C24_CURRICULUM

DIPLOMA IN CIVIL ENFINEERING

Offered By

STATE BOARD OF

TECHNICAL EDUCATION AND TRAINING TELANGANA HYDERABAD

IV SEMESTER

S. NO	Course		Teaching Scheme					Examination Scheme						
			Instruction Periods per week			Total Periods per semester	Credits	Continuous Internal Evaluation (CIE)			Semester End Examination (SEE)			
	Code	Course Name	L	T	P			Mid Sem 1	Mid Sem 2	Internal Evaluation	Max marks	Min marks	Total Marks	Min marks for passing including internal
1	SC-401	Advanced Engineering Mathematics	4	1	0	75	2.5	20	20	20	40	14	100	End Marks shall be ≥35% of Topper Marks and Subject Total Shall be ≥ D-Hybrid Grade Minimum
2	CE-402	Reinforced Concrete Structures	4	1	0	75	2.5	20	20	20	40	14	100	
3	CE-403	Irrigation Engineering	4	1	0	75	2.5	20	20	20	40	14	100	
4	CE-404	Basic Quantity Surveying	4	1	0	75	2.5	20	20	20	40	14	100	
5	CE-405	Water Supply & Sanitary Engineering	4	1	0	75	2.5	20	20	20	40	14	100	
6	CE-406	Advanced Surveying	4	1	0	75	2.5	20	20	20	40	14	100	
7	CE-407	Civil Engineering Drawing	1	0	2	45	1.25	20	20	20	40	20	100	End Marks shall be ≥50% of Topper Marks and Subject Total Shall be ≥ D-Hybrid Grade Minimum
8	CE-408	Advanced Surveying Lab	1	0	2	45	1.25	20	20	20	40	20	100	
9	CE-409	Basic Civil Engineering CAD Lab	1	0	2	45	1.25	20	20	20	40	20	100	
10	HU-410	Employability Skills Lab	1	0	2	45	1.25	20	20	20	40	20	100	
			28	6	8	630	20	200	200	200	400	164	1000	

SC-401 - ADVANCED ENGINEERING MATHEMATICS

Course Title	**Advanced Engineering Mathematics**	Course Code	**SC-401**
Semester	**IV**	Course Group	**Foundation**
Teaching Scheme in Periods (L : T : P)	**4:1:0**	Credits	**2.5**
Methodology	**Lecture + Tutorial**	Total Contact Periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites:

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

Course Outcomes (Cos):

CO 1	Solve Differential Equations of first order and first degree with appropriate method
CO 2	Solve the higher order Homogeneous Linear Differential Equations with constant coefficients.
CO 3	Solve the Higher order Non-Homogeneous Linear Differential Equations with constant coefficients.
CO 4	Expand given functions as a Fourier Series in the given intervals.
CO 5	Find the Laplace Transforms of simple functions using its properties.
CO 6	Solve Linear Differential Equations with constant coefficient by using Laplace and inverse Laplace Transformations.

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

Course Contents:

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

Differential Equations of First Order and First Degree: Definition of a Differential Equation - Order and Degree of a Differential Equations-Formation of Differential Equations - Solutions of Ordinary Differential Equations of first order and first degree: Variable Separable Method, Homogeneous Differential Equations, Exact Differential Equations,

Linear Differential Equations and Bernoulli's Equation-Problems leading to engineering applications by using above methods.

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

Higher order Homogeneous Linear Differential Equations with constant coefficients: Homogenous Linear Differential Equations with constant coefficients of second and higher order-Problems leading to engineering applications.

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

Higher order Non-Homogeneous Linear Differential Equations with constant coefficients: Complimentary Function (C.F), Particular Integral (P.I) and General Solution (G.S) of Non- Homogeneous Linear Differential Equations with constant coefficients-Second and Higher order Non- Homogenous Linear Differential Equations with constant coefficients of the form $f(D)y = X$, where $f(D)$ is a polynomial in D and X is in the form k(a constant), e^{ax}, Sin (ax), Cos ax, x^n (n= 1,2,3)- Related engineering problems with emphasis on second order Non-Homogeneous Linear Differential Equations.

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

Fourier Series: Periodic functions - Orthogonality Property of Trigonometric functions - Representation of a function as Fourier series over the interval $(c, c + 2\pi)$ - Euler's formulae - Sufficient conditions for existence of Fourier series for a function $f(x)$ - Fourier series of functions over the interval $(0, 2\pi)$ and $(-\pi, \pi)$ - Fourier series of odd and even functions in the interval $(-\pi, \pi)$.

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

Laplace Transformations: Definition of Laplace Transform -Sufficient conditions for Existence of Laplace Transform, Laplace Transform of some elementary functions -Linearity Property -First Shifting Theorem - Laplace Transforms of Derivatives - Laplace Transforms of Integrals - Multiplication t^n -Division by t - Related problems.

