

**C21\_ Curriculum**  
**DIPLOMA IN CIVIL ENGINEERING**



**OFFERED BY**  
**STATE BOARD OF TECHNICAL EDUCATION & TRAINING,**  
**TELANGANA: HYDERABAD**

### III SEMESTER

Sl No	Course Code	Course Name	Teaching Scheme				Credits	Examination Scheme						
			Instruction Periods per week			Total Period per semester		Continuous internal evaluation			Semester end examination			
			L	T	P			Mid Sem1	Mid Sem2	Internal evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
1	SC-301	Applied Engineering Mathematics	4	1	0	75	3	20	20	20	40	14	100	35
2	CE-302	Engineering Mechanics	4	1	0	75	3	20	20	20	40	14	100	35
3	CE-303	Building Materials and Construction Practice	4	1	0	75	3	20	20	20	40	14	100	35
4	CE-304	Hydraulics	4	1	0	75	3	20	20	20	40	14	100	35
5	CE-305	Advanced Surveying	4	1	0	75	3	20	20	20	40	14	100	35
6	CE-306	Building Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50
7	CE-307	Hydraulics Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	CE-308	Advanced Surveying Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	CE-309	Material Testing Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	HU-310	Communication and Life Skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11	CE-311	Skill Upgradation	0	0	8	120	2.5	0	0	Rubrics		--	-	
Activities: student performance is to be assessed through Rubrics														

## SC-301 - APPLIED ENGINEERING MATHEMATICS

Course Title	Applied Mathematics	Engineering	Course Code	SC-301
SEMESTER	III		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 Basic Engineering Mathematics and Engineering Mathematics at Diploma 1<sup>st</sup> and 2<sup>nd</sup> Semester level.

### Course Outcomes: COs

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

CO 1	Integrate different kinds of continuous functions
CO 2	Integrate various continuous functions using different methods of integration
CO 3	Find the values of definite integrals using fundamental theorem of integral calculus.
CO 4	Apply definite integrals to determine Areas, Volumes of irregular shapes.
CO 5	Find the Mean and RMS values of various functions and Approximate values of Definite integrals using Trapezoidal and Simpson's 1/3 <sup>rd</sup> rule
CO 6	Find order and degree of a Differential equation, form the Differential Equation from given primitive by eliminating the arbitrary constants and Solve Simple DEs of 1 <sup>st</sup> order and 1 <sup>st</sup> degree.

### Course Content:

#### Unit-I

**Duration: 14 Periods ( L: 11 – T:3 )**

#### Indefinite Integration-I

Integration regarded as anti-derivative – Indefinite integral of standard functions. Properties of indefinite integral. Integration by substitution or change of variable. Integrals of the form  $\sin^m \theta$ ,  $\cos^n \theta$ . Where m and n are positive integers. Integrals of  $\tan x$ ,  $\cot x$ ,  $\sec x$ ,  $\operatorname{cosec} x$  and powers of  $\tan x$ ,  $\sec x$  by substitution. Evaluation of integrals which are reducible to the following forms: (Nine standard integrals)

$$\begin{aligned}
 & i) \frac{1}{a^2 + x^2}, \frac{1}{a^2 - x^2}, \frac{1}{x^2 - a^2} \\
 & ii) \frac{1}{\sqrt{a^2 + x^2}}, \frac{1}{\sqrt{a^2 - x^2}}, \frac{1}{\sqrt{x^2 - a^2}} \\
 & iii) \sqrt{x^2 + a^2}, \sqrt{a^2 - x^2}, \sqrt{x^2 - a^2}
 \end{aligned}$$

## **Unit – II**

**Duration: 10 Periods ( L: 8 – T:2 )**

### **Indefinite Integration-II**

Integration by decomposition of the integrand into simple rational algebraic functions.  
Integration by parts - Bernoulli's rule.

## **Unit-III**

**Duration: 10 Periods (L: 8 – T: 2)**

### **Definite Integral and its Properties:**

Definite integral fundamental theorem of integral calculus properties of definite integrals, evaluation of simple definite integrals. Definite integral as the limit of a sum.

## **Unit – IV**

**Duration: 12 Periods (L: 10 – T: 2)**

### **Applications of Definite Integrals:**

Areas under plane curves – Sign of the Area – Area enclosed between two curves. Solid of revolution – Volumes of solids of revolution.

## **Unit – V**

**Duration: 10 Periods (L: 8 – T: 2)**

### **Mean , RMS values and Numerical Integration:**

Mean values and Root Mean Square values of a function on a given interval. Trapezoidal rule, Simpson's 1/3 rule to evaluate an approximate value of a definite integral.

## **Unit – VI**

**Duration: 19 Periods (L: 15 – T: 4)**

### **Differential Equations of First Order:**

Definition of a differential equation – order and degree of a differential equation – formation of differential equations – solution of differential equation of first order, first degree : Variables -separable, Homogeneous, Exact, Linear differential equation, Bernoulli's equation.

## Reference Books:

1. Integral Calculus Vol. I, by M. Pillai and Shanti Narayan
2. Thomas' Calculus, Pearson Addison –Wesley Publishers
3. Higher Engineering. Mathematics, by B.S. Grewal— Khanna publishers—New Delhi

## Suggested E-Learning references

1. [www.freebookcentre.net/mathematics/introductory-mathematics-books.html](http://www.freebookcentre.net/mathematics/introductory-mathematics-books.html)
2. E-books: [www.mathebook.net](http://www.mathebook.net)

## Suggested Learning Outcomes

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

### Unit-I

#### 1.0 Use Indefinite Integration to solve engineering problems

- 1.1 Use the concept of Indefinite integral as an anti-derivative.
- 1.2 Use the indefinite integrals of standard functions and properties of Integrals  
 $\int (u + v) dx$  And  $\int k u dx$  where  $k$  is constant and  $u, v$  are functions of  $x$  in solving simple problems.
- 1.3 Solve integration problems involving standard functions using the above rules.
- 1.4 Evaluate integrals involving simple functions of the following type by the method of Substitution.
  - (i)  $\int f(ax + b) dx$  where  $f(x) dx$  is in standard form.
  - (ii)  $\int [f(x)]^n f'(x) dx$
  - (iii)  $\int f(x)/[f(x)] dx$
  - (iv)  $\int f\{g(x)\} g'(x) dx$
- 1.5 Find the Integrals of  $\tan x, \cot x, \sec x$  and  $\operatorname{cosec} x$  using the above.
- 1.6 Evaluate the integrals of the form  $\int \sin^m \theta \cos^n \theta. d\theta$  where  $m$  and  $n$  are positive integers.
- 1.7 Evaluate integrals of powers of  $\tan x$  and  $\sec x$ .
- 1.8 Evaluate the Standard Integrals of the functions of the type : (Nine standard integrals)

$$\begin{aligned} \text{i)} & \frac{1}{a^2 + x^2}, \frac{1}{a^2 - x^2}, \frac{1}{x^2 - a^2} \\ \text{ii)} & \frac{1}{\sqrt{a^2 + x^2}}, \frac{1}{\sqrt{a^2 - x^2}}, \frac{1}{\sqrt{x^2 - a^2}} \\ \text{iii)} & \sqrt{x^2 + a^2}, \sqrt{a^2 - x^2}, \sqrt{x^2 - a^2} \end{aligned}$$

- 1.9 Evaluate the integrals of the type :

$$\int \frac{1}{a \pm b \sin \theta} d\theta, \int \frac{1}{a \pm b \cos \theta} d\theta \text{ and } \int \frac{1}{a \cos \theta \pm b \sin \theta \pm c} d\theta.$$

## Unit-II

### 2.0 Use Indefinite Integration to solve engineering problems

- 2.1 Evaluate integrals using decomposition method.
- 2.2 Evaluate integrals using integration by parts with examples.
- 2.3 Apply the Bernoulli's rule for evaluating the integrals of the form  $\int u \cdot v \, dx$ .
- 2.4 Evaluate the integrals of the form  $\int e^x [f(x) + f'(x)] \, dx$ .

## Unit-III

### 3.0 Understand definite integral and use it in engineering applications

- 3.1 Use the fundamental theorem of integral calculus in solving problems
- 3.2 Calculate the definite integral over an interval.
- 3.3 Apply various properties of definite integrals in engineering problems.
- 3.4 Evaluate simple problems on definite integrals using the above properties.
- 3.5 Find definite integral as a limit of sum by considering an area.

## Unit –IV

### 4.0 Understand definite integral and use it in Engineering applications

- 4.1 Find the Areas under plane curves and area enclosed between two curves using Integration.
- 4.2 Obtain the Volumes of solids of revolution and solve problems.

## Unit –V

### 5.0 Understand Mean, RMS values and Numerical Methods

- 5.1 Obtain the Mean value and Root Mean Square (RMS) value of the functions in any given Interval.
- 5.2 Apply the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals and solve some problems.

## Unit –VI

### 6.0 Solve Differential Equations in engineering problems.

- 6.1 Identify a Differential equation and find its order and degree
- 6.2 Form a differential equation by eliminating arbitrary constants.
- 6.3 Solve the first order first degree differential equations by the following methods:
  - (i) Variables Separable.
  - (ii) Homogeneous Equations.
  - (iii) Exact Differential Equations
  - (iv) Linear Differential equation of the form  $\frac{dy}{dx} + Py = Q$ ,  
Where P and Q are functions of x or constants.
  - (v) Bernoulli's Equation (Reducible to linear form.)
- 6.4 Solve simple problems leading to engineering applications by using above methods.

### 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**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	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

<b>MID SEM-I EXAM</b>							
S.No	Unit Name	R	U	A	Remarks		
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)			
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)			
Total Questions		4	4	4			
<b>MID SEM –II EXAM</b>							
S.No	Unit Name	R	U	A	Remarks		
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)			
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)			
Total Questions		4	4	4			
<b>Semester End Examination</b>							
Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R	U	A			
1	I	4	1	9(a)	13(a)		
2	II						
3	III		2	10(a)	14(a)		
4	IV						
5	V	4	3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI		7,8	10(b)	14(b)		
				12(a)	16(a)		
				12(b)	16(b)		
Total Questions		8	8	8			
<b>Legend:</b>		Remembering (R)	1 Mark				
		Understanding (U)	3 Marks				
		Application (A)	5 Marks				





**BOARD DIPLOMA EXAMINATIONS (C21)**  
**MID SEM –II, III SEMESTER**  
**SC-301-APPLIED ENGINEERING MATHEMATICS**

**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. Find  $\int_0^1 (x^4 + 1) dx$
2. Evaluate :  $\int_0^\pi \sin 3x dx$
3. Evaluate :  $\int_0^1 \frac{1}{1+x^2} dx$
4. Write the formula to find area bounded by the curve  $y= f(x)$  , x-axis, between the limits  $x=a$  and  $x =b$

**PART-B**

Instructions: 1. Answer **ALL** questions 02 X 03 = 06  
2. Each question carries **THREE** marks

5 a) Evaluate:  $\int_0^\pi \sqrt{1 - \sin 2x} dx$

OR

5 b) Evaluate:  $\int_0^\pi \sin^2 x dx$

6 a) Find the area bounded by the line  $2x + y = 8$ , x-axis and the lines  $x = 2$  and  $x = 4$ .

OR

6 b) Find the Volume of the Solid generated by revolving the part of the Circle

$x^2 + y^2 = 36$  From  $x = 0$  to  $x = 4$  about x – axis.

**PART C**

Instructions: 1. Answer **ALL** questions 02 X 05 = 10  
2. Each question carries **FIVE** marks

7 a) Evaluate:  $\int_0^\pi \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$

Or

7 b) Evaluate:  $\int_0^\pi \log \cos x dx$

8 a) Find the area enclosed between the Parabolas  $y = 3x - x^2$  and  $y = x^2 - x$ .

Or

8 b) Find the Volume of the Solid generated by the revolution of the area bounded by the

Ellipse  $\frac{x^2}{25} + \frac{y^2}{16} = 1$  , about x- axis.

**BOARD DIPLOMA EXAMINATION (C-21)**  
**III SEMESTER END EXAMINATION**  
**SC-301-APPLIED ENGINEERING MATHEMATICS**

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  $\int (x^8 - \frac{5}{x}) dx$
2. Evaluate  $\int_0^1 (x^2 + 1) dx$
3. Write the formula to find mean value of  $y = f(x)$ , in the interval (a, b)
4. Find the Order and Degree of the Differential Equation  $x \frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ .
5. Write Trapezoidal Rule to find the approximate value of  $\int_a^b f(x) dx$ .
6. Write the formula to find RMS value of  $y = f(x)$  over the range  $x=a$  and  $x = b$ .
7. Solve  $\frac{dy}{dx} = e^{4x+y}$
8. Write the condition for exactness of the differential equation  $M(x, y)dx + N(x,y)dy = 0$

**PART-B**

Instructions:

1. Answer **ALL** questions

04 X 03 = 12

2. Each question carries **THREE** marks

9.

a) Evaluate:  $\int_0^{\frac{\pi}{2}} \sqrt{1 - \sin 2x} dx$

**OR**

b) Find the approximate value of  $\int_0^6 \frac{dx}{1+x}$  by taking  $n = 6$  using Trapezoidal rule.

10.

a) Find the area bounded by the Parabola  $y = x^2 - 2x + 1$  and x-axis.

**OR**

b) Form the Differential Equation from  $y = Ae^x + Be^{3x}$  where A, B are arbitrary constants

11.

a) Find the RMS value of  $\sqrt{\log x}$  over the range  $x = 1$  and  $x = e$

**OR**

b) Calculate approximate value of  $\int_0^4 \frac{dx}{1+x}$  by taking  $n = 4$  using Simpson's 1/3 rule

12.

a) Solve:  $x \frac{dy}{dx} + 2y = \log x$ .

**OR**

b) Solve:  $x(1 - y^2)dx + y(1 - x^2)dy = 0$

### PART C

Instructions:

1. Answer **ALL** questions
2. Each question carries **FIVE** marks

04 X 05 = 20

13.

a) Evaluate:  $\int \frac{1}{x^2 + 8x + 25} dx$

**OR**

b) Find the RMS value of  $y = \sqrt{8 - 4x^2}$  between  $x = 0$  and  $x = 2$

14.

a) Find the volume of solid generated by revolving the Ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  about Major axis

**OR**

b) Solve:  $\frac{dy}{dx} = \sin(x + y)$

15.

a) A curve is drawn to passing through the points given by the following table:

x	1	1.5	2	2.5	3	3.5	4
y	3	3.4	3.7	3.8	2.7	2.6	2.1

Calculate the approximate area bounded by the curve, x-axis and the lines  $x = 1$  and  $x = 4$  using Simpson's 1/3 rule

**OR**

b) Evaluate:  $\int_0^1 \sqrt{1 - x^2} dx$  approximately by taking  $n = 4$  using Simpson's 1/3 rd Rule.

16.

a) Solve:  $(y^2 - xy)dx = x^2 dy$ .

**OR**

b) Solve:  $\frac{dy}{dx} + y \cos x = y^3 \sin 2x$ .

## CE-302- Engineering Mechanics

Course Title	Engineering Mechanics	Course Code	CE-302
Semester	III	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 Fundamentals of Engineering Physics and Engineering Mathematics

### Course Outcomes

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

CO1	Evaluate resultant force and explain the concepts of equilibrium
CO2	Discuss Moments of Forces, Beams and Supports
CO3	Illustrate the concept of centroids for various shapes and its calculation
CO4	Calculate Moment of Inertia of standard and Built-up sections.
CO5	Explain Simple stresses and strains and its effect on simple sections and composite sections
CO6	Interpret mechanical properties of materials

### Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R	U	A		
I	Principles of Mechanics and Force system	15	Q4	Q1	Q9(a)	Q13(a)	
II	Beams and Supports	10		Q2	Q10(a)	Q14(a)	
III	Centroid	12		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
IV	Moment of Inertia	13					
V	Simple Stresses and Strains	12		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
VI	Composite sections and Mechanical properties	13					
Total		60		8	8	8	

### Course Contents

#### UNIT - 1: Principles of Mechanics and Force system

**Duration: 15 Periods (L: 12 – T:3)**

Mechanics – Engineering Mechanics – Applications and branches of Engineering Mechanics – Statics, Dynamics, Kinetics and Kinematics – Systems of measurements and Units – S.I and M.K.S units of physical quantities used in Civil Engineering-

Definition of force – vectors and scalars – systems of forces – co-planar forces - Resultant of forces at a point – Parallelogram Law and Triangle Law of forces — Polygon law of forces – Resolution of forces - Parallel forces – like and unlike forces Lami's theorem – Moment of force –couple- Conditions of equilibrium of a rigid body subjected to a number of co-planar forces - Structural members supporting co-planar forces

## **UNIT - 2: Beams and Supports**

**Duration: 10 Periods (L: 8 – T:2)**

Types of supports –Simple support, fixed support, hinged support, roller support

Types of beams –simply supported beams, cantilever, fixedbeams, overhanging beams, continuous beams

Types of loading -point load (vertical and Inclined), uniformly distributed load,

Calculation of Reactions

## **UNIT - 3:Centroid**

**Duration: 12 Periods(L: 10 – T:2)**

Definitions – Centroid, Centre of gravity - Position of Centroid of standard figures like rectangle, triangle, circle, semi-circle, parallelogram and trapezium - Determination of location of Centroid of standard steel sections – T, L, I, Channel section, Z section and unsymmetrical I section - built up sections and plane figures having hollow portion.

