assessing "Participation in social task"

1. Interested to know the current situation of society.
2. Shows interest to participate in given social task.
3. Reliable
4. Helping nature
5. Inter personal skills
6. Ensures task is completed

Suggested additional aspects for assessing "Participation in Technical task"

1. Updated to new technologies
2. Identifies problems in society that can be solved using technology
3. Interested to participate in finding possible technical solutions to identified project
4. Reliable
5. Interpersonal skills

Suggested additional aspects for Carrying Self:

1. Stand or sit straight.
2. Keep your head level.
3. Relax your shoulders.
4. Spread your weight evenly on both legs.
5. If sitting, keep your elbows on the arms of your chair, rather than tightly against your sides.
6. Make appropriate eye contact while communicating.
7. Lower the pitch of your voice.
8. Speak more clearly.