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

Inverse Laplace transforms and Applications of Laplace Transformations: Definition of Inverse Laplace Transform- Inverse Laplace Transform of elementary functions – Linearity Property – First Shifting Theorem - Inverse Laplace Transforms by using Partial fractions - Inverse Laplace Transform of Derivatives - Inverse Laplace Transform of Integrals - Multiplication by s^n Division by s-Definition of Convolution of two functions –Convolution Theorem (without proof) and its Applications -Applications of Laplace Transforms in solving Second order Linear Differential Equations with constant coefficients under the Initial conditions-Problems leading to engineering applications.

Reference Books:

1. Advanced Engineering Mathematics-Erwin Kreyszig, John Wiley Publications.

2. Advanced Engineering Mathematics- R.K. Jain and S.R.K. Iyengar, Narosa Publications.
3. Higher Engineering Mathematics-B.S.Grewal, Khanna Publications.
4. Laplace Transforms - Murray R. Spigel, Schaum's Outline Series, McGRAW-HILL.
5. Integral Transforms – A.R. Vasishtha and R. K. Gupta,Krishnan Prakashan Publications.

Suggested E-Learning references:

1. https://www.khanacademy.org/
2. https://www.wolframalpha.com/
3. https://onlinecourses.swayam2.ac.in/
4. http://tutorial.math.lamar.edu/

Suggested Learning Outcomes:

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

CO1: Solve Differential Equations of first order and first degree with appropriate method

1.1 Explain the concept of Differential Equations.
1.2 Classify the Differential Equations.
1.3 Find the order and degree of Differential Equations.
1.4 Form a Differential Equation by eliminating arbitrary constants.
1.5 Solve the first order first degree Differential Equations by using Variables Separable Method.
1.6 Solve the first order first degree Homogeneous Differential Equations.
1.7 Solve the first order first degree Exact Differential Equati
1.8 Solve the first order Linear Differential Equation of the form $\frac{dy}{dx} + \text{Py} = \text{Q}$,where P and Q are functions in *x* alone or constants.
1.9 Solve the first order Bernoulli's equations of the form $\frac{dy}{dx} + \text{Py} = \text{Q}y^n$,where P and Q are Functions of *x* alone or constants.
1.10 Solve the problems leading to engineering applications by using above methods.

CO2: Solve the Higher order Homogeneous Linear Differential Equations with constant coefficients.

2.1 Solve Differential Equations of the type:$a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = 0$,where *a*, *b* and *c* are constants, when the roots of the Auxiliary Equation are real & distinct.
2.2 Solve Differential Equations of the type:$a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = 0$,where *a*, *b* and *c* are constants, when the roots of the Auxiliary Equation are real & equal.
2.3 Solve Differential Equations of the type: $a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = 0$,where *a*, *b* and *c* are constants, when the roots of the Auxiliary Equation are complex conjugate pair.
2.4 Solve the Higher order Homogeneous Linear Differential Equations with constant coefficients.

CO3 Solve the Higher order Non-Homogeneous Linear Differential Equations with constant coefficients.

3.1 Explain the concept of Complementary Function and Particular Integral to get General Solution of Non-Homogeneous Linear Differential Equation with constant coefficients.

3.2 Solve the Higher order Non-Homogeneous Linear Differential Equations of the type $f(D)\,y = X$, where f(D)is a polynomial in$D$and X is a function of the form: k (constant) and e^{ax}.

3.3 Solve the Higher order Non-Homogeneous Linear Differential Equations of the type $f(D)\,y = X$, where f(D) is a polynomial in D and X is a function of the form: Sin ax and Cos ax.

3.4 Solve the Higher order Non-Homogeneous Linear Differential Equations of the type $f(D)\,y = X$, where f(D) is a polynomial in$D$and X is a function of the form x^n (n = 1, 2, 3).

3.5 Solve engineering problems with emphasis on second order Non-Homogeneous Linear Differential Equations by using above methods.

CO4 Expand given functions as a Fourier Series in the given intervals.

4.1 Define Periodic function with examples

4.2 Explain the Orthogonality Property of functions in an interval.

4.3 Define the Fourier series of a function in the interval (c, c+2π) and state Euler's Formulae for determining the Fourier coefficients.