## **UNIT - 4: Moment of Inertia**

**Duration: 13 Periods(L: 10 – T:3)**

Definition of Moment of Inertia - Perpendicular and parallel axes theorems - Moment of Inertia of standard sections like rectangle, triangle, circle and hallow circular sections - Moment of Inertia – T, L, I, Channel section, Z sections and unsymmetrical I section using parallel axis theorem - Moment of Inertia and radius of gyration of built-up sections - Polar Moment of Inertia of solid and hollow circular sections using Perpendicular axis theorem

## **UNIT - 5: Simple Stresses and Strains**

**Duration: 12 Periods(L: 10 – T:2)**

Stress and strain – type of stresses and strains - Stress strain curves for ductile materials (like mild steel)–Hooke's law – Young's modulus – deformation under axial load - Elongation under self weight – shear stress and Shear Strain – Modulus of rigidity - Longitudinal and lateral strain – Poisson's ratio, Bulk Modulus –

relationship between elastic constants (proof not required, only problems). Stress due to gradually applied load, sudden loads and impact loads

## **UNIT - 6: Composite sections and Mechanical properties**

**Duration: 13 Periods (L:10 – T:3)**

Composite sections – effect of axial loads - Temperature stresses and strains – hoop stress – Temperature stresses in composite sections - Mechanical properties of materials

### **Reference Books**

1. Engineering Mechanics – S Timoshenko (Tata Mc Graw Hill)
2. Engineering Mechanics Statics and Dynamics – Ferdinand L.Singer
3. Engineering Mechanics – N.H. Dubey (Tata Mc Graw Hill)
4. Engineering Mechanics – R.S.Khurmi
5. Engineering Mechanics – P.K. AbdulLatheef
6. Engineering Mechanics & Statics – Dayaratnam
7. Engineering Mechanics – N. Srinivasulu
8. Engineering Mechanics – S.S. Bavikatti
9. Engineering Mechanics – A.K. Tayal

### **Suggested E-learning references**

1. [www.elearning.com/survey](http://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 Define Mechanics and Engineering Mechanics
- 1.2 State the applications of Engineering Mechanics
- 1.3 State the branches of Engineering Mechanics
- 1.4 Define the terms 1. Statics 2. Dynamics 3. Kinetics 4. Kinematics
- 1.5 State the systems of measurements and Units
- 1.6 State S.I and M.K.S units of physical quantities used in Civil Engineering
- 1.7 Define the following terms
  - a) Force
  - b) Resultant
- 1.8 Distinguish between
  - a) Scalar and Vector quantities
  - b) Co-planar and Non co-planar forces
  - c) Parallel and non-parallel forces
  - d) Like and unlike parallel forces
- 1.9 Compute the resultant of two co-planar forces acting at a point by
  - a) Law of parallelogram of forces
  - b) Triangle law of forces
- 1.10 Solve problems on computation of the resultant of a system of coplanar concurrent forces by

- a) Law of polygon of forces
  - b) Resolution of forces
- 1.11 Determine resultant of co-planar concurrent forces by analytical methods.
- 1.12 Define the following a) Moment b) Equilibrium of forces c) Equilibrant and d) Moment of a couple
- 1.13 Explain and Solve simple problems using Lami's Theorem
- 1.14 Solve problems on computation of the resultant of a system of coplanar parallel forces
- 1.15 Explain the properties of a couple
- 1.16 State the conditions of equilibrium of rigid body subjected to a number of co-planar forces
  
- 2.1 List and describe various types of supports (Simple support, fixed support, hinged support, roller support)
- 2.2 List and sketch various types of beams (simply supported beams, cantilever, fixed beams, overhanging beams, continuous beams)
- 2.3 List various types of loading (point load, uniformly distributed load, uniformly varying load)
- 2.4 To determine support reactions for cantilever, simply supported and overhanging beams with point loads (vertical and inclined) and uniformly distributed loads
  
- 3.1 Define Centroid and Centre of gravity.
- 3.2 Distinguish between Centroid and Centre of gravity.
- 3.3 State the need for finding the Centroid and Centre of gravity for various engineering applications.
- 3.4 Calculate the positions of Centroid for simple plane figures from first principles.
- 3.5 Explain the method of determining the Centroid by Method of moments.
- 3.6 Determine the position of Centroid of standard sections-T, L, I, Channel section, Z section, unsymmetrical I section.
- 3.7 Determine the position of Centroid of built up sections consisting of RSJs, flange plates and Plane figures having hollow portions
  
- 4.1 Define Moment of Inertia (MI), Polar Moment of Inertia, Radius of gyration.
- 4.2 State the necessity of finding Moment of Inertia for various engineering applications.
- 4.3 Determine Moment of Inertia and Radius of gyration for regular geometrical sections like T, L, I, Channel section, Z section, unsymmetrical I section.
- 4.4 State 1. Parallel axes theorem 2. Perpendicular axes theorem to determine MI.
- 4.5 Determine MI of standard sections by applying Parallel axes theorem.
- 4.6 Determine MI of built-up sections by applying Parallel axes theorem.
- 4.7 Calculate radius of gyration of standard sections.
- 4.8 Determine the polar M.I for solid and hollow circular section applying Perpendicular axes theorem.
- 5.1 Define the following terms
  - a) Stress
  - b) Strain



- c) Modulus of Elasticity
- d) Longitudinal Strain
- e) Lateral Strain
- f) Poisson's ratio
- g) Modulus of rigidity
- h) Bulk Modulus
- i) Factor of safety
- j) Resilience
- k) Strain Energy
- l) Proof resilience
- m) Modulus of Resilience

- 5.2 Distinguish between different kinds of stresses and strains.
- 5.3 Draw the stress-strain curve for ductile materials (Mild steel) and explain the salient points in the curve.
- 5.4 State Hooke's law and limit of proportionality.
- 5.5 Solve problems on relationship between simple stress and simple strain under axial loading on uniform bars and stepped bars.
- 5.6 Elongation under self weight
- 5.7 State the relationship among the elastic constants.
- 5.8 Solve problems on relationship between elastic constants.
- 5.9 Stress due to gradually applied load, suddenly applied load and impact loads.
  
- 6.1 Calculate stresses in simple and composite members under axial loading.
- 6.2 Explain and calculate temperature stress, strain, hoop stress, temperature stresses in composite sections.
- 6.3 Explain the mechanical properties of materials
- 6.4 Elasticity, plasticity, ductility, brittleness, malleability, stiffness, hardness, toughness, creep, fatigue – examples of materials which exhibit the above properties.

### **Suggested Student Activities**

1. Prepare a program in MS Excel to find centre of gravity;  $I_{ZZ}$  and  $I_{YY}$  of I, L, T and channel sections.
2. Prepare a report on calculation of tensile stress induced in the rope made with any material
3. Demonstrate the stresses developed in composite sections using AUTO CAD

### CO-PO Mapping Matrix

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

**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)	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					
Total Questions	8		8	8	

State Board of Technical Education and Training, Telangana

Model Question paper

DCE III Semester

Mid Semester-I Examination

Course Code: CE-302

Duration: 1 Hour

Course Name: Engineering Mechanics

Max.Marks: 20 Marks

PART-A

Answer **all** questions, Each Question carries *one* mark

**4x1 = 4 Marks**

- 1) Define Engineering Mechanics
- 2) State "Parallelogram law of forces".
- 3) Draw the sketch of a) overhanging beam                      b) Cantilever beam
- 4) List types of loads.

PART-B

Answer **two** questions. Each question carries *three* marks

**2x 3 = 6 Marks**

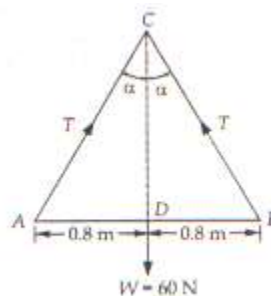
- 5) a) Write any three applications of Engineering Mechanics  
(OR)  
b) Two forces acting at angle of  $120^\circ$ . The bigger force is 80N and Resultant is perpendicular to smaller one. Find the magnitude of the smaller force
- 6) a) Draw the sketch of a cantilever beam of 4m length with a central point load of 9kN and udl of 5kN/m over the left half portion.  
(OR)  
b) List the types of loads to which a beam can be subjected and show with a neat sketch.

PART-C

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

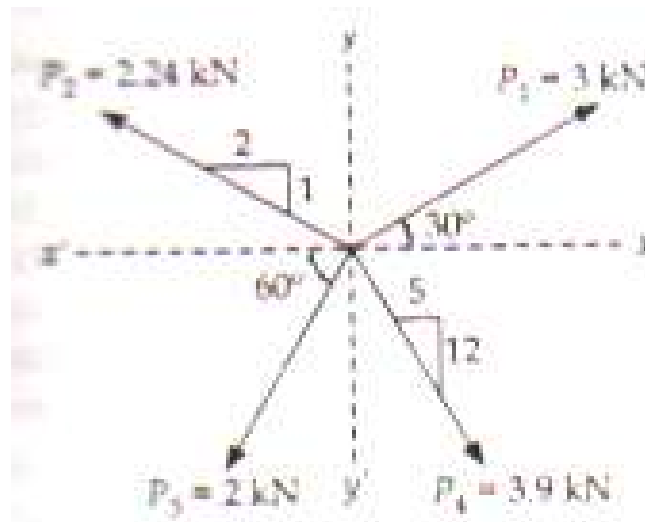
**2x5 = 10Marks**

- 7) a) A string 2m long is tied to the ends of a uniform rod that weighs 60N and is 1.6m long. The string passes over a nail, so that the rod hangs horizontally. Calculate the tension in the string.



(OR)

b) Determine the resultant, both in magnitude and direction, of the four forces acting on the body as shown in the fig. given below



8) a) A cantilever 1.75m length is subjected to two point loads of 2kN and 3kN at 0.75m and 1.5m from the free end. It also carries a udl of 3kN/m over a length of 1 m from free end. Draw a neat sketch of the beam and Calculate Support reactions of the beam.

(OR)

b) Draw the neat sketch and Determine the support reactions of a beam of 9m length simply supported at the right end and at 6m from the right end. It carries a udl of 5kN/m over a length of 6m from right end and a concentrated load of 10kN at 1m from left end.

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

**Course Code: CE-302**  
**Course Name: Engineering Mechanics**

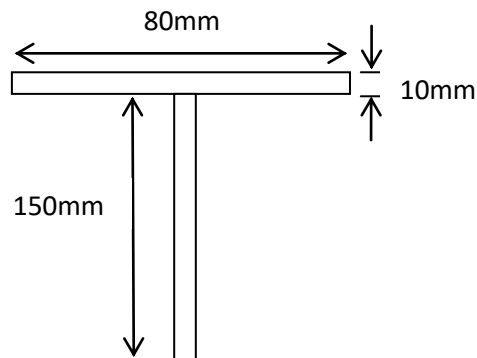
**Duration: 1 Hour**  
**Max.Marks: 20 Marks**

**PART-A**

Answer **all** questions, Each Question carries one mark.

**4x1 = 4 Marks**

- 1) Locate the centroid of T-section as shown in fig. below.



- 2) Give the position of centroid of a semi-circular section  
3) Define Moment of Inertia  
4) State perpendicular axis theorem.

**PART-B**

Answer **two** questions. Each question carries *three* marks

**2x 3 = 6 Marks**

- 5) a) Find the Centroid of an inverted T-section with flange 60mm x 10mm and web 50mm x 10mm.

(OR)

- b) Differentiate between the Centroid and Centre of gravity  
6) a) The moment of inertia of rectangular section beam about x-x and y-y axes passing through the centroid are  $250 \times 10^6 \text{ mm}^4$  and  $40 \times 10^6 \text{ mm}^4$  respectively. Calculate the size of the section.

(OR)

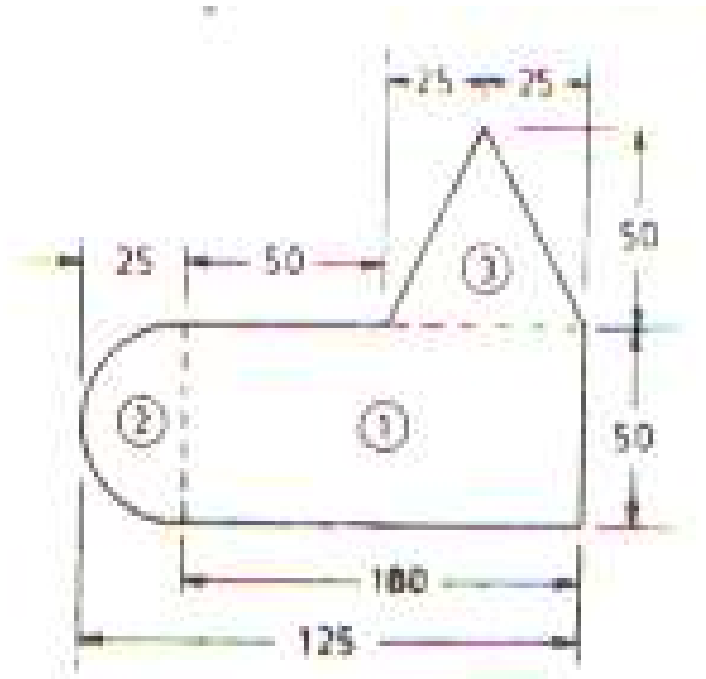
- b) Find the radius of gyration of hollow circular plate of 60mm inner diameter and 100 mm outer diameter.

**PART-C**

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

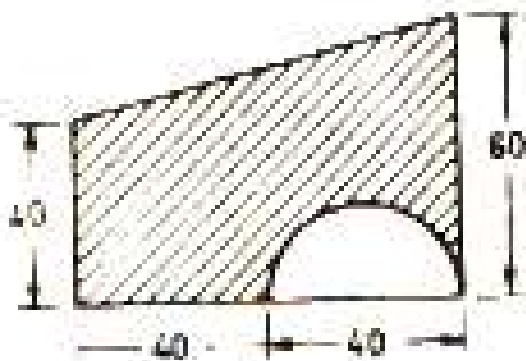
**2x5 = 10Marks**

- 7) a) A uniform lamina is shown in fig. Determinethe centroid of the lamina. All dimensions are in mm.

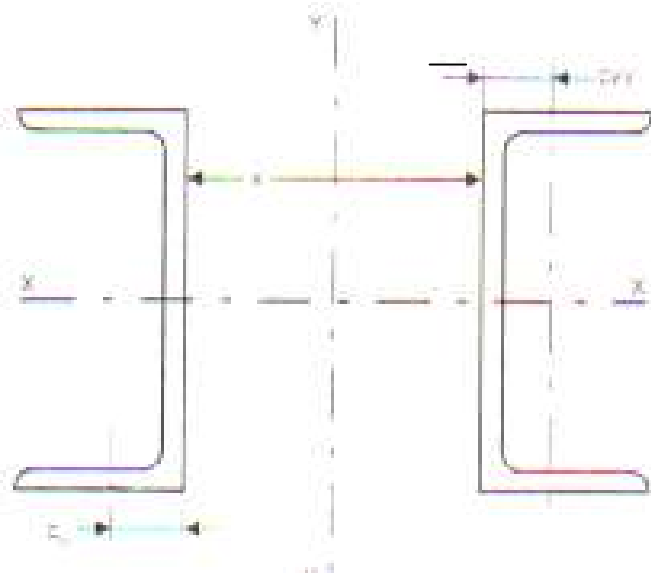


(OR)

b) A semi-circular area is removed from a trapezium as shown in fig. Determine the centroid of the remaining area

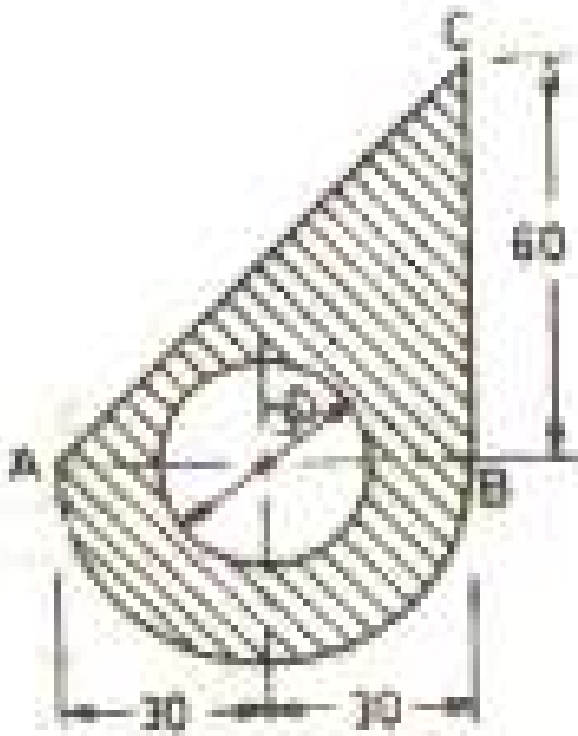


8(a) A section is built-up of two 225mm x 85mm channels placed back to back at a distance of  $x$  mm apart as shown in Fig. which are connected by battens. Determine the value of  $x$  so that  $I_{xx}$  of built up section is equal to  $I_{yy}$  of built-up section. Given the properties of each channel section as below:  $A = 3301 \text{ mm}^2$ ;  $C_{yy} = 23 \text{ mm}$ ;  $I_{xx} = 2694.6 \times 10^4 \text{ mm}^4$ ;  $I_{yy} = 187.2 \times 10^4 \text{ mm}^4$



(OR)

b) Find the moment of inertia of the section about AB as shown in Fig. Take diameter of the hole as 30 mm.





**State Board of Technical Education and Training, Telangana**

**Model Question paper**

**DCE III Semester**

**Semester End Examination**

**Course Code: CE-302**

**Duration: 2 Hours**

**Course Name: Engineering Mechanics**

**Maximum Marks: 40 Marks**

**PART-A**

Answer **all** questions. Each question carries **one** mark.

**8x1 = 8 Marks**

- 1) State the classification of Engineering Mechanics
- 2) Define “Radius of gyration”
- 3) State “Hooke’s law”
- 4) State “Lami’s Theorem”.
- 5) Define “Stress”
- 6) Define “Strain Energy”
- 7) List the Elastic Constants.
- 8) Define the term “Fatigue”

**PART-B**

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

**4x3= 12 Marks**

- 9)
  - a) State any three characteristics of couple.  
(OR)
  - b) A steel bar 5 meters long and 25mm in diameter is stretched by 2.0mm by a load of 80kN in pulling it axially. Determine the modulus of elasticity of the bar.
- 10)
  - a) The M.I of a triangle about its base is  $1526.5 \times 10^4 \text{ mm}^4$ , width of base is 120mm. Find the height of the triangle  
(OR)
  - b) Define i) Ductility ii) Brittleness
- 11)
  - a) Define the terms
    - i. Linear strain
    - ii. Lateral strain  
(OR)
  - b) A material has Young’s modulus of  $1.25 \times 10^5 \text{ N/mm}^2$  and Poisson’s ratio of 0.25. Calculate the modulus of rigidity and bulk modulus
- 12)
  - a) Define i) Toughness ii) Malleability  
(OR)
  - b) Define i) Ductility ii) Brittleness

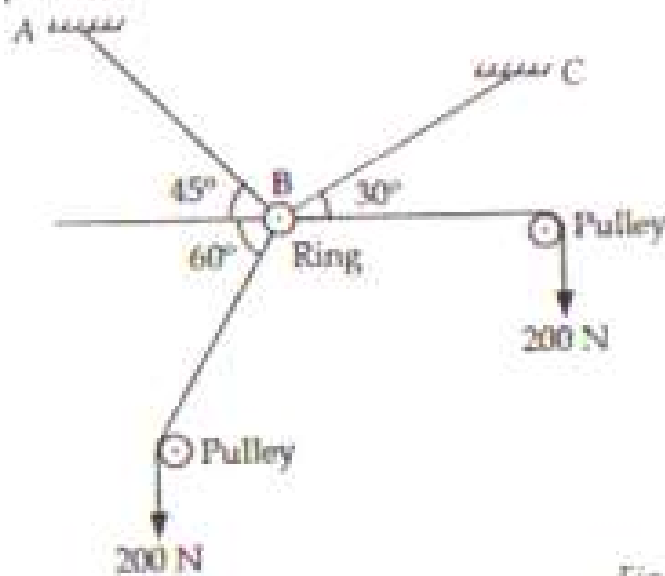
**PART-C**

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

**4x 5=20 Marks**

13)

- a) Calculate the tensile force in the cables AB and BC as shown in fig. The pulleys are frictionless.

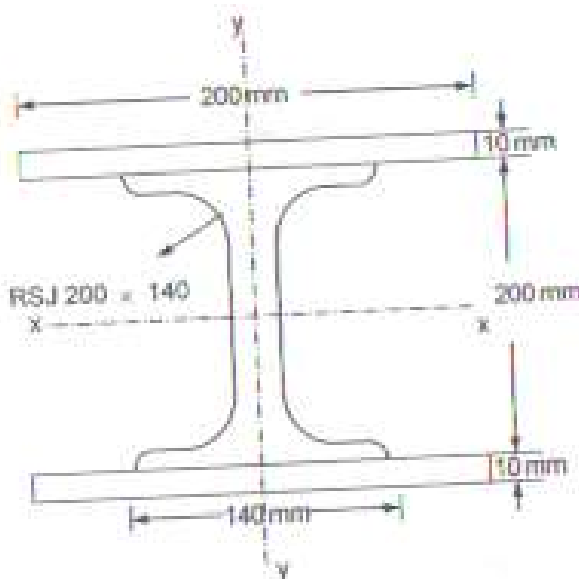


(OR)

- b) A tensile test is carried out on a steel bar of 10 mm diameter over a gauge length of 50mm. The bar yields at a load 22 kN, reaches a maximum load of 43 kN and breaks at 27 kN. The diameter of ruptured neck is 7.5mm and final gauge length is 64mm. Determine
- Yield strength
  - Ultimate strength
  - Percentage reduction in area and
  - percentage elongation.