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

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

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

CO5 Find the Laplace Transforms of simple functions using its properties

5.1 Define Laplace Transform.

5.2 Explain sufficient conditions for existence of Laplace Transform.

5.3 Obtain Laplace Transforms of some elementary functions.

5.4 State the Linearity Property of Laplace transforms.

5.5 State the First Shifting Theorem on Laplace Transforms.

5.6 Explain the Laplace transform of $f'(t)$and $f^{(n)}(t)$in terms of Laplace transform of f(t).

5.7 Explain the Laplace transform of $\int_0^t f(u)du$ in terms of Laplace transform f(t).

5.8 Explain the Laplace transform of $t^n f(t)$in terms of Laplace transform of f(t).

5.9 Explain the Laplace transform of $\frac{f(t)}{t}$ in terms of Laplace transform of f(t).

5.10 Solve problems on above methods.

CO6 Solve Linear Differential Equations with constant coefficient by using Laplace and inverse Laplace Transformations

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

6.2 State the Linearity Property of Inverse Laplace transforms.

6.3 State the First Shifting Theorem on Inverse Laplace Transforms.

6.4 Solve problems on Inverse Laplace transforms using Partial fractions.

6.5 Explain Inverse Laplace transforms of the functions: $s^n f(s), \frac{f(s)}{s}$, $f^{(n)}(s)$, $\int_s^\infty f(u)du$.

6.6 Solve the problems on 6.2, 6.3, 6.4 and 6.5.

6.7 Acquire the knowledge of convolution of two functions and state the convolution theorem.

6.8 Evaluate Inverse Laplace transforms of simple functions using Convolution Theorem.

6.9 Use Laplace and Inverse Laplace Transforms to solve second order Linear Differential Equations with constant coefficients under the initial conditions.

6.10 Solve the problems leading to engineering applications.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz.
3. Group discussion.
4. Group Tests.
5. Surprise tests.
6. Seminars.
7. Home Assignments.
8. Mathematics for preparing competitive exams and solving old question papers on Arithmetical ability.

CO-PO Mapping Matrix

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

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

DIPLOMA EXAMINATIONS (C - 24)

SC-401 SEMESTER IV, MID –I EXAM, MODEL PAPER

ADVANCED ENGINEERING MATHEMATICS

(Open Book System)

Duration : 1: 00 Hour **Max. Marks: 20**

PART-A

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

2 Each question carries **ONE** mark.

1. Find the order and degree of the differential Equation $\left(\frac{d^3y}{dx^3}\right)^4 + 3\left(\frac{d^2y}{dx^2}\right)^3 - 5\frac{dy}{dx} + y = 0$.

2. Find the Integrating Factor of $(1+x^2)\frac{dy}{dx} + 2xy = \frac{1}{1+x^2}$.

3. Find the roots of auxiliary equation of the differential equation $(2D^2 + 5D - 3)y = 0$.

4. Write the auxiliary equation of the differential equation $a_3\frac{d^3y}{dx^3} + a_2\frac{d^2y}{dx^2} + a_1\frac{dy}{dx} + a_0y = 0$.

PART-B

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

2. Each question carries **THREE** marks.

5(a) Form the differential equation by eliminating arbitrary constants A and B in the family of curves $y = Acos\,mx + Bsin\,mx$, where *m* is a constant.

OR

5(b) Solve $\frac{dy}{dx} - ytanx = 0$.

6(a) Solve $6\frac{d^2x}{dt^2} - \frac{dx}{dt} - 2x = 0$.

OR

6(b) Solve $(D^2-4)^2y = 0$.

PART- C

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

2. Each question carries **FIVE** marks

7(a) Solve $xy^3dy = (x^4 + y^4)dx$.

OR

7(b) Solve $(x^4 - 2xy^2 + y^4)dx - (2x^2y - 4xy^3 + siny)dy = 0$.

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

OR

8 b) Solve $(D^3 - 8)y$ =0.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24) SC-401
SEMESTER IV, MID –II EXAM, MODEL PAPER
ADVANCED ENGINEERING MATHEMATICS
(Open Book System)

Duration: 1: 00 Hour **Max. Marks: 20**

PART-A

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

2. Each question carries **ONE** mark.

1. Find the Particular Integral of $(D^2 - 5D + 6)y = e^{-x}$.
2. Find the Complementary Function of $2\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - 5y$ = 6 sin 2x.
3. Find a_0 for f(x) = x Cos x in $-\pi < x < \pi$.
4. Find b_1 for f(x) =x in $0 < x < 2\pi$.

PART-B

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

2. Each question carries **THREE** marks.

5(a) Find Particular Integral of $(D^2 - D - 6)y = e^x cosh3x$.

OR

5(b) Solve $(D^2 + 2025)y = \sin 45x$.

6(a) Calculate a_1 in the Fourier series expansion of f(x) = x sin x in the interval (– π, π).

OR

6(b) Find the value of b_n in the expansion of Fourier series for the function f(x) = e^{3x}, where 0 <x< 2 π.

PART- C

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

2. Each question carries **FIVE** marks

7(a) Solve $(D^2 - 3D + 2)y = e^x$ if y = 3 and $\frac{dy}{dx} = 3$, when $x = 0$.

OR

7 (b) Solve $y'' + y = x, y(0) = y'(0) = 1$.

8(a) Obtain Fourier series expansion of $|x^3|$ in the interval $(-\pi, \pi)$.

OR

8(b) Obtain Fourier series expansion of $f(x) = \begin{cases} x \ \ if\ 0 < x < \pi \\ 2\ if\ \pi < x < 2\pi \end{cases}$.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24)
SC-401 SEMESTER IV, SEMESTER END EXAM, MODEL PAPER
ADVANCED ENGINEERING MATHEMATICS

(Open Book System)

Duration: 2: 00 Hours **Max. Marks: 40**

PART-A

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

2 Each question carries **ONE** mark.

1. Find the order and degree of the Differential Equation $2y''' - 3y' = y$.
2. Find the Particular Integral of $(D^2 + 1)y = e^{\frac{x}{2}}$
3. Find $L(e^{-5t} + 7)$.
4. Verify the differential equation $(x + 2y - 2025)dy - (2x - y + 2024)dx = 0$ is homogeneous or not.
5. Find $L(5\cos 3t + 7\sinh 2t)$.
6. Find $L(te^{\omega t})$.
7. Find $L^{-1}\left(\frac{s}{s^2+81}\right)$.
8. Find $L^{-1}\left(\frac{3}{(s-3)^2}\right)$.

PART-B

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

2. Each question carries **THREE** marks.

9(a) Solve $(9D^2 - 24D + 16)y = 0$.

OR

9(b) Evaluate $L(2\cos^2 3t)$.

10(a) Solve $(D^2 + D - 2)y = 16$.

OR

10(b) Evaluate $L^{-1}\left(\frac{6}{s^2-4s+7}\right)$.

11(a) Evaluate $L(2\cos^2 3t)$.

OR

11(b) Evaluate $L(5e^{3t}\cosh 2t)$.

12(a) Evaluate $L^{-1}\left(\log\left(\frac{s-2}{s+3}\right)\right)$.

OR

12(b) Evaluate $L^{-1}\left(\frac{1}{s^2(16+s^2)}\right)$.

PART- C

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

2. Each question carries **FIVE** marks.

13(a) Solve: $xlogx\frac{dy}{dx} + y = \frac{logx}{x}$.

OR

13(b) Evaluate $L\left[e^{2t}\left(\frac{1-cos3t}{t}\right)\right]$.

14(a) Obtain the Fourier series expansion of the function f(x) = $|sinx|$ in $(-\pi, \pi)$.

OR

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

15(a) Evaluate $L(f(t))$, where $f(t) = \begin{cases} t & if\ 0 \le t < 2 \\ 3 & if\ t \ge 2 \end{cases}$.

OR

15(b) Evaluate $L\left((t^2 + 2t + 3)\sin 2t\right)$.

16(a) Evaluate $L^{-1}\left(\frac{1}{(s+1)(s+3)}\right)$ using Convolution Theorem.

OR

16(b) Solve the Differential Equation $\frac{d^2x}{dt^2} + 4x = 0$, when y(0) = $y'(0) = 1$ by using Laplace

Transform method.

CE-402-REINFORCED CONCRETE STRUCTURES

CourseTitle:	Reinforced Concrete Structures	CourseCode	CE-402
Semester:	IV Semester	CourseGroup	Core
TeachingSchemeinPeriods(L:T:P)	4:1:0	Credits	2.5
Methodology:	Lecture+Tutorials	TotalContactPeriods	75
CIE	60Marks	SEE	40Marks

Prerequisites

Thiscourse requirestheknowledge of Building materials, Construction practice, EngineeringMechanics and Strength of Materials

Course Outcomes

Uponthecompletionofthecourse, thestudentshall beable to

CO1	IllustratethebasicconceptsofRCC designbylimitstate,identifygradesof concreteandsteel andcalculate theloads actingon thestructure
CO2	Analyse and Design a rectangular beam
CO3	Discusstheprocedure and designaslab consideringboundaryconditions
CO4	Calculatestrengthof aflangedsectionasper code
CO5	Determinethedesignmomentsandforcesincontinuousbeamsandslabsasper codalprovisions and sketch the reinforcement details
CO6	Design a short column and footingaccordingto codalprovisions

CourseContentand BluePrint ofMarksforSEE

Unit No	UnitName	Periods	Questionsto beset forSEE			
			R		U	A
1	IntroductiontoR.C.Cand Philosophy of LimitStatedesign	10	Q4	Q1	Q9(a)	Q13(a)
2	AnalysisandDesign ofRectangularBeams	15				
3	DesignofSlabs	15		Q2	Q10(a)	Q14(a)
4	AnalysisofT-beams	10				
5	PrinciplesofdesignofContinuousbeamsand Slabs	12		Q3 Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Design of columns andfootings	13		Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		75	8		8	8

CourseContents

UNIT1:IntroductiontoR.C.C.andPhilosophyofLimitStateDesign

Duration:10Periods(L:8–T:2).

a) IntroductiontoR.C.C
b) CodesofpracticeofR.C.Cdesign
c) Study of IS 456-2000, SP-16, IS 13920-2016, SP-34, IS 875-2015
d) NominalMix–DesignMix–differences.
e) Loadstobeadoptedin R.C.C.design
f) Load transfer mechanism over individual structural elements.
g) PropertiesofConcrete
h) MethodsofdesigningR.C.elements
i) Strengthandserviceabilitylimitstates,characteristicstrengthofmaterialsandcharacteristicloads and partial safetyfactors.
j) Designstrengthofmaterialsanddesignloads.