14)

- a) A mild steel R.S. Joist 200mm x 140mm with one 200mm x 10 mm plate symmetrically riveted to each flange is used as a stanchion. Find  $I_{xx}$ ,  $I_{yy}$  and least radius of gyration for the compound section. Properties of R.S. Joist are, Area of section = 3670 mm<sup>2</sup>;  $I_{xx}$ = 2624.5 x 10<sup>4</sup> mm<sup>4</sup>;  $I_{yy}$ =329 x 10<sup>4</sup> mm<sup>4</sup>



(OR)

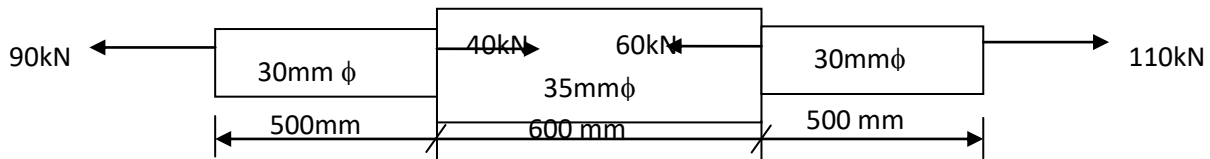
- b) An R.C. C column has square cross-section 400mm x 400mm. If it is reinforced with six steel bars each of 20 mm diameter. The column carries an axial compressive load of 630 kN. Determine stress in each material. Modular ratio is 15.

15)

- a) A cylindrical bar is 25mm dia of 1.2m long. During a tensile test it is found that the linear strain is 4 times the lateral strain. Calculate the shear and bulk modulus if the bar is elongated 0.06mm under axial tensile load of 50kN.

(OR)

- b) A steel bar 1.6 long is acted upon by forces as shown in fig. below. Find the elongation of the bar. Given  $E=200\text{GPa}$ .



16)

- a) Following are the details of a composite member formed by enclosing a copper rod in a steel tube:

Dia. of copper rod = 36mm

Internal dia. of steel tube = 40mm

External dia. of steel tube = 50mm

$E$  for steel = 200 GPa,  $E$  for copper = 110 GPa,  $\alpha$  for steel  $12 \times 10^{-6}$  per  $^{\circ}\text{C}$ ;  $\alpha$  for copper =  $16 \times 10^{-6}$  Per  $^{\circ}\text{C}$ . Calculate the stress developed in each material if the combination is heated through  $30^{\circ}\text{C}$ .

(OR)

- b) A copper rod 80mm in diameter is co-axially enclosed in a copper tube of internal dia. 90mm and external dia. 110mm, both of same length 480mm. The combination carries total axial thrust  $F$ . If the stress in the copper rod is 12 MPa compressive, find  
(a) The stress in the tube (b) The value of  $F$

### CE-303- Building Materials & Construction Practice

Course Title:	Building Materials & Construction Practice	Course Code	CE-303
Semester:	III	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 subject requires the basic knowledge of basic sciences

#### Course Outcomes

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

CO1	Explain the origin, types and uses of various building materials Stones, bricks tiles and sand and methods of testing of building materials as per standard procedures
CO2	State and explain method of using different types of cement, cement mortar and cement concrete after testing their quality by standard procedures
CO3	Comprehend timber and surface protective finishes and propose different market forms for appropriate field application
CO4	Classify Buildings as per NBC, select suitable type of foundation and method of constructing masonry as per standards
CO5	Propose a suitable Door, window, lintel, for a particular opening, identify suitable scaffolding for doing a particular work and select a suitable staircase
CO6	Select a suitable roof and flooring, explain their method of construction and provide suitable protective and decorative finishes

#### Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE		
			R	U	A
1	Stones, Bricks, tiles and sand	12	Q1	Q9(a)	Q13(a)
2	Cement, Cement mortar and concrete	13			
3	Timber and Surface protective materials	10	Q2	Q10(a)	Q14(a)
4	Classification of buildings, foundations and masonry	15			
5	Doors, windows, lintels, scaffolding and staircases	12	Q3	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Roofs, floorings, Protective and decorative finishes	13			
Total		75	8	8	8

## Course Contents

### UNIT-1: Stones, Bricks, tiles and sand

**Duration:12Periods(L:10 – T:2)**

- a) Classification of rocks, physical classification.
- b) Characteristics of good building stone.
- c) Common varieties of stones-granite, marble, Kadapa slab, Shahabad stones.
- d) Dressing of stones – purpose.
- e) Manufacture of bricks-Steps only
- f) ISI specification for bricks IS-1077-1971(sizes).
- g) Characteristics of good bricks.
- h) Testing of bricks as per IS-3495-1966 – tests on water absorption and compressive strength of bricks.
- i) Tiles –Types of tiles- roofing tiles (Mangalore tiles), floor tiles, Ceramic tiles, Vitrified tiles, Morbonite.
- j) Characteristics of good tiles.
- k) Characteristics of good sand,
- l) Functions of sand.
- m) Bulking of sand

### UNIT-2: Cement, Cement mortar and Concrete

**Duration: 13Periods (L:10 – T:3)**

- a) Chemical composition of cement.
- b) Method of manufacture of cement – Dry process(Flow chart only).
- c) Classification of cement – ordinary Portland cement, quick setting cement, white cement –Rapid hardening cement, Low heat cement, High alumina cement, Blast furnace slag cement and Pozzolana cement – uses of different types of cement.
- d) Tests for cement as per ISI – fineness, consistency, setting time, soundness tests.
- e) Define Fine aggregate and coarse aggregate
- f) Mortar – List Classification of mortar –Cement mortar, Surkhi Mortar, Blended mortar.
- g) Different proportions of mortars for various works.
- h) Preparation of cement mortar.
- i) Ingredients of plain concrete.
- j) Proportioning – usual proportions for different items of work-C.C.bed, Footings, Columns, Slabs & Beams for ordinary buildings.
- k) Plain concrete and reinforced concrete.
- l) Water cement ratio – factors effecting water cement ratio.
- m) Workability – Slump test on fresh concrete, hardened concrete – compressive strength test on hardened concrete.
- n) Admixtures –only definition – types – 1) Chemical admixtures – Plasticizers (water reducers), super plasticizers, air entraining agents, acceleratorsand retarders 2) Mineral admixtures – Pozzolanas -fly ash, blast furnace slag, silica fume and rice husk.
- o) Method of preparation of concrete – Hand and machine mixing.
- p) Procedure of mixing, conveyance, placing, compaction and curing of concrete.
- q) Curing – methods – suitability

- r) Introduction to ready mix concrete – Advantages and disadvantages.
- s) Use of fly ash, robo sand.

### **UNIT 3: Timber and Surface Protective Materials**

**Duration:10Periods(L:8 – T:2)**

- a) Characteristics of good timber.
- b) Seasoning of timber – Importance.
- c) Common varieties of timber used for different items of work – Doors and windows, form work, centring with particular references of Telangana.
- d) Composition of Paints, enamels, varnishes.
- e) Types and uses of surface protective materials like Paints, Enamels, Varnishes, Distempers, Emulsion, French polish and Wax Polish.

### **UNIT 4: Classification of Buildings,foundations and types of masonry**

**Duration:15Periods(L: 12 – T:3)**

- a) Component parts of a building –Their functions.
- b) Classification of buildings according to National building code.
- c) Site investigation for foundation as per N.B.C, Trial pit, auger boring.
- d) Bearing capacity of soils –safe and ultimate bearing capacity.
- e) Spread footing for columns and walls
- f) Raft foundation.
- g) Pile foundation and uses.
- h) Different loads to be considered for the design of foundation as per IS 875 – 1987.
- i) Spread foundation – Depth of foundation by Rankine’s formula– width of foundation – Thickness of concrete bed.
- j) Construction of foundation – spread footing only.
- k) Causes, effects and prevention of dampness at basement level.
- l) Classification of stone masonry –Random rubble and Coursed Rubble Masonry – general principles to be observed while constructing stone masonry
- m) Brick Masonry – Bonds in brick masonry – (English bond only) for one brick thick wall – General principles to be observed in construction of brick masonry.

### **UNIT 5: Doors, Windows, Lintels, scaffolding and staircases**

**Duration: 12Periods(L:10 – T:2)**

- a) Doors and windows – parts of door window – positioning.
- b) Common types of doors-panelled, Glazed and Flush doors.
- c) Special types of doors – Flush doors with modern construction materials, revolving doors, collapsible doors, rolling shutters, sliding doors
- d) Windows – Panelled and Glazed.
- e) Ventilators – fixed, swinging type and louvered.
- f) Lintels – Functions
- g) Scaffolding – Purpose and types – tubular scaffolding only.
- h) Location of stairs.

- i) Types of stairs – straight, Quarter turn, half turn, Dog legged, open well, bifurcated, spiral, helical stair cases (only line diagrams)

## **UNIT 6: Roofs, Floorings, protective and decorative finishes**

**Duration: 13 Periods (L:10 – T:3)**

- a) Roof – functions of roofs.
- b) Classification of roofs – flat roofs – pitched roofs.
- c) Different types of trusses – classification based on material and shape – King post truss, Queen post truss.
- d) Weather proof course on R.C.C. roof – importance.
- e) Types of flooring – Requirements of a good floor.
- f) Methods of constructing flooring – Cement Concrete flooring, Cement Plaster flooring, Tiled flooring.
- g) Plastering – purpose – Types of plastering – procedure for plastering, external finishing – sand faced, pebble dash, acoustic plastering and marble chips.
- h) Pointing – purpose – Types of pointing
- i) Painting – objects – method of painting new and old wall surfaces
- j) White washing – colour washing – Distempering – internal and external walls.

### **Reference Books**

1. Engineering Materials by S C Rangwala
2. Building materials by Kulakarni
3. Construction materials by N. Sreenivasulu
4. Building Materials by Duggal S. K.
5. Building Material & Construction by S.P. Arora & S. P. Bindra
6. Construction Technology by Sarkar Oxford University Press
7. Building materials & components by C B R I
8. National Building code by N.B.C
9. Building Construction by Sushil Kumar
10. Building Construction by S.C. Rangawala
11. SP20 Explanatory handbook on Masonry code

### **Suggested E-learning references**

1. <http://nptel.ac.in>
2. <https://www.youtube.com/watch?v=nMII3krK-GI>
3. <https://www.youtube.com/watch?v=6OAH09zgeXM>
4. [https://www.youtube.com/watch?v=j1bL\\_1NBvIc](https://www.youtube.com/watch?v=j1bL_1NBvIc)
5. <https://www.youtube.com/watch?v=cQGDP8kWEMM>
6. <https://www.youtube.com/watch?v=rh1Z-i14-h0>
7. <https://www.youtube.com/watch?v=veF4uSUtrEY>
8. <https://www.youtube.com/watch?v=USat6LdENzU>
9. <https://www.nicee.org/EQTips.php>

## **Suggested Learning Outcomes**

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

- 1.1 State the classification of rocks – Physical classification only.
- 1.2 State the characteristics of good building stone.
- 1.3 State the common varieties of stone used in different items of construction and their suitability for construction works – Granite, marble, Kadapa slabs, Shahabad stones.
- 1.4 Explain the purpose of dressing stones.
- 1.5 List the steps involved in the manufacture of bricks.
- 1.6 Common sizes of bricks – IS specifications.
- 1.7 State the characteristics of good bricks.
- 1.8 State the standard tests for bricks
- 1.9 Explain water absorption test and compressive strength test on bricks.
- 1.10 State the common variety of tiles used for different purposes.
- 1.11 State the characteristics of good tiles.
- 1.12 State the characteristics of good sand.
- 1.13 State the functions of building sand.
- 1.14 Explain the importance of bulking of sand.
  
- 2.1 State the chemical composition of cement.
- 2.2 State the steps in the manufacture of cement by dry process using flowchart.
- 2.3 State the classification of cements and their uses.
- 2.4 State and explain tests on cement for fineness, consistency, setting times and soundness of cement.
- 2.5 State grades of cement and their compressive strengths.
- 2.6 Understand the terms fine aggregate and coarse aggregate.
- 2.7 State the types of mortars.
- 2.8 State the different proportions of mortars for various works.
- 2.9 Explain the method of preparation of cement mortar
- 2.10 State the ingredients of plain and reinforced concrete.
- 2.11 State the usual proportions of plain and reinforced concrete for different items of work.
- 2.12 Define and explain the importance of Hydration of cement and water cement ratio



- 2.13 State the steps involved in the procedure of mixing, conveyance, placing, compaction and curing of concrete.
  - 2.14 State the need of curing and list the methods of curing suitable for different purposes
  - 2.15 Define workability and explain the method of conducting Slump test and Compressive strength test
  - 2.16 State the definition and types of admixtures in concrete.
  - 2.17 Explain ready mix concrete and state the advantages and disadvantages.
  - 2.18 State the uses of Fly ash and Robo sand
- 
- 3.1 State the characteristics of good timber.
  - 3.2 State the importance of seasoning of timber.
  - 3.3 Name the common varieties of timber used in Telangana for various Civil Engineering works.
  - 3.4 State various types of wood products used in construction work.
  - 3.5 State the composition of Paints, enamels, varnishes.
  - 3.6 Explain the types and uses of surface protective materials like Paints, Enamels, Varnishes, Distempers, Emulsion, French polish and Wax Polish.
- 
- 4.1 State the components of a building and their functions.
  - 4.2 State the classification of buildings according to National Building Code(NBC) with examples.
  - 4.3 Explain the investigations required for foundation as per N.B.C.
  - 4.4 Explain the terms Bearing capacity of soil, Safe bearing capacity of soil and Ultimate bearing capacity of soil.
  - 4.5 Describe with sketches – spread footings, raft and pile foundation.
  - 4.6 State the loads to be considered in design of foundation.
  - 4.7 State the rules for minimum depth, width of foundation and thickness of concrete bed for spread footing.
  - 4.8 Explain the method of constructing spread footing
  - 4.9 List the causes and effects of dampness at basement level and state the measures for prevention of dampness at basement level.
  - 4.10 List different types of stone masonry.
  - 4.11 Explain different types of stone masonry.
  - 4.12 State the general principles to be observed in stone masonry construction

- 4.13 Explain the terms Bond, Course, Header and Stretcher related to brick masonry.
  - 4.14 State the general principles to be observed in brick masonry construction.
  - 4.15 Explain with sketches English bond of brick masonry for one brick thick wall.
- 
- 5.1 State the principles of locating doors, windows and ventilators in buildings.
  - 5.2 Explain with sketches common and special types of doors, windows and ventilators.
  - 5.3 List the uses of different types of doors, windows and ventilators.
  - 5.4 Explain the functions of lintels.
  - 5.5 State the purpose of scaffolding.
  - 5.6 Define scaffolding and mention the types.
  - 5.7 List the component parts of tubular scaffolding.
  - 5.8 Sketch and explain about tubular scaffolding.
  - 5.9 State the principles of locating stairs.
  - 5.10 Explain terms: rise, tread, landing, flight, going, hand rail, newel post, baluster and balustrade.
  - 5.11 Draw the line diagrams of different stairs.
- 
- 6.1 State the functions of roofs.
  - 6.2 State the classification of roofs.
  - 6.3 State the classification of trusses based on material and shape.
  - 6.4 Explain with sketches king post truss and queen post truss.
  - 6.5 State the importance of providing a weather proof course on R.C.C roof
  - 6.6 State the types and functions of flooring.
  - 6.7 State the requirements of good floor.
  - 6.8 Explain method of construction of C.C flooring, cement plaster and tiled flooring
  - 6.9 State the objects of plastering.
  - 6.10 State the methods of plastering.
  - 6.11 State the steps in providing cement plastering on masonry walls.
  - 6.12 State the objects and types of pointing.
  - 6.13 State the objects of painting.
  - 6.14 Explain the method of painting new and old wall surfaces.
  - 6.15 Explain briefly the method of white washing, colour washing, distempering the brick masonry wall.

## Suggested Student Activities

1. Identify different types of construction materials available in market and study their properties
2. Collect and study different photographs of various foundations and prepare a report.
3. Collect and study different photographs of stairs.
4. Collect and study the different types of Damp Proofing materials and prepare a report.
5. Prepare models of various types of foundations.
6. Prepare models of different types of roof trusses.
7. Visit any nearby material testing laboratory and prepare a report on various tests conducted on building materials.
8. Prepare a report on prefabricated construction.
9. Prepare a report on the use of modern construction equipment in construction.
10. Tech fest/Srujana
11. Paper/Poster presentation
12. Quiz
13. Group discussion
14. Surprise Test

## CO-PO Mapping Matrix

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

**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					
Total Questions	8		8	8	

**State Board of Technical Education and Training, Telangana**

**Model Question paper**  
**DCE III semester Mid Semester-I Examination**

**Course Code: CE-303**

**Duration: 1 hour**

**Course Name: Building Materials and Construction Practice**

**Max. Marks: 20 Marks**

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**PART-A**

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

- 1) State physical classification of rocks and also give an example for each
- 2) State the standard sizes for common building bricks as per Indian Standards.
- 3) Mention standard values for any three properties of Ordinary Portland Cement.
- 4) Define 'Admixture'.

**PART-B**

Answer **two** questions. Each question carries **three** marks

**2x 3 = 6 Marks**

- 5(a) State any three properties of granite stone  
(or)
- 5(b) Define "Bulking of Sand". State the effects of bulking of sand on proportioning of concrete.
- 6(a) State the usual proportions of cement mortar for the following:  
(a) Internal Plastering  
(b) Top finishing of cement concrete flooring  
(c) Stone masonry for ordinary buildings  
(or)
- 6(b) What is water cement ratio? Explain its significance in strength and workability of concrete.

**PART-C**

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

**2x 5 = 10 Marks**

- 7(a) State ten important characteristics of good building stones.  
(or)
- 7(b) Explain the test to be conducted for testing compressive strength of bricks
- 8(a) Explain tests to be conducted on cement to determine its normal consistency  
(or)
- 8(b) Explain the procedures involved in Hand mixing and machine mixing of cement concrete.

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

**Course Code: CE-303**

**Course Name: Building Materials & Construction Practice**

**Duration: 1 hour**

**Max. Marks: 20 Marks**

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**PART-A**

Answer **all** questions, Each Question carries **one** mark

**4x1= 4 Marks**

1. State ingredients of paint.
2. Define 'seasoning of timber'.
3. Define bearing capacity of soil
4. State the different types of stone masonry

**PART-B**

Answer **two** questions. Each question carries **three** marks

**2x 3 = 6 Marks**

5(a) Mention any three characteristics of good paint.

(or)

5(b) List any five varieties of timber used in Telangana for different civil engineering works and give one use of each

6(a) Explain the causes and effect of dampness at basement level

(or)

6(b) State the general principles to be observed in stone masonry construction

**PART-C**

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

**2x 5 = 10 Marks**

7(a) State three characteristics of good timber and mention two common defects in timber.

(or)

7(b) State five important characteristics of a good varnish

8(a) State classification of buildings with examples

(or)

8(b) Explain brick masonry with sketch in English bond of one brick wall and one and half brick wall

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

**Course Code: CE-303**

**Course Name: Building Materials & Construction Practice**

**Duration: 2 hours**

**Max. Marks: 40 Marks**

**PART-A**

Answer **all** questions

**8x1 = 8 Marks**

- 1) Define 'dressing of stones'.
- 2) State components of building
- 3) List any two types of windows
- 4) What is meant by hydration of cement.
- 5) State the different types of stairs based on geometry
- 6) State the purpose of scaffolding.
- 7) State the classification of roofs
- 8) State different types of pointing?

**PART-B**

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

**4 x 3 = 12 Marks**

9(a) Define "Bulking of Sand". State the effects of bulking of sand on proportioning of concrete.

(or)

9(b) State advantages of tubular scaffolding

10(a) State any six characteristics of good timber.

(or)

10(b) State three objects of plastering a wall

11(a) Explain the terms:

i) Rise    ii) tread    iii) landing

(or)

11(b) State the principles of locating doors in buildings

12(a) Draw a neat sketch of king post truss and name the parts

(or)

12(b) Define prime coat in painting? State its necessity

**PART-C**

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

13(a) What is meant by water-cement ratio? Explain the ill effects of increased and decreased water-cement ratio on workability and strength of concrete

(or)

13(b) Explain paneled doors and their uses with neat sketches

14(a) State the general principles to be observed in brick masonry construction

(or)

14(b) Explain briefly the method of construction of cement concrete floor

15(a) Explain about open well stair with neat sketch.