UNIT2:Analysisanddesign ofRectangularbeams

Duration:15Periods(L:12–T:3)

a) Assumptions made in the limit state design of flexure.
b) Stress-straindiagramofsinglyreinforcedRCCbeam.(Noderivations).
c) Depthofneutralaxis,leverarm.
d) Momentofresistanceofsinglyreinforcedrectangularsection
e) Criticalpercentageofsteel.
f) Calculationofmomentofresistanceofthegivensectionanddesignofsinglyreinforcedrectangular beamforthegivenload.
g) Doublyreinforced sections–necessity, use.
h) Calculationofneutralaxisandmomentofresistance of doubly reinforced rectangular beamforthegivensection
i) Shearin singlyreinforced beams
j) Methods of providingshear reinforcement-verticalstirrups,combinationofverticalstirrupsand bent up bars.
k) Codalprovisionsforspacingofstirrupsandminimumshearreinforcement
l) Developmentofbondstress inreinforcingbars.
m) Designbondstress–developmentlength–bondandanchorageconceptsandtheirimportance.
n) Curtailmentoftensionreinforcement-codal provisions.
o) Simpleproblemsondevelopmentlength.

UNIT3: Design ofslabs

Duration:15Periods (L:12 –T:3)

a) Slabsasstructuralandfunctionalmembers
b) Onewayandtwowayslabs
c) General Design Considerations - Minimum reinforcement, maximum spacing of reinforcement, maximum diameter, concrete cover -stiffness criteria- stiffness ratios for simply supported, continuousslabs.
d) Onewayand two wayslabs withvarious end conditions.
e) Designofone-wayslabforflexureandcheck for shear - Checkfordeflectionusingsimplifiedapproachof stiffnesscriteria.
f) Designoftwo-wayslabswithdifferent end conditions,
g) Designoftorsionreinforcementfortherestrainedslabs– Deflectioncheckusingstiffnesscriteria

UNIT4:AnalysisofT-beams

Duration:10Periods(L: 8–T:2)

a) ConditionsneededfordesignofabeamasT-Section– advantages,Codalprovisionsforeffectiveflangewidth-threecases ofTbeams.
b) Neutralaxis,leverarmandmomentofresistanceforunderreinforced,balancedsectionsusingthe equations givenin the code(noderivations).
c) Calculation of the moment of resistance of T- section using the equations given inthecode

UNIT5:PrinciplesofDesignofContinuousbeamsand slabs

Duration:12Periods(L:10–T:2)

a) Behaviorofcontinuousmembersandadvantagesofcontinuousbeamsand slabs.
b) DeterminationofB.MandS.Fofcontinuousbeamsandslabsofminimumthreespansusing BM &SFcoefficientsgivenin thecode
c) Sketch the detailingof reinforcementinacontinuousbeamofthreespans.

UNIT6:Design of Columnsandfootings

Duration:13Periods(L:10–T:3)

a) Typesofcolumns(Longand Short) -effectivelength fordifferentendconditions.
b) Codalprovisionsfordesignofcolumns- square,rectangularandcircularcolumnswithlateral ties and helical reinforcement
c) DeterminationofLoadcarryingcapacityofshortcolumn- square,rectangular,circularcolumnsubjected toaxial loadonly.
d) Designofshortcolumns -square,rectangular andcircularcolumnsusinglongitudinalreinforcementandlateralties
e) Footings-Types
f) Footingsunderisolatedcolumns
g) Codalprovisionsfordesignof footings-sizeoffootingsforgiven bearingcapacity

h) Procedureofcheckingthefootingforone-wayshear,two-wayshear,bearingstressandfor development length.

i) Design of an isolated square footing of uniform thickness under asquarecolumn for flexureonly.

RecommendedBooks

1. IS:456-2000
2. IS:875-2015
3. IS : 13920-2016
4. SP:16 - Design Aids for Reinforced Concrete to IS456
5. SP:34-Handbookonconcrete reinforcementanddetailing
6. Design of Reinforced Concrete StructuresbyS.Ramamrutham.
7. Design of Reinforced Concrete StructuresbyV.N.VaziraniandM.M.Ratwani.
8. Illustrated Design of R.C. Buildings by Dr. V. L. Shah & Dr. S. R. Karve, Structures Publications, Pune
9. ReinforcedConcreteDesign"bySUnnikrishna Pillai&DevdasMenon Tata McGraw-HillPublishingCo.Ltd.New Delhi
10. "LimitStateDesignofReinforcedConcrete"byP.C.Varghesen Prentice-Hallof IndiaPvt.Ltd. New Delhi
11. LimitStateDesignofR.C.CStructuresbyAshok K.Jain Nemchandbrothers,Roorkee. " CONCRETETECHNOLOGY: Theoryandpractice"byM.SShetty, S.Chand&Co.Ltd.,New Delhi
12. "ConcreteTechnology"byA.R.Santhakumar,Oxforduniversitypress

SuggestedE-learningreferences

1. http://nptel.ac.in
2. https://freevideolectures.com/Course/2686/Design-of-Reinforced-Concrete-Structures

SuggestedLearningOutcomes

Aftercompletion of thecourse,thestudentshallbeableto

SuggestedLearningOutcomes

Aftercompletion of thecourse,thestudentshallbeableto

CO1 - Illustrate the basic concepts of RCC design by limit state, identify grades of concrete and steel and calculate the loads acting on the structure

1.1 DifferentiatePlainCementConcreteandReinforcedCementConcrete.
1.2 Statethe necessityof reinforcement inplain concrete
1.3 Statetheadvantagesand disadvantagesofR.C.C.
1.4 Identifythe materialused in R.C.C.and theirfunctionin R.C.C.
1.5 ExplainthedifferentcodesusedindesignofR.C.elements
1.6 Listthe Loadstobe consideredinthedesignofR.C. elements.
1.7 Explain the Load transfer mechanism over individual structural elements.

1.8 Statethedifferentmethods ofdesigningR.C.elements.
1.9 Statethedifferentgradesofconcrete
1.10 Differentiatethenominal mix concreteanddesignmix concrete.
1.11 State theequationsoftensilestrengthandmodulusofelasticityofconcreteasper IS456 – 2000.
1.12 Calculatethepropertiesofconcrete:Poisson'sratio,creep,shrinkage,workabilityandunit weight, CompressiveStrength/GradeofConcrete,TensileStrength
1.13 Statethedifferent typesofsteel asper IS 456–2000.
1.14 Statethemodulus ofelasticityandunitweight of steel.
1.15 DefineLimitStateandStatedifferentlimitstates.
1.16 Distinguish'strength'and'serviceability'limitstates
1.17 StatethedifferentIS:456 –2000codeprovisions for Limitstatemethodofdesign.
1.18 Definethe'characteristicstrength'ofmaterialsand'characteristicloads'
1.19 Explainthe roleofpartialsafetyfactorsin limitstate design.
1.20 Define'Designstrengthofmaterials'and'Design loads'

CO2 - Analyse and Design a rectangular beam

2.1 Statetheassumptions madeinthelimitstatedesign of flexure.
2.2 DrawtheStressandstraindiagramsforasinglyreinforcedrectangularbeamindicating appropriate stress and strain values in compression zone and tension zoneofthe beam.
2.3 Calculatethetotalcompressiveforceandtotaltensileforceresistedbythesinglyreinforcedrectangular beam.
2.4 Calculatethedepthof neutralaxis fromtheequilibriumcondition
2.5 Defineleverarmandwritetheequationforleverarmfor asinglyreinforcedrectangularbeam.
2.6 Definecriticalorbalancedsection,underreinforcedsectionandoverreinforcedsection.
2.7 Explain-whytheover reinforcedsectionsarenotrecommended?
2.8 Calculatethemaximumdepthofneutralaxis,limitingvalueofmomentofresistancewith respecttoconcreteand steeland limitingpercentageof steel.
2.9 State the general design requirements for beams in limit state design as per IS 456 – 2000(Effective span, limiting stiffness, minimum tension reinforcement, maximumtension reinforcement, maximum compression reinforcement, spacing of main bars,Coverto reinforcement, side facereinforcement.)
2.10 Calculate the depth of neutral axis for a given section and decides the section isbalancedorunderreinforcedoroverreinforcedandaccordinglycalculatesthemomentof resistancefor the respectivecase.
2.11 Calculatetheareaof steelfora given beamwithgivencross sectionandloading.
2.12 Explaintheeffectofshearon beam.
2.13 Explain the shear stress distribution across a homogeneous section and reinforcedconcretesection with sketches.
2.14 Calculate the design shear strength and maximum shear stress in different grades ofconcreteas perIS 456–2000.

2.15 State the necessity of shear reinforcement and different formsofshearreinforcementprovided in beams

2.16 Showthecriticalsectionforshear.

2.17 Calculatetheshearstrengthofconcrete,shearresistanceofverticalstirrups,shearresistanceof bent up barsas perIS 456– 2000.