(or)

15(b) List different types of ventilators with their uses

16(a) List the requirements of good floor.

(or)

16(b) Describe the method of application of oil bound distemper on a masonry wall



### CE-304- HYDRAULICS

Course Title	Hydraulics	Course Code	CE-304
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture+Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

#### Pre requisites

This subject requires the basic knowledge of physics

#### Course Outcomes

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

CO1	Calculate fluid pressure using pressure measuring devices and compute the forces on immersed plane surfaces.
CO2	Apply the general principles of flow of liquids and Bernoulli's theorem and solve problems on discharge and pressure measurements using flow measuring devices.
CO3	Determine the discharge and coefficients of discharge for Orifices and Mouthpieces, Notches and Weirs
CO4	Evaluate the major loss and various minor losses of head in flow through pipes.
CO5	Determine the flow parameters and design the most economical channel sections.
CO6	Explain the working principles of pump, Turbines and layout of a typical Hydro-electric power station.

#### Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R	U	A	
1	Properties of fluids and Measurement of fluid pressure	12	Q4	Q1	Q9(a)	Q13(a)
2	Flow of fluids	13		Q2	Q10(a)	Q14(a)
3	Flow through orifices, mouthpieces, notches and weirs	13				
4	Flow through pipes	12		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)
5	Open channel flow	10				
6	Pumps, turbines and hydroelectric power plants	15		Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		75		8	8	8

## Course Contents

### UNIT 1: Properties of fluids and Measurement of fluid pressure:

**Duration: 12Periods (L:10 – T:2)**

- a) Scope and importance of hydraulics in Civil Engineering
- b) Fluids - classification - Properties – Formulae- units
- c) Pressure- types – relationship - Pressure measuring Instruments –Compute the pressure of flowing liquid on a Piezometer, Manometers- U-tube, inverted U-tube and differential Manometer
- d) Total pressure and Centre of pressure on plane surface immersed in liquid - Numerical problems

### UNIT 2 : Flow of fluids

**Duration:13Periods(L:10 – T:3)**

- a) Types of Flow - Rate of flow or discharge-continuity equation- Numerical problems
- b) Total energy of liquid in motion – Bernoulli's theorem (without proof) –its limitations -Numerical Problems.
- c) Applications of Bernoulli's theorem – Numerical problems on Pitot tube and venturi meter

### UNIT 3: Flow through Orifices, Mouth Pieces, Notches and weirs

**Duration: 13Periods (L:10 – T:3)**

- a) Orifice-types of Orifices- Large Rectangular Orifice-Time of emptying a prismatic tank by an orifice - Numerical Problems. (No derivations)
- b) Mouth piece-Types of Mouth pieces- Numerical problems
- c) Notch - types of notches - rectangular, triangular and trapezoidal notches- Numerical problems
- d) Weirs - types of weirs - Numerical problems -(No Derivations)

### UNIT4: Flow through pipes

**Duration :12Periods(L:10 – T:2)**

- a) Frictional loss in pipes - Chezy's formula and Darcy's formula (without proof) – Numerical problems.
- b) Types of Minor Losses
- c) Hydraulic gradient and total energy line.
- d) Discharge through parallel pipes and compound pipes (series) connected to a reservoir.
- e) Reynold's number and critical velocity
- f) Laminar and turbulent flow in pipes.

**UNIT5:Open Channel Flow****Duration: 10Periods(L:8– T:2 )**

- a) Open channel flow - Discharge through open channel - Chezy's and Manning's formula (derivation not necessary). - Numerical problems
- b) Geometric properties of open channel
- c) Empirical formulae for value of C.
- d) Derive condition for most economical section of a channel-rectangular and trapezoidal sections - (Simple numerical Problems)

**UNIT 6: Pumps, Turbines and Hydro-electric Power plants****Duration: 15 Periods (L:12 – T:3)**

- a) Pumps - types - reciprocating pumps and centrifugal pumps.
- b) Classification of turbines-impulse and reaction turbines.
- c) Sketch a typical layout of a hydroelectric power plant – components parts– Functions of surge tank

**Reference Books**

1. Reya&Rao, Hydraulics
2. Modi&Seth, Hydraulics & Fluid Mechanics
3. Bansal.R.K, Fluid Mechanics &Hydraulics

**Suggested E-learning references**

1. <http://nptel.ac.in>
2. You tube videos on working of pumps and turbines.
3. Profile of a company manufacturing pumps and turbines on internet.
4. Wikipedia search on the different terms used in hydraulics

**Suggested Learning Outcomes**

Upon completion of course, the students shall be able to

- 1.1 Explain the scope and importance of hydraulics in Civil Engineering.
- 1.2 Define fluid and List examples of fluids
- 1.3 Differentiate between ideal and real fluids.
- 1.4 Define - Mass density, Specific weight, Specific gravity, Adhesion, Cohesion, Surface tension, Capillarity, Compressibility, Dynamic Viscosity, Kinematic viscosity and Vapour pressure - State the units and formulae
- 1.5 Define 1. Atmospheric pressure, 2. Gauge pressure and 3. Absolute pressure – State the relation between them
- 1.6 Describe the following pressure measuring instruments and Compute the pressure of a flowing fluid on a
  - a) Piezometer,

- b) Simple, differential and inverted differential manometers.
- 1.7 Define 1. Total Pressure and 2. Centre of Pressure.
  - 1.8 Calculate total pressure and Centre of pressure on the following surfaces immersed in a liquid at rest:
    - a) Horizontal plane,
    - b) Vertical plane and
    - c) Inclined plane
- 2.1 State the different types of flow of liquids
  - 2.2 Define Uniform flow, Non-uniform flow, Steady flow, Unsteady flow, Laminar flow and Turbulent flow.
  - 2.3 State one dimensional continuity equation and energies of liquid in motion.
  - 2.4 State the equation for Bernoulli's theorem of total energy of liquids in motion (no proof) and limitations of Bernoulli's theorem
  - 2.5 Compute the pressure and velocity at a section of flowing liquid in a pipe for the given conditions using Bernoulli's equation.
  - 2.6 Describe the working principle and use of pitot tube & venturimeter
  - 2.7 Compute the actual discharge of flowing liquid through
    - i. Pitot Tube, and
    - ii. Venturimeter
- 3.1 Define orifice and list different types of orifices
  - 3.2 Distinguish between small and large orifices
  - 3.3 Define vena-contracta,  $C_c$ ,  $C_v$ , and  $C_d$  (Hydraulic coefficients).
  - 3.4 State the formulae for actual, theoretical discharges through small orifice
  - 3.5 Calculate the discharge,  $C_c$ ,  $C_v$ ,  $C_d$  for given conditions-Numerical Problems
  - 3.6 Calculate discharge through Large Rectangular Orifice for given conditions-Numerical Problems.
  - 3.7 State the formula for time of emptying of a prismatic tank by an orifice-Numerical problems
  - 3.8 Define mouth piece - Classify mouth pieces.
  - 3.9 Calculate discharge through a mouth piece for given data- Numerical Problems.
  - 3.10 Define a notch and list different types of notches.

- 3.11 Calculate the discharge over following notches: Rectangular, Triangular and Trapezoidal
- 3.12 Define weir and list the different types of weirs.
- 3.13 Determine the discharge over sharp crested and broad crested weirs under given conditions - Numerical Problems.
- 3.14 Determine the discharge over rectangular weir using Francis, and Bazin's empirical formulae
  
- 4.1 List the various losses that occur when water flow through pipes.
- 4.2 Differentiate Major loss and Minor losses.
- 4.3 Compute loss of head due to friction using Chezy's , and Darcy's equations
- 4.4 Compute the various minor losses of head for given data –Numerical problems.
- 4.5 Define Hydraulic gradient line and Total energy line.
- 4.6 Calculate discharge through Parallel and Compound (series) Pipes connected to reservoir for given data- Numerical Problems.
- 4.7 Define Critical velocity and Reynold's number.
- 4.8 Explain the classification of flow as laminar or turbulent flow in pipes based on Reynold's number.
  
- 5.1 Define open channel flow.
- 5.2 Differentiate open channel flow and pipe flow.
- 5.3 Define Wetted perimeter and Hydraulic mean depth/radius.
- 5.4 State Chezy's formula and Manning's formula for uniform flow through open channels.
- 5.5 List the Values of 'C' for different surfaces
- 5.6 State the following formulae to evaluate 'C'
  - a) Kutter's, formula,
  - b) Manning's formula and
  - c) Bazin's formula .
- 5.7 Calculate Velocity and Discharge in a channel using Chezy' s and Manning's formulae for given conditions-Numerical problems.
- 5.8 Define most economical section of a channel.
- 5.9 Derive the conditions for most economical section for Rectangular channel and Trapezoidal channel.

- 5.10 Design the most economical rectangular and trapezoidal channel sections for the given conditions – Numerical problems
- 6.1 Define Pump and list different types of Pumps
- 6.2 Describe the parts of Reciprocating Pump with a sketch.
- 6.3 Describe the working principle of Single acting and Double acting reciprocating pumps.
- 6.4 List the functions of air vessels for reciprocating pumps.
- 6.5 Describes the different parts of centrifugal pumps and explain the working principle of centrifugal pump.
- 6.6 Define priming and explain the necessity of priming.
- 6.7 Explain the use of foot valve and strainer in a centrifugal pump.
- 6.8 Define Turbine and list types of turbines.
- 6.9 Differentiate between Impulse and Reaction turbines.
- 6.10 Explain the working principle of Pelton wheel turbine.
- 6.11 Describe the Parts of Francis Turbine.
- 6.12 Explain the purpose of draft tube and list types of draft tubes.
- 6.13 Sketch a typical layout and List different components of hydro-electric power plant installation.
- 6.14 Define surge tank and list the functions of surge tank

### **Suggested Student Activities**

1. To visit a nearby petrol bunk and bike repairing centre and submit a report on pressure measuring devices
2. To carry out market survey for pipes of different sizes and materials available.
3. To assess conditions of water supply mains of your locality and quantify the pressure drop and measuring the actual discharges through various outlets.
4. To visit & submit a report on nearby hydel power plant to know the setup of various components.
5. Student is encouraged to participate in Tech fest/ Srujana fest to evolve any novel method of water supply systems
6. Prepare/Download a dynamic animation to illustrate the working principle of hydraulic pumps.
7. Paper/Poster presentation
8. Quiz
9. Group discussion
10. Surprise Test/Slip test

## CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, and Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2	1	2	1	1	2	1,2,3,4.5.6,7
CO2	1	3	2	2	3	2	2	1,2,3,4.5.6,7
CO3	2	3	2	2	2	2	2	1,2,3,4.5.6,7
CO4	1	2	3	2	2	2	2	1,2,3,4.5.6,7
CO5	3	2	2	3	2	1	2	1,2,3,4.5.6,7
CO6	1	1	1	1	1	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)	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				Q10(a)	Q14(a)
III		Q2		Q9(b),	Q13(b),
IV				Q11(a), Q11(b)	Q15(a), Q15(b)
V		Q3	Q5,Q6	Q10(b),	Q14(b),
VI			Q7,Q8	Q12(a), Q12(b)	Q16(a), Q16(b)
Total Questions	8		8	8	



State Board of Technical Education and Training, Telangana

Model Question paper  
DCE III semester  
Mid Semester-I Examination

Course Code: CE-304  
Course Name: HYDRAULICS

Duration: 1 hour  
Max. Marks: 20 Marks

**PART-A**

Answer **all** questions, Each Question carries **one** mark

**4x1 = 4 Marks**

- 9) Define the term 'specific gravity'
- 10) Define 'absolute pressure'.
- 11) List out any two types of fluid flow.
- 12) Write the mathematical form of Bernoulli's theorem

**PART-B**

Answer **two** Questions. Each question carries **three** marks

**2x 3 = 6 Marks**

5(a) what is weight density of a fluid giving the values for water and mercury.

(OR)

5(b) Compare the center of pressure and total pressure.

6(a) Draw a neat sketch of venturimeter showing its salient features

(OR)

6(b) State three assumptions of Bernoulli's theorem

**PART-C**

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

**2x 5 = 10 Marks**

7(a) Convert the following vacuum pressures into absolute pressures

- (a) 26cm of mercury
- (b) 11.14 kN/m<sup>2</sup>
- (c) 0.05 N/mm<sup>2</sup>
- (d) 0.34 Kgf/cm<sup>2</sup>

(OR)

7(b) A triangular body of base 2m and height 2.4m is immersed vertically such that the base is parallel to and at a depth of 1.6m from free surface of liquid. Find total pressure and centre of pressure.

8(a) Water is flowing through a tapered pipe of length 100m having diameter 600mm at the upper end and 300mm at the lower end at the rate of 50lit/s. The pipe has a slope of 1in30. Find the pressure at the lower end if the pressure at higher end is  $0.1962 \text{ N/mm}^2$ .

**(OR)**

8(b) A venturimeter is to be fitted to a 15 cm diameter pipe which is horizontal where the pressure head is 10m of water. The maximum flow is 9000 litres per minute. Find the diameter of the throat so that the pressure does not become negative. Assume the coefficient of venturimeter as 0.98

State Board of Technical Education and Training, Telangana

Model Question paper  
DCE III semester  
Mid Semester-II Examination

Course Code: CE-304  
Course Name: HYDRAULICS

Duration: 1 hour  
Max. Marks: 20 Marks

PART-A

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

- 1) Write the relation between  $C_d$ ,  $C_c$  and  $C_v$ .
- 2) List any two classification of Mouthpiece based on discharge condition.
- 3) Define Hydraulic Gradient Line
- 4) Write the formula to calculate the head loss due to pipe friction by Darcy's equation

PART-B

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

5(a) State three advantages of V-notch

(OR)

5(b) Water flows over a rectangular notch 1.25m wide with a head of 0.10m. The same discharge passes through a right angled V notch. Find the head of water in the v-notch.

6(a) It was observed that the difference of head between the two ends of a pipe 250m long and 300mm diameter is 1.5m. Taking Darcy coefficient as 0.01 and neglecting minor losses, calculate the discharge flowing through the pipe.

(OR)

6(b) A pipe of diameter 90mm is suddenly enlarged to a diameter of 150mm. Find the loss of head due to the enlargement when the quantity of water flowing is  $0.072\text{m}^3/\text{sec}$

PART-C

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

7(a) A jet of water issues from an orifice  $1250\text{mm}^2$  in area under a constant head of 1.125m. It falls vertically 1m before striking the ground at a distance of 2m measured horizontally from vena-contracta. Calculate hydraulic Co - efficient ( $C_c$ ,  $C_d$  &  $C_v$ ), if the jet is discharging 3.65 lit/sec.

(OR)

7(b) The catchment area of a tank is  $5 \times 10^6\text{Sq.m}$ . The max rainfall in the catchment is 5 cm per hour. Out of this 80% will reach the tank. Find the length of waste weir if the depth

of the water is not to exceed 1 m. The waste weir has to carry piers 1 m wide and 5 m clear span for supporting super structure.

8(a) Water is discharged through a pipe 1220m long which is 40mm in diameter for 610m, and 250mm for the rest of its length. Calculate the flow, taking only friction into account, end of the pipe is 30.5m below the reservoir level. Take  $f = 0.004$  for 400mm pipe  $f = 0.006$  for the 250mm pipe.

**(OR)**

8(b) A 2 km long water main has to carry a discharge of  $0.54 \text{ m}^3/\text{sec}$ . If the maximum allowable loss of head due to friction is 26m, find the diameter of the pipe required. Assume  $f=0.008$ . Use Darcy's equation neglecting minor losses.

State Board of Technical Education and Training, Telangana

Model Question paper  
DCE III semester  
Semester End Examination

Course Code: CE-304  
Course Name: HYDRAULICS

Duration: 2 hours  
Max. Marks: 40 Marks

PART-A

Answer **all** questions. Each question carries **one** mark.

**8x1 = 8 Marks**

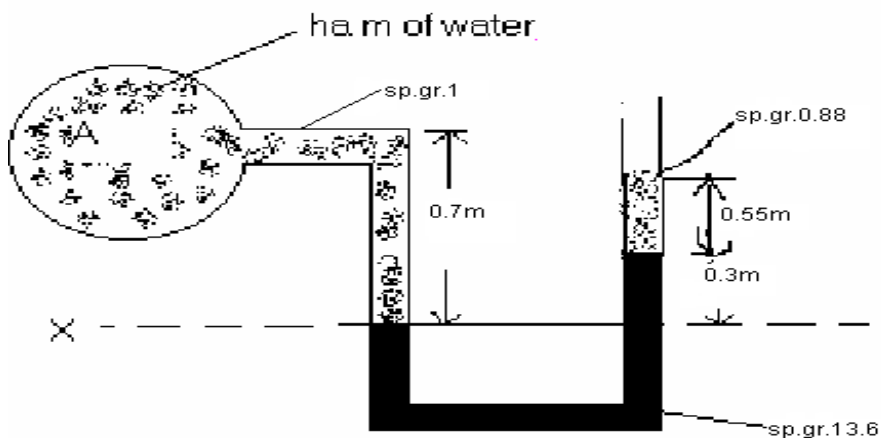
- 1) Define Adhesion.
- 2) List the classification of orifice based on size
- 3) Name the parts of a reciprocating pump?
- 4) State Bernoulli's theorem
- 5) Define steady flow in open channels
- 6) Define the term hydraulic mean depth
- 7) What is the difference between single – stage and multi – stage pumps?
- 8) What is draft tube?

PART-B

Answer **four** questions. Each Question carries **three** marks

**4 x 3 = 12 Marks**

9(a) Calculate the pressure at point A in the figure given below



(OR)

9(b) A rectangular channel of having most economical 6.0 m wide. Find the discharge if bed slope is 1 in 1200. Assume C as 50

10(a) A rectangular channel of 1.5m width is used to carry  $0.2 \text{ m}^3$  of water. The rate of flow is measured by placing a  $90^\circ$  V- notch weir. If the maximum depth of water is not to exceed 1.2m. Find the position of the apex of the notch from the bed of the channel.

(OR)

10(b) List the components of a Hydroelectric power plant

11(a) Find the discharge through a rectangular channel 4 m wide, having depth of water 3 m and bed slope 1 in 1500 Take  $N=0.03$  in Kutter's formula.

(OR)

11(b) A trapezoidal channel 5m wide at the bottom and 1.5m deep discharges 1500 l/sec. The side slopes are 2H : 1V. Given N for the channel surface as 0.03, find the longitudinal slope.

12(a) List the component part of centrifugal pump

(OR)

12(b) Draw a sketch of reciprocating pump

### PART-C

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

**4 x 5 = 20 Marks**

13(a) A circular plane of 2m diameter is immersed in water so that its plane makes an angle of  $30^\circ$  and the height point or plane is 1.6 m below the surface. Find the total pressure and centre of pressure.

(OR)

13(b) Determine the section of a trapezoidal channel discharging at  $30 \text{ m}^3/\text{sec}$ , bed slope 1 in 2000 and side slopes as 1.5H : 1V, Chezy's constant is 50.

14(a) A reservoir has been built 4km away from a college campus having 5000 inhabitants. Water is to be supplied from the reservoir to the campus. It is estimated that each inhabitant will consume 200 liters of water per day and that half of the daily supply is

pumped within 10hrs. Calculate the size of the supply main, if the loss of head due to friction in pipeline is 20m. Assume 'f' for pipe as 0.008.

**(OR)**

14(b) Explain the functions of surge tank.

15(a) Find the value of Manning's 'n' in terms of 'C' Chezy's constant

**(OR)**

15(b) What do you mean by most economical section, write the conditions for trapezoidal section

16(a) Explain the working of reciprocating pump

**(OR)**

16(b) Brief the important types of draft tube

### CE-305- Advanced Surveying

Course Title	Advanced Surveying	Course Code	CE-305
Semester	III	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 Chain, Compass surveying and Levelling

#### Course Outcomes

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

CO1	Analyze the basic concepts and principles of Theodolite in any civil engineering projects before planning and during execution.
CO2	Explain the working principles and use of Tachometric survey in rough terrain
CO3	Discuss the basic concepts of simple curves
CO4	Interpret data from Theodolite in setting out curves.
CO5	Distinguish basic concepts and principles of GPS and GIS in Surveying
CO6	Apply the knowledge of Total Station in different field activities.

#### Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R	U	A		
1	Theodolite Surveying	15	Q4	Q1	Q9(a)	Q13(a)	
2	Trigonometric Levelling	10		Q2	Q10(a)	Q14(a)	
3	Tacheometric Surveying	13					
4	Elements of Simple Curves	12		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
5	Curve Setting	12					
6	Advanced surveying instruments	13		Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)	
Total		60		8	8	8	



## **Course Contents**

### **UNIT 1: Theodolite Surveying**

**Duration: 15 Periods(L:12 – T:3)**

Principles of Theodolite surveying - Component parts of Theodolite –Technical terms used in Theodolite surveying - Fundamental lines and relationship between fundamental lines - Temporary adjustments- Measurement of horizontal angles by repetition and reiteration method -Measurement of vertical angles - Measurement of magnetic bearings, deflection angles, direct angles and Prolonging a straight line - Errors in Theodolite surveying - Theodolite traversing by included angle method and deflection angle method - Checks for closed and open traverse - Traverse computations, Latitude, Departure, closing error, balancing a closed traverse by Bowditch and Transit rules only, problems on Omitted measurements (Length/Bearing/ Length and Bearing of a line are omitted) - Area of closed traverse (Independent Co-ordinates method only).

### **UNIT 2: Trigonometric levelling**

**Duration:10 Periods (L:8– T:2)**

Trigonometric Levelling - Principle - Necessity -Elevations and distance of objects whose base is accessible and whose base is inaccessible with instrument stations in same vertical plane and different vertical planes.

### **UNIT 3: Tacheometric Surveying**

**Duration: 13 Periods (L: 10 – T:3)**

Principle of tacheometry - Methods of tacheometry - Uses of tacheometry compared to a theodolite - Stadia Tacheometry with staff held vertical and line of collimation horizontal or inclined - Elevations and distances of staff stations - Determination of Tacheometric constants - Tangential Tachometry: Finding elevations- Problems.

### **UNIT 4: Elements of Simple Curves**

**Duration: 12 Periods (L: 10 – T:2)**

Types of curves - Advantages and application - Designation of curve - Relationship between radius and degree of curve - Simple circular curve - elements of simple curve.

### **UNIT 5: Curve setting**

**Duration: 12 Periods (L: 10 – T: 2)**

Preparation of curve table and setting out curves by chain and tape by using different types of methods - single and double theodolite methods (Rankine's method) - problems.

### **UNIT 6: Advanced Surveying Instruments**

**Duration: 13 Periods (L:10– T:3)**

Principle and uses of EDM, Electronic Theodolite - Geographical-Information-System(GIS): -components-Spatial and Attribute data - application of GIS in Civil Engineering - Introduction to Photogrammetric surveying- types and Uses of Photogrammetry - Total Station: Introduction-Application - Component parts -Accessories used – Advantages using Total Station. Global Positioning System: Introduction - Maps -

Types of maps – Various satellites used by GPS - Differential GPS – Fundamental of GPS  
- G.P.S receivers - Functions - G.P.S applications in Civil Engineering.

### Reference Books

1. Surveying I& II by B.C.Punmia
2. Surveying by S.K. Husain
3. Surveying and levelling I& II by T.P.Kanetkar
4. Surveying by S.K.Duggal
5. Surveying by R.Agor(Khanna Publishers)
6. Surveying (McGrawhill) by N.N. Basak
7. Higher Surveying by A.M.Chandra (New Age Int.)
8. Remote sensing and GIS - Basudeb Bhatta ( Oxford Publications)
9. Advanced Surveying by R Agor (Khanna Publications)

### Suggested E-learning references

1. <http://nptel.ac.in>
2. [E- Lessons prepared by SBTET,TS](#)

### Suggested Learning Outcomes

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

- 1.1 Identify the parts and functions of a Theodolite
  - 1.2 List the fundamental lines of a Theodolite and their relationships.
  - 1.3 List the steps involved in carrying out temporary adjustments for taking observations
  - 1.4 Explain measuring of horizontal and vertical Angles.
  - 1.5 Explain the method of conducting traverse survey
  - 1.6 Compute the latitude, departure of lines and error of closure.
  - 1.7 Types of omitted measurements
    - i) Length and bearing one side.
    - ii) Length of one side and bearing of adjacent side.
    - iii) Length of two adjacent sides.
    - iv) Bearing of two adjacent sides.
  - 1.8 Closing error and balancing the same by Bowditch and transit rules.
  - 1.9 Calculate the area of a closed traverse by Independent co-ordinates.
- 
- 2.1 Calculate the height of an object when the base of the object is accessible.
  - 2.2 Calculate the elevation of the object when the base of the object is inaccessible and instrument stations are in same vertical plane and in different vertical planes.

- 3.1 Explain the methods and advantages of Tacheometry.
- 3.2 Explain the principle of Tacheometry.
- 3.3 Determination of Tacheometric constants by field measurements.
- 3.4 Find vertical and horizontal distance of stations by Stadia observations.
- 3.5 Explain the principle of Tangential Tacheometry
- 3.6 Solve Simple problems in Tangential Tacheometry
  
- 4.1 State the definition and notation of a simple curve.
- 4.2 Difference between types of curves
- 4.3 State and derive the relation between degree and radius of curves
- 4.4 Compute the elements of simple curve
  
- 5.1 Explain the procedure for setting out a simple curve by linear methods using Chain and Tape.
- 5.2 Explain the procedure for setting out a simple curve by Angular Methods- Single and Double Theodolite.
- 5.3 Solve problems on setting out a simple curve by linear and angular methods
  
- 6.1 Understand the principles and uses of Electronic Distance Meter (EDM) and Electronic Theodolite.
- 6.2 Understand Concept, application and uses of GIS in Civil Engineering
- 6.3 Brief introduction to Photogrammetric surveying
- 6.4 Understand principle, uses, application and features of Total station
- 6.5 Understand principle, uses, application and fundamentals of G.P.S.

### **Suggested Student Activities**

1. Setting out sewer grades.
2. Compare Horizontal angles determined by repetition and reiteration methods between same points.
3. Calculate the height of a building by vertical angle method and verify by measuring the height with a tape taking BM as Plinth.
4. Determine RL's and heights of objects like chimneys and towers and compare the results by single plane and Double plane methods.
5. Demarcate the boundary of the given land using Total station.
6. Conduct a Closed Traverse survey and find out the area enclosed.
7. Plot the Curves executed on site and compare the parameters from plotted drawings and site execution.

8. Determine the height of the elevated objects by trigonometrical levelling.
9. Transfer the centre line alignment from Ground to inside of Tunnel using Total Station and Theodolite.
10. Indicate your college name and its specifications in google maps.
11. Conduct GIS enabled study of artificial recharge structures in a given locality and submit a report.
12. Prepare a base map for water and sewage network for your town using Remote sensing and Geographic Information System

**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 of 3 to 5.

**CO-PO Mapping Matrix**

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2	2	1	1	1	2	1,2,3,4,5,7
CO2	2	2	2	2	2	2	2	1,2,3,7
CO3	2	2	2	3	1	1	2	1,2,3,5,6,7
CO4	1	2	2	2	1	2	1	1,5,7
CO5	1	1	1	3	1	1	1	1,2,3,5,7
CO6	1	1	1	3	1	1	1	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					
Total Questions	8		8	8	

**State Board of Technical Education and Training, Telangana**

**Model Question paper**

**DCE III semester**

**Mid Semester-I Examination**

**Course Code: CE-305**

**Duration:1 hour**

**Course Name: Advanced Surveying**

**Max.Marks:20**

**PART-A**

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

- 13) Define the terms Telescope normal and Telescope inverted.
- 14) What are the fundamental lines of a theodolite.
- 15) Define trigonometric leveling.
- 16) Mention the three cases that occur in trigonometric leveling.

**PART-B**

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

- 5(a) What are the possible sources of errors while using a theodolite.

(OR)

- 5(b) Write the procedure to find the deflection angles.

- 6(a) How can the height of a tower be determined, when its base is inaccessible?

(OR)

- 6(b) State three differences between ordinary leveling and trigonometric leveling?

**PART-C**

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

- 7(a) The following readings were obtained in a traverse survey, where the length and bearing of the last line were not recorded.

<b>Line</b>	<b>Length(m)</b>	<b>Bearing</b>
AB	75.50	30° 24'
BC	180.50	110° 36'
CD	60.25	210° 30'
DA	?	?

Compute the length and bearing of line DA.

(OR)

7(b) Find the area of the closed traverse having the following data, by co-ordinate method.

Side	Latitude	Departure
AB	+225.50	+120.50
BC	-245.00	+210.00
CD	-150.50	-110.50
DA	+170.00	-220.00

8(a) In order to ascertain the elevation of the top (Q) of the signal on a hill, observations were made from two instrument stations P and R at a horizontal distance of 100m. apart, the stations P and R being in line with Q. The angles of elevation of Q at P and R were  $28^{\circ} 42'$  and  $18^{\circ} 6'$  respectively. The staff readings upon the benchmark of elevation 287.28m were respectively 2.870 and 3.750 when the instrument was at P and at R, the telescope being horizontal. Determine the elevation of the foot of the signal if the height of the signal above its base is 3m.

(OR)

8(b) A theodolite was set up at A and the angle of elevation to the top of tree was  $8^{\circ} 36'$ . The horizontal distance between the vertical axis of theodolite and projected position of the top of the tree was 200m. Determine the RL of the top of the tree if the RL of the instrument axis was 1609.89

**State Board of Technical Education and Training, Telangana**

**Model Question paper**

**DCE III semester**

**Mid Semester-II Examination**

**Course Code: CE-305**

**Duration:1 hour**

**Course Name: Advanced Surveying**

**Max.Marks:20 Marks**

**PART-A**

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

- 1) Write the principle of tacheometry.
- 2) What is the difference between Theodolite and Tacheometer.
- 3) List the different types of curves.
- 4) What is a relation between the radius and degree of curve?

**PART-B**

**Answer two questions. Each question carries *Threemarks2x3 = 6 Marks***

5(a) Describe the method of determining the constants of a Tacheometer from field measurements

(OR)

5(b) What are the sources of errors in Tacheometry. What are the permissible errors.

6(a) Draw a neat sketch of simple circular curve and indicate its all notations.

(OR)

6(b) Define i) forward tangent ii) point of tangency.

**PART-C**

**Answer two questions. Each question carries *five marks2x5 = 10Marks***

7(a) The following readings were observed on a staff vertically held.

Instrument Station	Staff Station	Vertical Angle	Hair readings (m)	Remarks
C	BM	-5° 20'	1.500, 1.800, 2.450	RL of BM
C	D	+8° 12'	0.750, 1.500, 2.250	is 750.50m



Calculate the horizontal distance CD and RL of D, when the constants of instruments are 100 and 0.15.

(or)

7(b) The following readings were observed with a Transit Theodolite

Instrument Station	Staff Station	Target	Vertical Angle	Staff Reading	Remarks
O	A	Lower	+4° 30'	0.950	RL of the instrument axis is 255.50m
		Upper	+6° 30'	3.250	

Calculate the horizontal distance between the instrument station and staff, and also the RL of staff station A.

8)a) Derive a relationship between a radius and degree of a curve.

(or)

b) What are different types of curves and write its suitable areas of application

**State Board of Technical Education and Training, Telangana**

**Model Question paper**

**DCE III semester**

**Semester End Examination**

**Course Code: CE-305**

**Duration: 2 hours**

**Course Name: Advanced Surveying**

**Max.Marks: 40 Marks**

**PART-A**

Answer **all** questions. Each question carries **one** mark

**8x1 = 8 Marks**

- 1) Mention any six fundamental lines of transit theodolite.
- 2) List any two advantages of tangential tacheometry.
- 3) Mention any two methods of setting out circular curve by chain and tape.
- 4) What is balancing?
- 5) Define Deflection angle?
- 6) Define Point of Commencement?
- 7) State the principle of EDM.
- 8) Define photogrammetry?

**PART-B**

Answer **two** questions. Each question carries **three** marks

**4x 3 = 12 Marks**

9(a) Explain clearly the procedure of measurement of horizontal angles by repetition method?

(OR)

9(b) Two straights intersect at a chainage 1060 m and the angle of intersection is  $120^{\circ}$ . Calculate (a) Length of long chord (b) Tangent length (c) versed sine of the curve (d) Degree of the curve.

10(a) Explain how the additive and multiplying constants of a tacheometer determined in the field.

(or)

10(b) Write the uses of GPS in Civil Engineering.

11(a) Write the formulas for (i) apex distance (ii) tangent length (iii) length of the curve (iv) mid ordinate distance (v) degree of curve (vi) angle of intersection

(or)

11(b) Explain how a simple curve can be set out using chain and tape (any method)

12(a) Write the uses of GPS in Civil Engineering.

(OR)

12(b) Mention three advantages and three disadvantages of total station.

### PART-C

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

13(a) The record of a closed traverse given below with one bearing and distance missing

Line	Length(m)	Bearing
AB	100	?
BC	80.5	140°30'
CD	60	220°30'
DA	?	310°15'

Calculate the length of DA and bearing of AB

(OR)

13(b) Two tangents intersect at point B of chainage 380.00m, the deflection angle being  $36^\circ$ . Calculate all the data necessary for setting out a simple circular curve with a radius of 300m by Rankine's method of deflection angles. Take peg interval 30m.

14(a) A Tacheometer fitted with an analytic lens was set up at a station A and the following readings were obtained on a vertically held staff.

Station	Staff	Vertical Station Angle	Hair Readings
A	B.M	-2°18'	1.500,1.800,2.4500
A	B	+8°36'	0.750,1.500,2.250

R.L of BM was 100.00 Calculate the horizontal distance AB and the R.L of B.

(OR)

14(b) Explain briefly five components of GIS

15(a) Two tangents intersect at point B of chainage 380.00m, the deflection angle being  $36^\circ$ . Calculate all the data necessary for setting out a simple circular curve with a radius of 300m by Rankine's method of deflection angles. Take peg interval 30m.

(OR)

15(b) Calculate the perpendicular offsets at 20m interval along the tangents to set out first five pegs of simple circular curve of 250m radius.

16(a) Explain briefly five components of GIS?

(OR)

16(b) What are the four basic functions of the EDM instrument?

### CE-306- Building Drawing

Course Title	Building Drawing	Course Code	CE-306
Semester:	III	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture+ Practical	Total Contact Periods	45 Periods
CIE	60 Marks	SEE	40 Marks

#### Pre requisites

This course requires the basic knowledge of Engineering drawing

#### Course Outcomes

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

CO1	Sketch the conventional signs and component parts related to building plotting as per IS 962.
CO2	Draw plan, cross section and elevation of Residential buildings of load bearing walls
CO3	Develop plan, cross section and elevation of Residential buildings of framed structures
CO4	Draw line diagrams of School buildings.
CO5	Plan and Interpret line diagrams of Hostel buildings.
CO6	Analyse line diagrams of Hospital buildings.

#### 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 building drawing	15	1	3	
2	Residential Buildings	15			1
3	Public Buildings	15			1
Total		45	1	3	2

## CourseContents

### UNIT 1: Introductionto building drawing

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

- a) Sketch the Conventional signs for materials like bricks, stone, concrete, wood, glass, earth, steel - water supply and sanitary fixtures like tap, wash basin, sink, W.C pan (Indian and European type), shower, flush tank.-Electrical installations like one way switch, Two way switch, Distribution Board, Socket-5A, 15A, Ceiling fan, LCD bulb, Fluorescent Lamp, Bell.
- b) Cross section of a load bearing wall showing all the components below and above the ground level.
- c) Plan and cross section of a column along with footing.
- d) Elevation of a fully panelled door and label the parts
- e) Elevation of fully panelled window and glazed window and label the parts
- f) Elevation of King post truss and label the parts with the given data.(details of the joints not required)
- g) Plan and elevation of Dog legged stair case

### UNIT 2: Residential Buildings

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

- a) Plan, section and elevation of single storied load bearing type residential building from the given line diagram and set of specifications or by measurement of existing building.  
(i) 1BHK (ii) 2BHK
- b) Plan, section and elevation of single storied (framed structure) residential building
- c) Plan, section and elevation of Two-storied residential building (framed structure type)
- d) Plan of any two apartments at first floor level (contains minimum 4 flats of any BHK).
- e) Draw the Site Plan, and proposed construction plan, Section passing through the Stair or WC and Bath and elevation for 3BHK house as per basic principles of building, i.e. Town planning authority in your vicinity.

### UNIT 3: Public buildings

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

- a) Plan of a Sanitary block of a large building showing internal water supply and sanitary fittings
- b) Line diagram of Primary school building for 250 students showing the functional requirements.
- c) Line diagram of Hostel building for 100 students showing the functional requirements
- d) Line diagram of rural hospital building for 10 beds capacity showing the functional requirements.
- e) Line diagram of the Bank, showing the functional requirements.

- f) Line diagram of Restaurant, showing the functional requirements in ground floor and first floor only.

### **Recommended Books**

1. Civil Engineering Drawing-I by Chakraborty
2. Civil Engineering Drawing-I by N.Srinivasulu.
3. S.C.Rangwala ,”Civil Engineering Drawing
4. Shah. M.G. Kale, CM, Patki, S.Y., Building Drawing, Mcgraw Hill Publishing
5. Malik and Mayo, Civil Engineering Drawing, Computech Publication Ltd
6. M. G. Shah and C. M. Kale, Principles of Perspective Drawing, Mcgraw Hill
7. Swamy, Kumara; Rao, N, Kameshwara, A ., Building Planning and Drawing, Charotar Publication, Anand.
8. Bhavikatti, S. S., Building Construction, Vikas Publication House Pvt. Ltd., Delhi.
9. Mantri, Sandip, A to Z Building Construction, Satya Prakashan, New Delhi.
10. Sane, Y.S., Planning and design of Building, Allied Publishers, New Delhi.

### **Suggested E-learning references**

1. <http://nptel.ac.in>
2. <https://www.youtube.com/c/Circlelineartschool/videos>

### **Suggested Learning Outcomes**

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

- 1.1 Sketch the conventional signs of various Civil Engineering materials, plumbing and electrical elements.
- 1.2 Draw the cross section of load bearing wall and name all components below and above ground level.
- 1.3 Draw the plan and cross section of column and footing below and above ground level
- 1.4 Draw the elevation of fully panelled door and label the parts
- 1.5 Draw the elevation of fully panelled window and glazed window and label the parts
- 1.6 Draw elevation of King post truss and label the parts with the given data.
- 1.7 Draw plan and section of a dog legged staircase with given specifications.
- 2.1 Draw the plan, section and elevation of single storied load bearing type residential building from the given line diagram and set of specifications.
  - i. 1BHK
  - ii. 2BHK
- 2.2 Draw the plan, section and elevation of single storied residential building (framed structure) from the given line diagram and set of specifications.

- 2.3 Draw the plan, section and elevation of two storied residential building (framed structure) from the given line diagram and set of specifications.
- 2.4 Draw the plan of any two apartments at first floor level.
- 2.5 Draw the Site Plan, and proposed construction plan, Section and elevation for 3BHK house as per Town planning authority in your vicinity.
- 3.1 Draw the plan and cross section of sanitary block showing internal water supply and sanitary fittings.
- 3.2 Draw the line diagram of Primary school building for 250 students .
- 3.3 Draw the line diagram of a Hostel building for 100 students.
- 3.4 Draw the line diagram of a Rural hospital building for 10 beds capacity
- 3.5 Draw the line diagram of a Bank.
- 3.6 Draw the line diagram of a Restaurant.