2.18 Calculatetheminimumshearreinforcementandmaximumspacingofshearreinforcement as perIS 456– 2000.

2.19 Calculatethenominalshearstress,shearresistedbybentupbarsandspacingofverticalstirrups.

2.20 Designtheshearreinforcementforbeams.

2.21 Statethe situations which requiredoublyreinforced beams.

2.22 Determinethemomentofresistanceforagivendoublyreinforcedsection

2.23 Calculatetheallowableworkingloadonsinglyreinforcedanddoublyreinforcedbeamforthegiven span.

2.24 Calculatethedevelopmentlength ofbarsin compressionandtension.

2.25 Sketch the detailing of reinforcement showing the curtailment positionformain tension bars.Statethe importanceofanchoragevaluesof reinforcement.

CO3 - Discuss the procedure and design a slab considering boundary conditions

3.1 Distinguish one wayslabsandtwowayslabs.

3.2 Listthetypes ofslabs basedon supportcondition.

3.3 Statethegeneraldesignrequirementsof slabsasper IS456–2000.

3.4 Statethefunctionsof distributionsteelinslabs.

3.5 Sketch the general reinforcement details for a a) oneway slab simply supported ontwo parallel sidesb) oneway slab simply supported on four sides c) two way simplysupported slab d) one-way continuous slab e) cantilever slab continuous over asupportand f)slabcantileveringfrom the top of abeam.

3.6 Markthe edgestrip andmiddle strip ofatwo wayslab.

3.7 Sketch the general reinforcement details for a continuous two way slab for its edgestripand middlestrip usingstraight bars andbentup bars.

3.8 Design one-way slab for given grades of materials, loads and span for flexure andincludingshear check, check fordeflectionusingstiffness criteria.

3.9 Sketch load distribution in two-way slabs. Design two-way slab with different endconditionsforflexureincludingshearusingB.MandS.Fcoefficients.Providetorsional reinforcement in the restrained slabs. Check the deflection using simplifiedapproachof stiffnesscriteria.

CO4 - Calculate strength of a flanged section as per code

4.1 Listtheadvantagesof a T-beam.

4.2 Statetheformulaforeffectivewidthofflangeofa T-beamandL-beamasperIS456 – 2000.

4.3 Calculatetheeffectivewidthofflangeofanisolated T-beamas perIS 456–2000.
4.4 DescribethethreecasesofdeterminingneutralaxisofT-beamswithsketchesandnotations.
4.5 Calculatethedepthofneutralaxisandmomentofresistanceofthegiven Tsectionusingthe expressionsgiven in the code.
4.6 Calculatetheminimum and maximumreinforcement in T-beams asper 456 – 2000.

CO5 - Determine the design moments and forces in continuous beams and slabs as per codal provisions and sketch the reinforcement details

5.1 Explainthebehaviorofcontinuousslabsandbeams subjectedtoloading.
5.2 Listtheadvantagesof continuousbeamsorslabs.
5.3 Drawthelinediagramofacontinuousslaborbeamandindicatethebendingmomentand shear force values at salientpoints asper IS 456–2000.
5.4 Showthepositionofsagging(+ve)andhogging(-ve)bendingmomentsalongthecontinuousbeam or slab.
5.5 Sketchthegeneralreinforcement detailsforacontinuousbeamorslab.
5.6 CalculatestheB.MandS.Fofcontinuousbeamsandslabs(Minimumofthreespans)at criticalsectionsusingB.MandS.Fcoefficientsgiven inthecode.

CO6 - Design a short column and footing according to codal provisions

6.1 Statethe necessityof providingreinforcement in column.
6.2 Explainthebehavior ofcolumn underloading
6.3 Defineandcalculatetheeffectivelengthofcolumnfordifferentendconditionsaspertheory and as per code.
6.4 Classifythecolumnsbasedontypeofreinforcement,loadingandslendernessratio.
6.5 Calculatetheslendernesslimitsforcolumntoavoidbucklingofcolumn.
6.6 Calculateminimumeccentricityof column.
6.7 Calculatetheloadcarryingcapacityofashortcolumnwithlateralties
6.8 Differentiatebetweenshortandlongcolumnsandunderstandtheirfailure behavior.
6.9 StatethedesignrequirementsofcolumnsasperIS456 –2000.
6.10 DesignaShortSquare,rectangular,circularcolumnwithlateraltiesandlongitudinalreinforcement (subjected to axial load only).
6.11 DefineFootingandStatedifferenttypesofFootings(Square/RectangularIsolatedfootings of Uniform/Tapered sections).
6.12 Calculatetheminimumdepthoffoundationusing Rankine's formula.
6.13 StatethecodeprovisionsforthedesignofR.C.Cfootings.
6.14 Explaintheprocedureofcheckingthefootingforone-wayshear,two-wayshear,bearingstressand for development length. (Not for examination)
6.15 Design of an isolated square footing of uniform thickness under asquarecolumn for flexureonly.