### **Suggested Student Activities**

1. Tech fest/Srujana
2. Surprise Test
3. Group discussion
4. Prepare a case study of nearby small public buildings verify and draw the various views and judge the prevailing bye-laws.
5. Prepare a plan, elevation and section of your college main block.
6. Prepare a plan of temporary construction shed and draw various views.
7. Prepare a plan of vehicle parking shed and draw various views.
8. Study the difference between framed structure and a load bearing structure and present it.
9. Incorporate the concepts of Green building technology in your institute building.
10. Draw the plan elevation and sectional views of a pitched roof residential building.
11. Visit the Town planning office in your vicinity and see the master plan of your city and discuss with your authorities
12. Discuss with Municipal or Panchayat authorities regarding stamp duty, Authorized layouts and unauthorized layouts.

### CO-PO Mapping Matrix

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

### 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) 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



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

**Course Code: CE-306**

**Duration: 1 hour**

**Course Name: Building Drawing**

**Max. Marks: 20**

**PART-A**

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

1. Sketch the conventional signs for the following .
  - a) Bricks
  - b) Wood cross section
  - c) Stone Masonry
  - d) W.C pan (Indian type)
2. Sketch the plans of odd course and even course of one Brick wall of English Bond meeting at corner and name the components.

**PART-B**

Answer **any one** question. Each question carries **twelve** marks

**1 x 12 = 12 Marks**

3. Draw the cross section of load bearing wall and Name any 8 components below and above the ground level. (assume suitable dimensions)
4. Draw the elevation of fully panelled door of size 1200mm X 2100mm (not to scale) and label the parts.

**State Board of Technical Education and Training, Telangana**  
**Mid Sem-II Model Question paper**  
**DCE III semester Examination**

**Course Code: CE-306**

**Duration: 1 hour**

**Course Name: Building Drawing**

**Max. Marks: 20**

**PART-A**

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

**2 x 4 = 8 Marks**

1. Draw the plan of a single room of size 4 m x 3 m. Take wall thickness as 300mm
2. Draw the cross section of load bearing wall with foundation. Wall thickness is 300 mm.

Assume suitable dimensions

**PART-A**

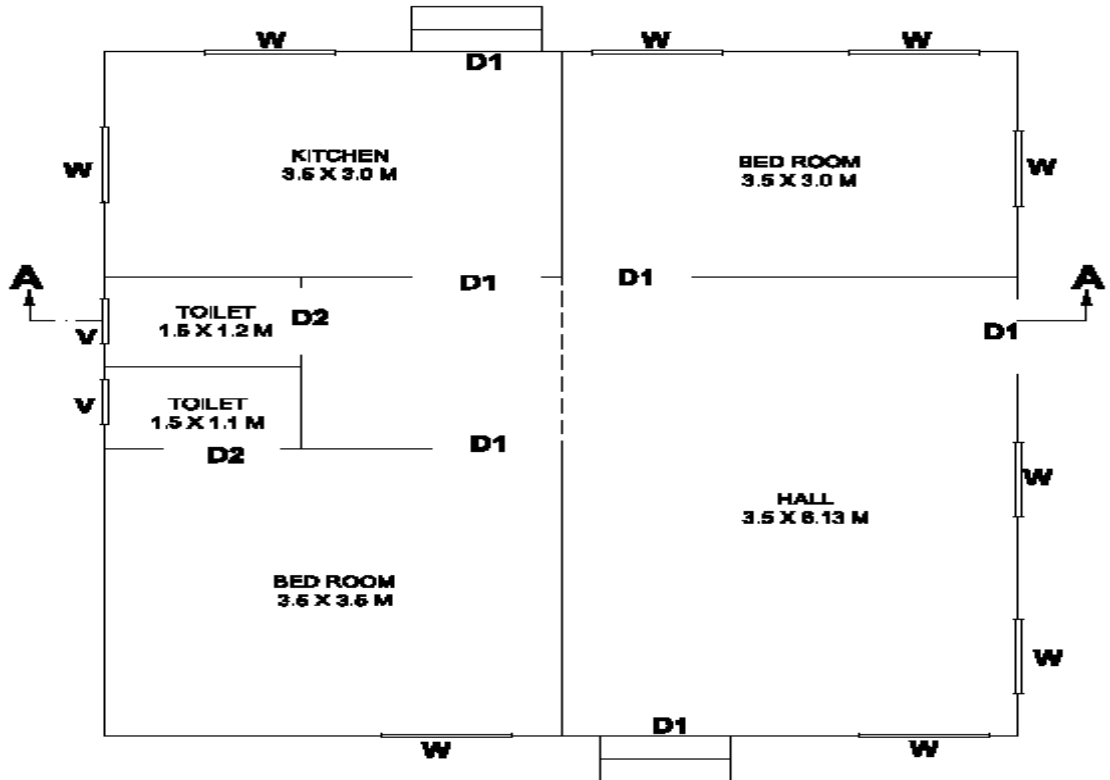
Answer **any one** question. Each question carries **twelve** marks

**1x12 = 12 Marks**

1. The line sketch of a small residential building is shown in Fig. Draw to scale of 1:100 the following views :
  - i. Dimensioned Plan 10 marks

Specifications:-

- a) All the dimensions in line sketch are internal measurements.
- b) Foundation : 1200mm below the ground level and 1000mm wide
- c) C.C Bed : 1000mm wide and 300mm deep
- d) Footings : 2 Nos. With suitable offsets using RR Masonry in CM (1:6)
- e) Basement : 450mm height with suitable width of Stone masonry in CM (1:6)
- f) Super structure : walls 300mm thick Height from top of the floor to bottom of the roof slab is 3000mm. All walls are of BW in CM(1:6)
- g) RCC roof slab 120mm thick.
- h) Doors , Windows, Ventilators and Lintels may be suitably provided.
- i) Parapet : 150mm thick, Height 750mm.
- j) Sunshades for all external doors and windows are to be suitably provided.

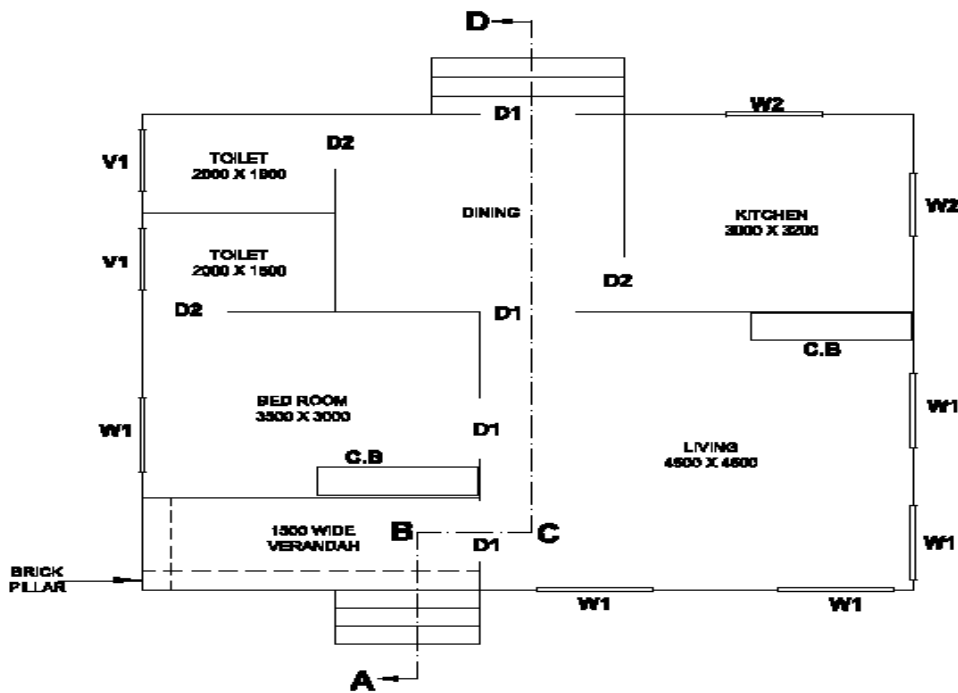


2. The line sketch given below shows the plan of a residential building. The dimensions given in the sketch are internal dimensions of the rooms. Draw the Cross section along ABCD of the given line sketch to a scale of 1:100

#### Specifications

- i. Foundations :- The depth of foundation shall be 1000mm below ground level. Plain cement concrete (1:4:8) bed in the foundation will be 800mm wide and 200mm deep. Width of first and second footings will be 500mm and 400mm respectively. Whereas the depth of both the footings will be 400mm each using stone masonry in C.M (1:8).
- ii. Basement:- The height of the basement is 600mm. Damp proof course of walls in the basement is 150mm thick.
- iii. Super structure: - All the walls except the partition wall between the toilets are 200mm thick. The partition wall is 100mm thick.
- iv. A square brick pillar 200mm X 200mm is provided at left corner in front veranda.
- v. Lintels and Sunshades :- Lintels with RCC (1:2:4) are provided on all openings and depth of 150mm with a bearing of 150mm on either side. Sunshades 100mm thick at the wall face and 75mm thick at the free end are provided projecting 600mm from lintels over all exterior openings. A continuous sunshade is provided both sides of front veranda.

- vi. Veranda: In front veranda RCC beam 200mm X 250mm is laid over the brick pillar, the bottom of the beam being at 2100mm from the floor level.
- vii. Height of super structure : The walls in the super structure are taken to a height of 3300mm.
- viii. Roofing : Roofing consists of RCC (1:2:4) slab 110mm thick and weather proof course 50mm thick.
- ix. Flooring : Flooring shall be of Shahabad stone 25mm thick over 80mm thick CC bed of (1:3:6) over a sand filling in the basement.
- x. Parapet : Parapet is 100mm thick and 700mm height.
- xi. Assume suitable sizes for steps, doors, windows and ventilators.



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

**Course Code: CE-306**

**Duration: 2 hours**

**Course Name: Building Drawing**

**Max. Marks: 40**

**PART-A**

Answer **all** questions each question carries **four** marks .

**4x4=16 Marks**

1. Sketch the conventional signs for the following materials,
  - a). Stone masonry
  - b) Wood longitudinal section
  - c) Wash basin
  - d) Glass
  - e) Concrete
2. Draw the cross section of load bearing wall and Name any 6 components below  
And above the ground level.
3. Draw the elevation of king post truss and labels the parts
4. Draw the elevation of fully panelled window of size 1000mm x 1400 mm (not to scale) and label the parts

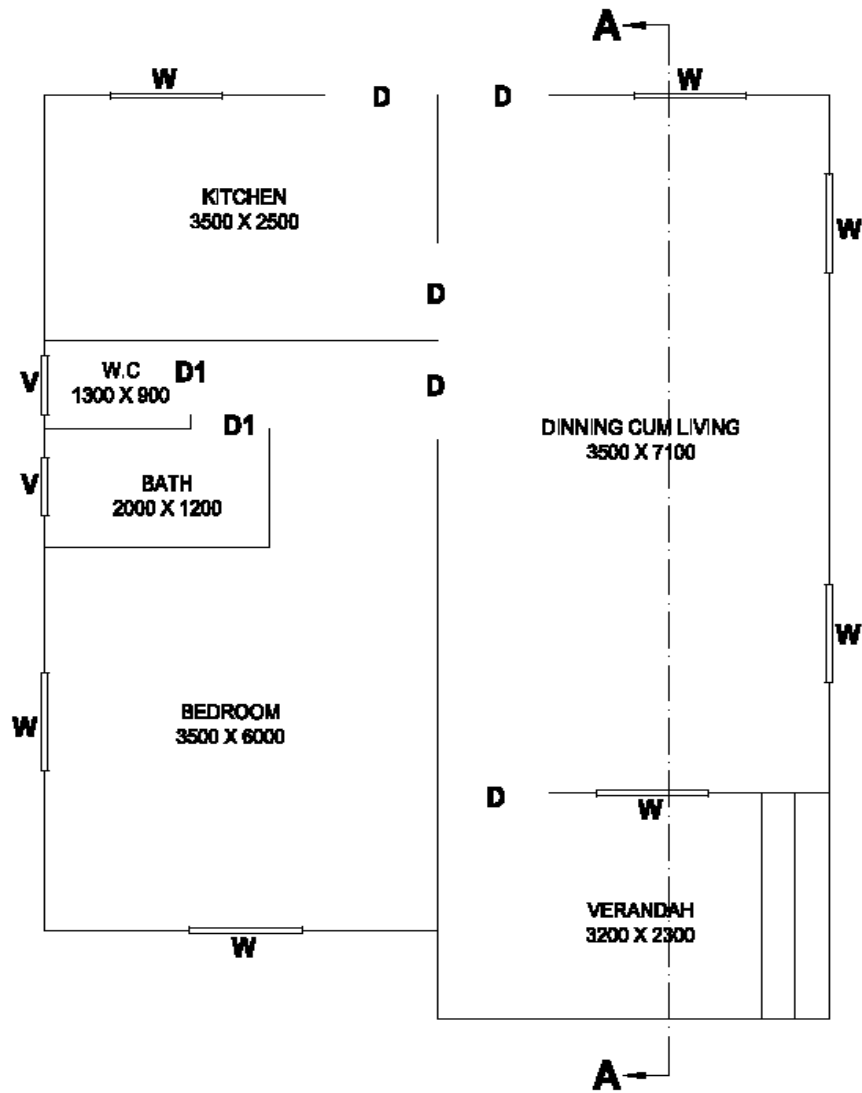
**PART- B**

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

**1x24=24 Marks**

5. The line sketch given below shows the plan of a Single storied two bedroom load bearing residential building. The dimensions given in the sketch are internal dimensions of the rooms. Draw to a scale of 1:100
  - a) Plan
    - Specifications:
    - i. Foundation :- 1.0m wide and 1.0m deep
    - ii. Levelling course :- 1.0m wide and 0.2m height in CC 1:4:8
    - iii. First footing :- 0.75m wide and 0.4m height in stone masonry in C.M (1:8)
    - iv. second footing :- 0.60m wide and 0.4m height in stone masonry in C.M (1:8)
    - v. Basement :- 0.45m wide and 0.6m height in stone masonry in C.M (1:8)
    - vi. Flooring :- 20mm thick Marble flooring set in 20mm thick C.M (1:4) over a bed of C.C (1:5:10) and 150mm thick sand cushion.
    - vii. Super structure :- 300mm thick brick masonry in C.M (1:6), Height 3000mm

- viii. Parapet wall :- 150mm thick and 0.75m height in brick masonry in C.M (1:6)
- ix. Lintels :- 150mm thick in R.C.C (1:2:4)
- x. Sunshades :- 75mm thick flat, projecting 0.60m from face of wall.
- xi. Roofing :- R.C.C slab 120mm thick all over with full bearing.
- xii. Doors :- MD= D=1.0m X 2.0m; D1=0.9m X 2.0m
- xiii. Windows :- W= 1.0m X 1.22m;
- xiv. Ventilators :- V 0.45m X 0.75m



6.a) Draw a line diagram for a proposed Rural hospital of 10 beds capacity. ( to a suitable scale) showing the functional requirements

## CE-307- Hydraulics Lab

Course Title	Hydraulics Lab	Course Code	CE-307
Semester	III	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 Hydraulics

### Course Outcomes

**Upon completion of the course the learner shall be able to**

CO1	Assess the flow parameters like discharge, velocity of flow measuring devices
CO2	Determine flow rates, pressure variations, various losses for flow through pipes
CO3	Verify Bernouli's theorem and calculate the coefficient of discharge flow measuring devices
CO4	Calculate the constants in open channel flow
CO5	Identify and analyze the component parts of Pumps
CO6	Recognize and Identify the component parts of Turbines

### Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods
1	Orifices, Mouthpieces and Notches	15
2	Verification of Bernoulli's theorem and study of Pipe flow parameters	15
3	Open channel flow and Study of Fluid machines	15
Total		45

### Course Contents

#### LIST OF EXPERIMENTS:

#### Unit 1: Orifices, Mouthpieces, Notches and weirs

**Duration: 15 Periods (L:5 – P:10)**

1. Determination of coefficient of discharge of a small orifice by constant head method
2. Determination of Cc of an orifice by finding Cv and Cd.
3. Determination of coefficient of discharge of a mouthpiece by constant head method
4. Determination of coefficient of discharge of a Rectangular and triangular notch.
5. Determination of coefficient of discharge of a trapezoidal notch

## Unit 2: Verification of Bernoulli's theorem and study of Pipe flow parameters

Duration: 15 Periods(L:5 – P:10)

1. Verification of Bernoulli's theorem.
2. Determination of coefficient of a discharge of a venture meter.
3. Determination of friction factor in pipe flow.

## Unit 3: Open channel flow and Study of Fluid machines

Duration: 15 Periods(L:5 – P:10)

1. Determination of Chezy's constant in open channel flow.
2. Study of reciprocating pump
3. Study of centrifugal pump.
4. Study of turbines – Pelton Wheel
5. Study of turbines – Francis Turbine
6. Study of turbines – Kaplan Turbine

### KEY Competencies to be achieved by the student

S.No	Experiment Title	Key Competency
1	Coefficient of discharge of small Orifice by constant head.	Regulate the flow Operate stop clock accurately Draw graph between $Q$ vs $H^{1/2}$
3	Hydraulic coefficients of an orifice.	Regulate flow. Note co-ordinate values and measure volume Operate stop clock accurately. State the relation.
4	Coefficient of discharge of mouth piece by constant head.	Regulate the flow. Operate stop clock accurately graph between $Q$ vs $H^{1/2}$
5	Coefficient of discharge of rectangular notch.	Note readings of head Operate stop clock accurately Draw graph between $Q$ vs $H^{3/2}$
6	Coefficient of discharge of triangular notch	Note readings of head Operate stop clock accurately. Draw graph between $Q$ vs $H^{5/2}$
7	Coefficient of discharge of trapezoidal notch	Note readings of head Operate stop clock accurately. Compare the results of rectangular and triangular notch.
8	Verify Bernoulli's theorem	Note readings of head at various locations Plot hydraulic gradient line and total energy line
9	Coefficient of discharge of Venturimeter.	Note readings of head Operate stop clock accurately. Draw graph between $Q$ vs $H^{1/2}$
10	Friction factor in pipe flow.	Note readings of head Observe the significance of friction factor of pipe flow.
11	Chezy's constant	Note readings of head. Observe the significance in design of section of open channel



## Recommended Books

1. Hydraulics Lab Manual by S.K.Likhi, NewAge International Pvt Ld
2. Laboratory Manual of Hydraulic and Hydraulic Machines by R.V.Raiker, Prentice Hall India learning Pvt Ltd

## Suggested E-learning references

1. <http://nptel.ac.in>

## Specific Learning Outcomes

### Upon completion of the course the learner shall be able to

- 1.1 State the principle / law / apparatus / equipment required for testing for determination of Cd of Orifices by constant head method
- 1.2 Perform test and record observations.
- 1.3 Draw inferences on the relationship between parameters.
- 1.4 Draw a graph between Q vs  $H^{1/2}$ .
- 1.5 State the principle / law / apparatus / equipment required for testing for determination of Cd of Mouthpieces
- 1.6 Perform test and record observations.
- 1.7 Draw inferences on the relationship between parameters.
- 1.8 Draw a graph between Q vs  $H^{1/2}$
- 1.9 State the principle / law / apparatus / equipment required for testing for determination of Cd of Rectangular Notches
- 1.10 Perform test and record observations.
- 1.11 Draw inferences on the relationship between parameters.
- 1.12 Draw a graph between Q vs  $H^{3/2}$ .
- 1.13 State the principle / law / apparatus / equipment required for testing for determination of Cd of Triangular Notches.
- 1.14 Perform test and record observations.
- 1.15 Draw inferences on the relationship between parameters.
- 1.16 Draw a graph between Q vs  $H^{5/2}$ .
- 1.17 State the principle / law / apparatus / equipment required for testing for determination of Cd of Trapezoidal Notches
- 1.18 Perform test and record observations
- 1.19 Draw inferences comparing the results with rectangular notch and triangular notch on the relationship between parameters.

- 2.1 States the principle/law /apparatus/equipment required for verification of Bernoulli's Theorem
- 2.2 Perform test and record observations.
- 2.3 State Inference and application.
- 2.4 Plot Hydraulic gradient line and Total energy line.
- 2.5 State the Aim /apparatus/equipment required to determine the Cd for flow through Venturi meter
- 2.6 Perform test and record observations.
- 2.7 State Practical application.
- 2.8 Draw a graph between Q vs.  $H^{1/2}$
- 2.9 State the Aim /apparatus/equipment required to determine the friction factor in pipe flow.
- 2.10 Perform test and record observations.
- 2.11 State Importance of friction factor in pipe design.

- 3.1 State the Aim / apparatus / equipment required to determine the chezy's coefficient in Open channel flow.
- 3.2 Perform test and record observations.
- 3.3 State Importance in design of section of open channel.
- 3.4 Identify the component parts of a Reciprocating pump
- 3.5 State the functions of each component of Reciprocating pump
- 3.6 State field applications for Reciprocating pump
- 3.7 Identify the component parts of a centrifugal pump
- 3.8 State the functions of each component of centrifugal pump
- 3.9 State field applications for centrifugal pump
- 3.10 State field applications and compare with Reciprocating pump.
- 3.11 Identify the component parts of Pelton wheel, Francis or Kaplan turbines.
- 3.12 State function of each component
- 3.13 State field applications of Turbines

### **Suggested Student Activities**

1. To carryout market survey for pipes of different sizes and materials available.
2. To visit & submit a report on nearby canal/irrigation structures/dam site to know the usage of notches and weirs.
3. To visit & submit a report on nearby hydel power plant to know the type of turbine installed and its setup.
4. Student is encouraged to attend the Tech fest/Srujana

5. Paper/Poster presentation
6. Quiz
7. Group discussion
8. Surprise Test

### CO-PO Mapping Matrix

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

**State Board of Technical Education and Training, Telangana**

**Model Question paper  
DCE III semester  
Mid Semester-I Examination**

**Course Code:CE-307  
Course Name: HYDRAULICS LAB**

**Duration:1 hour  
Max.Marks:20 Marks**

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**Pick any one experiment from the given list**      1x20=20Marks

1. Determination of coefficient of discharge of a small orifice by constant head method
2. Determination of Cc of an orifice by finding Cv and Cd.
3. Determination of coefficient of discharge of a mouthpiece by constant head method
4. Determination of coefficient of discharge of a Rectangular notch.
5. Determination of coefficient of discharge of a triangular notch
6. Determination of coefficient of discharge of a trapezoidal notch

**State Board of Technical Education and Training, Telangana**

**Model Question paper  
DCE III semester  
Mid Semester-II Examination**

**Course Code:CE-307  
Course Name: HYDRAULICS LAB**

**Duration:1 hour  
Max.Marks:20 Marks**

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**Pick any one experiment from the given list**      1x20=20M

1. Verification of Bernoulli's theorem.
2. Determination of coefficient of a discharge of a venture meter.
3. Determination of friction factor in pipe flow.

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

**Course Code: CE-307**  
**Course Name: HYDRAULICS LAB**

**Duration: 2 hours**  
**Max. Marks: 40 Marks**

**Pick any one experiment from the given lot 1x40=40M**

1. Determination of coefficient of discharge of a small orifice by constant head method
2. Determination of  $C_c$  of an orifice by finding  $C_v$  and  $C_d$ .
3. Determination of coefficient of discharge of a mouthpiece by constant head method
4. Determination of coefficient of discharge of a Rectangular and triangular notch.
5. Determination of coefficient of discharge of a triangular notch
6. Determination of coefficient of discharge of a trapezoidal notch
7. Verification of Bernoulli's theorem.
8. Determination of coefficient of a discharge of a venture meter.
9. Determination of friction factor in pipe flow.
10. Determination of Chezy's constant in open channel flow.

### CE-308- Advanced Surveying Lab

Course Title	Advanced Surveying Lab	Course Code	CE-308
Semester:	III	Course Group	Practical
Teaching Scheme in Period(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture+ Practical	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

#### Pre Requisites

Basics of chain surveying, compass surveying and levelling

#### Course Outcomes

CO1	Use and operate Theodolite in the field
CO2	Apply the knowledge of Theodolite in different operations of civil engineering projects
CO3	Discuss the knowledge of principles and purpose of tacheometry in finding out the constants
CO4	Determine height and reduced level of the top and bottom of accessible object and inaccessible object by use of Trigonometrical levelling
CO5	Formulate the setting out of curve by linear methods
CO6	Set out curves by angular methods

#### Course Content

Unit No	Unit Name	Periods
1	Theodolite Surveying and Trigonometric Levelling	15
2	Tacheometric Surveying	15
3	Curve Setting	15
	Total	45

## **Course Contents**

### **UNIT 1**

#### **a) Theodolite surveying**

**Duration: 9 Periods (L:3.0-P:6.0)**

Study of transit Theodolite- Temporary adjustments of Theodolite - Measurement horizontal angles by reiteration and repetition method - Measurement of vertical angles - Determination of inaccessible horizontal distance involving two Instrument stations.

#### **b) Trigonometric levelling**

**Duration: 6 Periods (L:2.0-P:4.0)**

Determination of height and reduced level of the top and bottom of accessible object - Determination of distance and elevation of an inaccessible object involving two instrument stations

### **UNIT 2**

#### **a) Tacheometry**

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

Determination of constants of Tacheometry - Determination of horizontal distance and elevation by Stadia Tacheometry

### **Unit 3**

#### **Curve setting:**

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

Setting out a simple curve by chain and tape method - Setting out a simple curve by one Theodolite and two Theodolite methods.

### KEY Competencies to be achieved by the student

S. No	Experiment Title	Key Competency
1	Study of transit Theodolite	Holding the instrument and fixing on tripod Identifying parts and their functions Conducting operations like swinging and transiting
2	Temporary adjustments	Spreading the tripod on ground properly for easy levelling and stability Centering the instrument exactly over station using plumb bob and by moving legs Operating foot screws to level Eyepiece adjustment Focusing the object glass
3	Measurement of horizontal angle by Repetition method Reiteration method and Measurement of bearing	Operating lower and upper clamps and their tangent screws reading the Vernier accurately Recording the observations at their appropriate positions on page of theodolite field book
4	Measurement of Vertical angles	Operating vertical circle clamp and its tangent screw Recording the observations at their appropriate positions on page of theodolite field book
5	Determination of inaccessible horizontal distance involving two instrument stations	Measuring the horizontal angles accurately and calculating the distance
6	Trigonometric Levelling -	<ol style="list-style-type: none"> <li>1. Determination of height and reduced level of the top and bottom of accessible object.</li> <li>2. Determination of distance and elevation of an inaccessible object involving two instrument stations.</li> </ol>
7	Field Exercises using Tacheometer	<ol style="list-style-type: none"> <li>1. Calculates constants K &amp; C</li> <li>2. Finds the height and reduced level of an object whose base is accessible</li> <li>3. Finds the height and reduced level of an object whose base is inaccessible</li> </ol>
8	Setting out curves	<ol style="list-style-type: none"> <li>1. Sets out a given simple curve using chain and tape by               <ol style="list-style-type: none"> <li>i. Offsets from long chord</li> <li>ii. Offsets from successive bisection of chords,</li> <li>iii. radial and perpendicular offsets from tangent and</li> <li>iv. Offsets from chord produced</li> </ol> </li> <li>2. Sets out a given simple curve using one Theodolite</li> <li>3. Sets out a given simple curve using Two Theodolite</li> </ol>



## Reference Books

1. Surveying I& II by B.C.Punmia
2. Surveying by S.K. Husain
3. Surveying and levelling I& II by T .PKanetkar
4. Surveying by S.K.Dugal
5. Surveying by R.Agor(Khanna Publisher)
6. Surveying (McGrawhill) by N.N. Basak
7. Higher Surveying by A.M.Chandra (New Age Int)

## Suggested E-learning references

1. <http://nptel.ac.in>

## Suggested Learning Outcomes

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

- 1.1 Know the parts of Theodolite
- 1.2 Perform temporary adjustment.
- 1.3 Measurement of horizontal and vertical angles
- 1.4 Record the observations in the field book.
- 1.5 Computation of included angles, latitudes and departures from field notes
- 2.1 Determine constants of a given Tachometer in the field
- 2.2 Take Tacheometric observations.
- 2.3 Compute heights and distances from field observations.
- 2.4 Determine horizontal and vertical distances of accessible objects by using a Theodolite.
- 2.5 Determine horizontal and vertical distances of inaccessible objects by using two Theodolite stations.
- 3.1 Compute the elements of curve.
- 3.2 Sets out simple curve by different methods using chain and tape
- 3.3 Setting out simple circular curve by one Theodolite and two Theodolite methods.

## Suggested Student Activities

1. Road survey (at least for 150m) by total station.
2. Conduct a traverse survey of a given plot and find out the area.
3. Prepare the contour maps of the given area in your locality.
4. Set out a centre line of a given building using theodolite.
5. Find out the parameters of a curve for an existing road in your locality
6. Detailed study report on telescope used in surveying instrument.
7. To set out two parallel lines along both the sides of an obstacle by using theodolite
8. To find the distance between two inaccessible points by using trigonometric levelling.
9. Make a presentation on refraction error, curvature error caused by telescope
10. Prepare a report on any one of the following. Aerial survey, photogrammetric survey, hydrographic survey, military survey and mine survey.

## CO-PO Mapping Matrix

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

**State Board of Technical Education and Training, Telangana**

**MID SEMESTER –I Model Question paper**

**DCE III Semester**

**Course Code: CE-308**

**Duration:1 hour**

**Course Name: Advanced Surveying Lab**

**Max.Marks:20 Marks**

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**Instructions to the Candidate:**

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

- 1.Measurement of horizontal angle by Reiteration method
2. Measurement of horizontal angle by repetition method
3. Measure vertical angle by using theodolite.
4. Perform the temporary adjustments of a theodolite in field.
5. Find the RL of the top of a electric pole using a transit theodolite.

**State Board of Technical Education and Training, Telangana**

**MID SEMESTER-II Model Question paper**

**DCE III Semester**

**Course Code: CE-308**

**Duration:1 hour**

**Course Name: Advanced Surveying Lab**

**Max.Marks:20 Marks**

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**Instructions to the Candidate:**

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

1. Determination of Stadia constants.
2. Determination of horizontal distance by Horizontal sight.
3. Determination of Horizontal distance and elevation for inclined sight with staff held vertical by Stadia hair method.
4. Determination of height of an object whose base is accessible
5. Determination of height of an object whose base is inaccessible

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

**Course Code: CE-308**

**Course Name: Advanced Surveying Lab**

**Duration: 2 hours**

**Max. Marks: 40 Marks**

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**Instructions to the Candidate:**

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

1. Measurement of horizontal angle by Reiteration method
2. Measurement of horizontal angle by repetition method
3. Measure vertical angle by using theodolite.
4. Determination of height of an object whose base is accessible
5. Determination of Stadia constants.
6. Determination of horizontal distance by Horizontal sight.
7. Determination of Horizontal distance and elevation for inclined sight with staff held vertical by Stadia hair method.
8. Setting out simple curve by Offsets from Long chord method
9. Setting out simple curve by Rankine's method using Theodolite.
10. Setting out Compound curves given two Radii by Deflection angle method

### CE-309- Material Testing Lab

Course Title	Material Testing Lab	Course Code	CE-309
Semester:	III	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

#### Course Outcomes

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

CO1	Select suitable sample of material and Use standard equipment like UTM, Hardness testing machine etc for conducting different tests based on BIS
CO2	Test Bricks and metals to check their suitability for construction works as per IS specification
CO3	Check suitability of Ordinary Portland cement for a particular work as per standards by conducting Fineness test and Normal consistency test
CO4	Find the suitability of Ordinary Portland cement for a particular work by conducting Initial and final setting times of cement and Compressive strength of cement.
CO5	Select suitable sample of Fine aggregate based on tests for use in mortar and concrete
CO6	Identify suitable sample of Course aggregate based on tests for use in mortar and concrete

#### Course Content

Unit No	Unit Name	Periods
1	Tests on Bricks and metals	15
2	Tests on Cement	15
3	Tests on Aggregates	15
Total		45

## Course Contents

### UNIT 1: Tests on Bricks and metals

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

- a) Water absorption,
- b) Crushing strength
- c) Tension Test
- d) Hardness Test
- e) Izod/Charpy Test
- f) Deflection Test

### UNIT 2: Tests on Cement

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

- a) Fineness test
- b) Normal consistency test
- c) Initial and final setting times of cement.
- d) Compressive strength of cement.

### UNIT 3: Tests on Aggregates

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

- a) Specific Gravity and Water absorption of Fine and Coarse aggregate
- b) Bulking of Sand,
- c) Bulk Density and Percentage of voids in Fine and Coarse aggregate
- d) Sieve analysis of fine and Coarse aggregate

### KEY Competencies to be achieved by the student

S. No	Experiment Title	Key Competencies
1	Water Absorption on bricks	Taking weight of dry bricks and wet bricks
2	Crushing strength test on bricks	1. Preparation of 1:1 cement mortar and application of cement mortar over top and bottom faces of brick
		2. Application of load gradually at the rate 14 N/mm <sup>2</sup> per minute till failure occurs
		3. Recording the load at FAILURE
3	Tension test on mild steel rod	1. Marking of gauge length on the MS Rod
		2. Fixing the specimen correctly in between jaws
		3. Application of load at required rate carefully
		4. Measuring the load at failure accurately
4	Brinell/Rockwell Hardness test	1. Placing of specimen at exact position

		2. Application and release of load at required rate
5	Izod/Charpy test on mild steel/brass	1. Preparation of standard specimen and fixing the specimen in the right position of anvil
		2. Recording down the reading by observing the appropriate scale
6	Deflection test on beams(central point load)	1. Measuring the dimensions of specimen accurately
		2. Application of load at exact point of application
		3. Measurement of deflection accurately
7	Fineness test on cement	1. Taking weight of cement sample and its residue
8	Normal consistency test on cement	1. Measurement of required percentage of water to cement accurately
		2. Preparation of sample in the mould
		3. Noting down the plunger penetration on vicat's scale
9	Setting times of cement	1. Measurement of required percentage of water to cement accurately
		2. Preparation of sample.
		3. Noting down the needle penetration on Vicat's scale
		4. Recording time at required needle penetration
10	Compressive strength test on cement	1. Taking weights of different grades of standard sand and cement accurately
		2. Addition of required percentage of water to cement accurately
		3. Application of load at required rate and recording of load at failure accurately
11	Specific Gravity and Water absorption of fine and coarse aggregate	Take weights accurately, record the observations and calculate accurately
12	Bulking of sand	1. Measuring the volume of sand and water accurately
		2. Addition of water to sand in accurate increments

		3. Measuring the increase in volume of sand
13	Bulk Density and Percentage of voids in coarse and fine aggregates	1. Taking the weight of cylindrical measure accurately
		2. Calculating the bulk density of coarse/ fine aggregates both in loose and compacted states
		3. Taking the weight of coarse/ fine aggregate and containers
14	Sieve analysis of coarse and fine aggregate	1. Correct arrangement of sieves used for the sieve analysis of fine or coarse aggregate
		2. Weighing the residue in each sieve accurately

### Reference 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, Mcgraw Hill, 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 State the significance of water absorption test on bricks
- 1.2 State the standards on water absorption of bricks used for various construction works
- 1.3 Explain the procedure for conducting water absorption test on bricks
- 1.4 Perform water absorption test on bricks
- 1.5 State the significance of crushing strength test on bricks
- 1.6 State the standards on crushing strength of bricks used for various construction works
- 1.7 Explain the procedure for conducting crushing strength test on bricks
- 1.8 Determine crushing strength of bricks by testing



- 1.9 Compare observations of crushing tests conducted on different types of bricks like clay bricks, fly ash bricks, concrete blocks
- 1.10 State the properties of mild steel used as reinforcement in concrete
- 1.11 State various tests conducted on mild steel by using UTM
- 1.12 Explain the tension test on Mild steel specimen
- 1.13 Conduct tension test on mild steel using UTM
- 1.14 Interpret the behaviour of the steel with increasing load
- 1.15 Draw inferences from tests on different grades of steel
- 1.16 State the significance of hardness of metals
- 1.17 Explain the hardness test by Brinell/ Rockwell testing machine
- 1.18 Calculate BHN and Rockwell's hardness on given steel samples
- 1.19 State of effect of impact loading over structures made of different metals
- 1.20 Explain method of Izod/Charpy impact test on Mild steel specimen
- 1.21 Calculate Impact load on Mild steel specimens by sing Izod/Charpy Testing machine
- 1.22 Use apparatus required for conducting deflection tests on beams under central point load
- 1.23 Find the Young's modulus by conducting deflection test on steel and wooden beams at different positions of loading
  
- 2.1 State the significance of workability and Compression tests in field.
- 2.2 State the method of preparing sample and the number of samples required for given work
- 2.3 Use apparatus required for conducting fineness test on cement
- 2.4 State the standards on fineness of cement
- 2.5 Explain the procedure for conducting the fineness test on cement
- 2.6 Conduct the fineness test on cement and record the observation
- 2.7 State the significance of normal consistency of cement
- 2.8 Use apparatus required for conducting normal consistency test on cement sample
- 2.9 Explain the procedure for conducting normal consistency test on cement sample
- 2.10 Find the normal consistency of given cement sample
- 2.11 Draw the inference from the observations of normal consistency of fresh cement and old cement samples of same and different grades

- 2.12 State the significance of setting times on construction activity
- 2.13 State the standards on initial and final settings times of various types of cement
- 2.14 Use apparatus required for conducting initial and final setting times of given cement sample
- 2.15 Explain the procedure for conducting initial and final setting times of given cement sample
- 2.16 Find the initial setting time of given cement sample
- 2.17 Draw the inference from the observations of initial setting times of fresh and old cement samples of same and different grades
- 2.18 State the significance of compressive strength of cement used for various civil engineering works
- 2.19 State various grades of cement available in the market based on compressive strength of the cement
- 2.20 State the standards on compressive strengths of different types of cements used in construction
- 2.21 Use apparatus required for conducting compressive strength test on given cement sample
- 2.22 Explain the procedure for conducting compressive strength test on given cement sample
- 2.23 Find the compressive strength of given cement sample
- 2.24 Draw the inference by comparing the observations of compressive strength test on fresh and old cement samples
  
- 3.1 Calculate the fineness modulus of given sample of aggregate
- 3.2 State the significance of specific gravity and water absorption of fine and coarse aggregate used for construction
- 3.3 State the range of specific gravity values for various naturally available fine and coarse aggregate
- 3.4 State standards on water absorption of sand
- 3.5 Use apparatus required for conducting Specific gravity and water absorption test on given aggregate sample
- 3.6 Explain the procedure for conducting specific gravity and water absorption test on given aggregate sample
- 3.7 Find specific gravity and water absorption test on given aggregate sample
- 3.8 Explain the effect of bulking of sand on quantities of material and quality mortar and concrete

- 3.9 State the significance of bulking of sand on strength and durability properties of mortar and concrete
- 3.10 Use apparatus required for conducting bulking of sand test on given sand sample
- 3.11 Explain the procedure for conducting bulking of sand test on given sand sample
- 3.12 Draw the inferences from the observations of bulking of sand tests conducted on fine, medium and coarse sands
- 3.13 Explain the field method of adjustment for bulking of fine aggregate
- 3.14 Use apparatus required for conducting test to determine bulk density of coarse and fine aggregate
- 3.15 Find the bulk density of given sample of coarse and fine aggregate
- 3.16 Explain the effect of voids in coarse and fine aggregates on strength and durability properties of mortar and concrete
- 3.17 Use apparatus required for conducting tests to find percentage of voids present in aggregate
- 3.18 Find the percentage of voids present in given sample of aggregate
- 3.19 State the significance sieve analysis of fine and coarse aggregates on properties of concrete
- 3.20 State the grading limits of fine aggregate as per IS: 383-1970
- 3.21 Use apparatus required for conducting sieve analysis of fine aggregate

#### **Suggested Student Activities**

1. Collect the information with proper justification for the fine aggregates used for different constructional activities such as foundation, plastering, concreting etc mentioning zonal classification.
2. Take the students for industrial visit for a nearby industry Select any two materials used for various mechanical engineering applications. Compare their mechanical properties
3. Presentation on Strain gauges, strain indicators, extensometer.
4. Collecting different samples of materials from market and testing in lab
5. Collecting Specifications of various materials and correlate with standards.
6. Collecting and study of various IS codes regarding testing of materials
7. Field tests on various building materials such as cement, sand, brick etc as per codes.
8. Tech fest/Srujana
9. Paper/Poster presentation

10. Quiz
11. Group discussion
12. Surprise Test

### CO-PO Mapping Matrix

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

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

**Course Code: CE-309**

**Course Name: Material Testing Lab**

**Duration:1 hour**

**Max.Marks:20 Marks**

**Instructions to the Candidate:**

1 x 20 =20 Marks

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

***(ii) Check the suitability of the given construction material by drawing suitable inference***

- 1) Calculate the water absorption of given sample of bricks
- 2) Calculate the crushing strength of given sample of bricks
- 3) Determine the various parameters of stress strain curve for the given mild steel specimen.
- 4) Determine the Brinell's hardness number for the given metal sample
- 5) Determine the Rockwell's hardness number for the given metal sample
- 6) Find the Izod impact value for the given metal specimen
- 7) Find the Charpy impact value for the given metal specimen
- 8) Determine the Young's modulus of the given material by conducting deflection test under central point load

**State Board of Technical Education and Training, Telangana**  
**Mid Sem-II Model Question paper**  
**DCE III semester**

**Course Code: CE-309**

**Course Name: Material Testing Lab**

**Duration:1 hour**

**Max.Marks:20 Marks**

**Instructions to the Candidate:**

1 x 20 =20 Marks

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

***(ii) Check the suitability of the given construction material by drawing suitable inference***

- 1) Calculate the fineness of given sample of cement
- 2) Determine the Standard consistency of given sample of cement
- 3) Determine the initial setting time of cement
- 4) Calculate the compressive strength of given cement mortar cubes

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

**Course Code: CE-309**

**Duration: 2 hours**

**Course Name: Material Testing Lab**

**Max. Marks: 40 Marks**

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**Instructions to the Candidate:**

1 x 40 = 40 Marks

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

***(ii) Check the suitability of the given construction material by drawing suitable inference***

- 1) Calculate the water absorption of given sample of bricks
- 2) Calculate the crushing strength of given sample of bricks
- 3) Determine the various parameters of stress strain curve for the given mild steel specimen.
- 4) Determine the Brinell's hardness number for the given metal sample
- 5) Determine the Rockwell's hardness number for the given metal sample
- 6) Find the Izod impact value for the given metal specimen
- 7) Find the Charpy impact value for the given metal specimen
- 8) Determine the Young's modulus of the given material by conducting deflection test under central point
- 9) Calculate the fineness of given sample of cement
- 10) Determine the Standard consistency of given sample of cement
- 11) Determine the initial setting time of cement
- 12) Calculate the compressive strength of given cement mortar cubes
- 13) Calculate the Specific gravity and water absorption of given sample of aggregate
- 14) Determine the percentage of bulking in given sample of sand by field method
- 15) Calculate the Bulk density and percentage of voids in given sample of aggregate
- 16) Calculate the fineness modulus of given sample of aggregate

### **HU-310 - Communication and Life Skills Lab**

Course Title	Communication and Life Skills Lab	Course Code	HU-310
Semester	III	Course Group	Practical
Teaching Scheme in Periods- L: T:P	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

#### **Rationale:**

The course is designed to impart listening skills and life skills to the students of diploma which will help them a great deal in personal and professional fronts.

#### **Prerequisites:**

The course requires the basic knowledge of vocabulary, grammar, and four language learning skills, viz. Listening, Speaking, Reading and Writing.

#### **Course Contents**

##### **I. Listening Skills-I**

**Duration: 6 (L 2 P 4)**

- A paragraph
- A song
- A recipe
- A dialogue

##### **II. Life Skills – I**

**Duration: 6 (L2 P 4)**

###### **1. Introduction to Life Skills**

- What are life skills?
- Importance of life skills
- Practicing life skills

###### **2. Attitude**

- Features of attitude
- Attitude and behaviour
- Attitude formation
- Positive attitude
- Negative attitude
- Overcoming negative attitude
- Attitude at workplace

###### **3. Adaptability**

- Need for adaptability
- Willingness to experiment
- Fear of failure
- Think ahead
- Stay positive

- Open mind
- Curiosity
- Being in present

### III. Listening Skills – II

**Duration: 9 (L 3 P 6)**

- Biography
- Interview
- A Report
- Telephone Conversation

### IV. Life Skills – II

**Duration: 9 (L 3 P 6)**

#### 4. Goal setting

- Importance of setting goals
- What is goal setting
- Short term goals
- Long term goals
- Achieve goals using SMART

#### 5. Motivation

- Why motivation
- Characteristics of motivation
- Extrinsic motivation
- Intrinsic motivation

#### 6. Time Management

- Features of time
- Secrets of time management
- Time wasters
- Prioritisation
- Productive time
- Time Quadrant

### V. Life Skills – III

**Duration: 6 (L 2 P 4)**

#### 7. Creativity

- Flexibility
- Curiosity
- Determination
- Innovative ideas

#### 8. Critical Thinking

- Observation
- Curiosity
- Introspection
- Identify biases
- Critical Analysis

#### 9. Problem Solving and Decision Making

- Define the problem
- Generate Options



- Evaluate and choose an option
- Implement Solution
- Monitoring and seeking feedback

## **VI. Life Skills – IV**

**Duration: 9 (L 3 P 6)**

### **10. Leadership Qualities and Teamwork**

- Significance of Leadership
- Factors of leadership
- Leadership styles
- Leadership Skills
- Importance of Teamwork
- Characteristics of a good team
- Benefits of teamwork
- Problems of teamwork
- Qualities of team player

### **11. Stress Management/Managing Emotions**

- Components of Emotions
- Stress busters
- Managing Emotions
- Emotions at workplace

### **12. Core Human Values / Forming Values**

- Honesty and integrity
- Work Ethics
- Ego and Respect
- Trust and Truthfulness
- Social Responsibility
- Character formation
- Designing Destiny

**Course Outcomes:**

	At the end of the course the students will have the ability to:
<b>Listening Skills - I</b>	Identify the main or the central idea. Listen for specific details. Learn the pronunciation.
<b>Listening Skills - II</b>	Listen for drawing inferences. Listen for accuracy. Listen to convey ideas.
<b>Life Skills – I</b>	Know the Life Skills. Practice life skills for a better life. Think positively. Develop positive attitude. Overcome negative attitude. Develop adaptability in any situation.
<b>Life Skills – II</b>	Know the importance of setting goals. Set goals using SMART features. Get inspired to get success. Get personal and professional success. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.
<b>Life Skills – III</b>	Learn to be creative. Think innovatively. Know the reasons for a problem. Learn to overcome problems. Learn the various techniques to solve the problems. Learn to make proper decisions on time. Think ‘out of the box’. Think critically.
<b>Life Skills – IV</b>	Develop trust and confidence. To develop healthy and wealthy life. Know how to be a leader. Learn the qualities of a good leader. Learn the qualities of a good team. Learn the advantages and disadvantages of a team. Differentiate between Eu-stress and Distress. Manage stress effectively.

### CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
310.1	-	-	-	-	3		3	5,7
310.2	-	-	-	-	3	2	3	5,6,7
310.3	-	-	-	-	3	3	3	5,6,7
310.4	-	-	-	-	2	2	3	5,6,7
310.5	-	-	-	-	2	2	3	5,6,7
310.6		-	--	--	2		3	5,7

#### Suggested Student Activities:

- Listening Comprehension
- Seminars
- Presentations
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Find a solution to the problem
- Making innovative things through recycling
- Creating advertisements
- Five-minute activities on Life Skills
- Watching videos on life skills and making presentations
- Case studies
- Role Plays
- Dialogues

#### **Evaluation Pattern:**

##### **I. Continuous Internal Examination:**

**60 Marks**

- |  |   |
|--|---|
| <p>a. <b>Mid Sem- I</b></p> <p style="padding-left: 20px;">Syllabus:</p> <p style="padding-left: 40px;">i. Listening Skills - I</p> <p style="padding-left: 40px;">ii. Life Skills - I</p>               | 20 marks  |
| <p>b. <b>Mid Sem – II</b></p> <p style="padding-left: 20px;">Syllabus:</p> <p style="padding-left: 40px;">i. Listening Skills - II</p> <p style="padding-left: 40px;">ii. Life Skills - II</p>           | 20 Marks  |
| <p>c. <b>Internal assessment:</b></p> <p style="padding-left: 20px;">i. Seminars:</p> <p style="padding-left: 20px;">ii. Assignments:</p> <p style="padding-left: 20px;">iii. Lab record submission:</p> | <p>20 marks</p> <p>10 marks</p> <p>5 marks</p> <p>5 marks</p> |

## II. Semester End Examination :

40 Marks

- |                        |          |
|------------------------|----------|
| a. Listening:          | 10 Marks |
| b. Life Skills topics: | 15 Marks |
| c. <i>Viva Voce</i> :  | 15 Marks |

### References:

- a. Flint, Chris and Jamie Flockhart *Listening: A2 (Collins English for Life: Skills)* Collins. 2013
- b. Brown, Stephen E. *English in Everyday Life*. McGraw-Hill Education. 2008
- c. Mohanraj, Jayashree. *Let Us Hear Them Speak: Developing Speaking-Listening Skills in English*. Sage. 2015
- d. Susan Earle – Carlin. *Q Skills for Success: Listening and Speaking 5: Student Book with Online Practice*. Oxford University Press. 2013
- e. Kumar, Sanjay and Pushpa Latha. *Communication Skills: A Work Book*. Oxford University Press. 2018
- f. Carnegie, Dale. *The Leader in You*. Simon & Schuster: 1995
- g. Carnegie, Dale. *The Art of Public Speaking*. Prabhat Prakashan. New Delhi. 2013
- h. Kaye, Martin. *Goal Setting (Workbook Included): Goals & Motivation: Introduction To A Complete & Proven Step-By-Step Blueprint For Reaching Your Goals (Goal Setting Master Plan 1)*. Kindle Edition. MK Coaching. 2016.
- i. West, Steven. *Critical Thinking Skills: Practical Strategies for Better Decision making, Problem-Solving and Goal Setting*. Kindle Edition. 2018
- j. Tracy, Brian. *Goals*. Berrett-Koehler Publishers Inc. San Francisco. 2017
- k. Tracy, Brian. *Master your Time Master your Life*. Penguin Random House Inc. New York. 2017
- l. Sean Covey. *The 7 Habits of Highly Effective Teens*. Simon and Schuster, 2011

### E-Learning Resources:

- a. <http://www.bbc.co.uk/worldservice/learningenglish/youmeus/learnit/learnitv39.shtml>
- b. [https://www.examenglish.com/leveltest/listening\\_level\\_test.htm](https://www.examenglish.com/leveltest/listening_level_test.htm)
- c. [https://www.oxfordonlineenglish.com/listening?utm\\_referrer=https%3A%2F%2Fwww.google.co.in%2F](https://www.oxfordonlineenglish.com/listening?utm_referrer=https%3A%2F%2Fwww.google.co.in%2F)
- d. <https://takeielts.britishcouncil.org/prepare-test/free-ielts-practice-tests/listening-practice-test-1>
- e. <https://learnenglish.britishcouncil.org/en/listening>
- f. <https://www.cambridgeenglish.org/learning-english/activities-for-learners/?skill=listening>
- g. <https://www.businessenglishsite.com/business-english-listening.html>

**BOARD DIPLOMA EXAMINATION (C-21)**  
**MID SEMESTER EXAMINATION - I**  
**HU-310- COMMUNICATION AND LIFE SKILLS LAB**

**Time : 1 Hour**

**Total Marks: 20**

**Marks**

**Part – A**

**10 marks**

1. Listening Comprehension:

5 X 2 = 10

*(Teacher should give the questions before reading the passage given below)*

There are two problems which cause great worry to our educationists – the problem of religious and moral instruction in a land of many faiths and the problem arising out of a large variety of languages.

Taking up the education of children we see that they should be trained to love one another, to be kind and helpful to all, to be tender to the lower animals and to observe and think right. The task of teaching them how to read and write and to count and calculate is important, but it should not make us lose sight of the primary aim of moulding personality in the right way.

For this it is necessary to call into aid, culture, tradition and religion. But in our country, we have in the same school, to look after boys and girls born in different faiths and belonging to families that live diverse ways of life and follow different forms of worship associated with different denominations of religion. It will not do to tread the easy path of evading the difficulty by attending solely to physical culture and intellectual education.

It is not right for us in India to be dissuaded from this by considerations as to overtaking the young mind. What is necessary must be done and it is not in the fact too great a burden.

On the basis of reading the above passage, answer the following questions:

1. Which two problems have our educations to face?
2. What is the primary aim of the education of children?
3. How should the problem of religious and moral instruction be dealt with?
4. Which basic training is the writer talking about?
5. How can we serve the spiritual needs of school children?

**PART- B**

**10 Marks**

***Instruction: Answer any one of the questions in 150 words.***

2. What are the benefits of developing an optimistic sense towards your life?
3. Give an instance from your life when you adapted yourself to a new situation.

**BOARD DIPLOMA EXAMINATION (C-21)**  
**MID SEMESTER EXAMINATION - II**  
**HU-310- COMMUNICATION AND LIFE SKILLS LAB**

**Time : 1 Hour**

**Total Marks: 20 Marks**

**Part – A**

**10 marks**

1. Listening Comprehension:

5 X 2 = 10

*(Teacher should give the questions before reading the passage given below)*

Isaac Newton figured out why objects fall to the ground and why the planets move the way they do. Isaac Newton was born in Lincolnshire, England, in 1643. His father died before he was born but, despite having a difficult childhood, he gained a place at Cambridge University. When the plague broke out he was forced to stay at home and, with so much free time on his hands, Newton started to wonder about what made things fall.

Newton said that he was inspired to think about forces when he saw an apple fall from a tree. He came up with the theory of gravity, an invisible force that pulls all of the objects in the Universe together, and the reason things don't float off into the sky.

In 1685, Newton described his Laws of Motion – a mathematical guide to how an object's movement is affected by speed and mass. Two years later, Newton published his ideas about gravity in a book which contains many of the foundations of modern science.

Newton also invented a new kind of telescope called a reflector. It used a mirror to collect light instead of lenses, and was much more powerful than existing telescopes. He also showed that white light was made up of all the colours of the rainbow.

1. What did Isaac Newton find?
2. Where did Isaac Newton born?
3. Which disease broke out in his childhood?
4. What was the telescope that Isaac Newton invented?
5. From which colour rainbow is made up of?

**PART- B**

**10 Marks**

Instruction: Answer any one of the questions in 150 words.

2. What were the short term goals which you set to yourself and how you managed to achieve them in the recent past?
3. Explain -
  - i) how you prioritise your tasks.
  - ii) how you manage your time in the best possible way.

**BOARD DIPLOMA EXAMINATION (C-21)**  
**SEMESTER END EXAMINATION**  
**HU-310- COMMUNICATION AND LIFE SKILLS LAB**

**Time: 3 Hours**

**Total Marks: 40**

**Marks**

**Part – A**

**10 marks**

- 1. Listen to the following passage and answer the questions give below it. 5 X 2 = 10**  
*(Teacher should give the questions before reading the passage)*

Some of us think that writing is only for writers. But writing is for all of us. As Julia Cameron notes in her book *The Right to Write: An Invitation and Initiation into the Writing Life*, “I believe we all come into life as writers.” Writing can be beneficial for all of us, because it can be therapeutic. One of the most powerful parts of therapy is cultivating the ability to observe our thoughts and feelings, said Elizabeth Sullivan, a licensed marriage and family therapist in San Francisco. And that’s what writing helps us do.

“Most of us do not think in complete sentences but in self-interrupted, looping, impressionistic cacophony,” she said. Writing helps us track our spinning thoughts and feelings, which can lead to key insights (e.g., I don’t want to go to that party; I think I’m falling for this person; I’m no longer passionate about my job; I realize how I can solve that problem; I’m really scared about that situation.) Writing is “speaking to another consciousness – ‘the reader’ or another part of the self. We come to know who we really are in the present moment,” she said. Writing also creates a mind-body-spirit connection, she said. “When you use your hands to pen or type something directly from your brain, you are creating a powerful connection between your inner experience and your body’s movement out in the world.” We hold worries, fears and memories in our bodies, Sullivan said. When we use the body in positive ways – such as dancing or writing — we stay in the present moment, we inhabit our bodies, and we can heal ourselves, she said. “Writing is a small movement but it is incredibly powerful when you are writing down what is in your mind.”

Free writing or journaling is simply writing what’s on your mind. It’s letting it all hang out without censoring yourself. According to Sullivan, this could be: “Today I woke up and found the car window smashed and I wondered if the glass replacement guys go out at night and do it.”

“Poetry is a natural medicine; it is like a homeopathic tincture derived from the stuff of life itself—your experience,” writes John Fox in *Poetic Medicine: The Healing Art of Poem-Making*.

Sullivan suggested writing a short letter to a loved one. Imagine this person has written to you and asked you: “How are you doing, really?” Another exercise is to “write to someone with whom you have ‘unfinished business’ without sending it.” The goal is for you to gain a clearer understanding of your own thoughts and feelings about the person, she said.

*Answer the following questions:*

1. Why does Julia Cameron believe that we all come into life as writers
2. What is the most important therapeutic quality of writing?
3. Whose consciousness does a writer touch through his or her writing?
4. How does Elizabeth Sullivan describe our thinking? Why does she say so?
5. Which word in the passage means 'a coarse unpleasant noise'?

**Part – B**

**15 marks**

2. Seminar Presentations on Life Skills topics:

**Part – C**

**15 marks**

3. Viva Voce.



### CE-311-Skill Upgradation

Course Title	Skill Upgradation	Course Code	CE-311
Semester	III	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. Prepare a report on the significance of centroid of electric fan, moving vehicles and rotating shafts
2. Visit any nearby construction site and participate in various construction activities and write a report.
3. Make regular visits to ongoing Metro Rail Works and observe the advanced construction techniques used in Civil engineering and submit a report.
4. Collect and study different photographs of various types of foundations of Civil engineering works and prepare a report.
5. Compare the measured angles, Levels and Contours of the college campus obtained from Total station and the data obtained from Traditional Surveying instruments
6. Visit and submit a report on the usage of notches and weirs in a nearby canal/irrigation structure/dam site.
7. Visit a nearby power hydroelectric project and prepare a report on the types of turbines used
8. Notice the pumps used in your college and hospital for various purposes and prepare a report
9. Write a short notes on different types of integrals.
10. Prepare a notes on different methods to evaluate integrals.
11. List out Properties of definite integrals.
12. List out and explain various applications of definite integrals.
13. Explain the procedure to solve problems on Areas using integration
14. Explain the procedure to find volumes of irregular shapes of solids of revolution using integration.
15. Prepare a presentation to find Mean values and R.M.S values of any given function.
16. Explain the procedure to calculate approximate area by using Trapezoidal rule.
17. Explain the procedure to calculate approximate area by Simpson's 1/3 rule

18. Prepare a presentation on solving 1<sup>st</sup> order differential equations using any suitable method.

**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 for Activity assessment(in Applied Engineering Mathematics)**

CATEGORY	4	3	2	1
<b>Mathematical Concepts</b>	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.
<b>Procedures</b>	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.
<b>Explanation</b>	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.
<b>Working with Others</b>	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.
<b>Mathematical Errors</b>	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.

**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.