Note: Studentsmaybeencouragedtousedesignaids SP-16 fordesignofslabs,beams for general practice and SP-34 for Reinforcement & detailing.I.S.456–2000 isallowed in theExamination.

SuggestedStudentActivities

1. Visittonearbymulti-storeyedbuilding/Apartmentandcollectthestructuraldetails.
2. Design the structural elements-Beams, slabs and columns for residential building (One andTwostoreybuilding).
3. Prepare a case study of failure of structures due to wrong design, use of poor quality ofmaterialsand faultyconstruction methods.
4. Understandthe conceptofformwork fordifferenttypesofbuildingsandcollectinformationaboutstrippingtimes forforms fordifferentconditions.
5. CollecttheIScodesrelatedtoDesignofRCCstructures,makeareportandpresentit
6. Techfest/Srujana
7. Paper/Posterpresentation
8. Quiz
9. Groupdiscussion
10. SurpriseTest

CO-POMappingMatrix

	Basic and DisciplineSpecificKnowledge	ProblemAnalysis	Design/DevelopmentofSolutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and	ProjectManagement	LifelongLearning	LinkedPO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	1	2	2	1	1	1	2	1,2,3,5,6,7
CO2	2	3	3	2	1	1	2	1,2,3,5,6,7
CO3	2	3	3	2	1	1	2	1,2,3,5,6,7
CO4	2	2	2	1	1	1	2	1,2,3,5,6,7
CO5	2	2	2	1	1	1	2	1,2,3,5,6,7
CO6	2	2	2	1	1	1	1	1,2,3,5,6,7

State Board of Technical Education and Training,
TelanganaModelQuestion paper
DCEIVsemester MidSemester-IExamination

CourseCode:CE-402 **Duration:1 Hour**
CourseName:ReinforcedConcreteStructures **Max.Marks:20Marks**

PART-A

Answer**all**questions,EachQuestioncarries **one**mark **4x1=4Marks**

1. Definedesignstrengthofmaterialanddeignload.
2. Findmodulusof elasticityofconcreteasperIS456-2000forM30concrete.
3. Listvariousformsofshearreinforcementinbeams.
4. Definedevelopmentlength.

PART-B

Answer**two**questions.Eachquestioncarries **three**marks **2x 3=6 Marks**

5(a)Explainhowthemaximumstrengthofconcreteinoutermostfibreofcompressionistakenas0.446$f_{ck.}$

(OR)

5(b)Explain limitstateof collapseand serviceabilityconditions.

6(a)Find the limiting moment of resistance of a singly reinforced beam of size 200 x400mm, useM20gradeconcreteandFe415steel, effectivecovertoreinforcement is25mm.

(OR)

6(b)Calculate the spacing of two legged 8mm stirrups as per min. shear reinforcement for a beam350mmwideand 500mm overall depth of Fe415steel.

PART-C

Answer**two**questions.Eachquestioncarries**five**marks **2x 5 =10 Marks**

7(a)Explaintheproperties of Concrete.

(OR)

7(b)Drawthestress-straindiagramforconcrete,mild steelbarsandcolddeformedbars.

8(a)ASinglyreinforcedRCbeamsimplysupportedoveraneffectivespanof4m,carriesaudlof10kN/m overentirespan. Design thebeam usingM20gradeconcreteandFe415 steel.

(OR)

8(b)Singlyreinforcedrectangularbeam300X600mmeffectivedepthcarriesauniformlydistributedloado f40kN/mincludingitsself-weightoversimplysupportedspanof6 mand is reinforced with 6 bars of 20 mm diameter of which 2 bars are curtailed nearthesupport.Design theshear reinforcement.Use M20gradeconcreteandFe415steel.

StateBoardofTechnicalEducation andTraining,Telangana
ModelQuestionpaper
DCEIVsemester MidSemester-IIExamination

CourseCode:CE-402 **Duration:1 Hour**
CourseName:ReinforcedConcreteStructures **Max.Marks:20Marks**

PART-A

Answer**all** questions. EachQuestioncarries **one** mark**4x1=4Marks**

1) Distinguish between onewayand two wayslabs.
2) Writethecodalprovisions formaximumspacingof barsin slabs.
3) ListanytwoadvantagesofTbeams.
4) Statetheconditionsneededtocallabeamas a T-Beam.

PART-B

Answer**two**questions.Eachquestioncarries **three**marks **2x 3=6 Marks**

5(a)Howdoyoucheckforshear anddeflectionindesignofslabs?

(OR)

5(b)Draw theloaddispersion diagram of two wayslab to supporting beams.

6(a)WhataretheadvantagesofT-beams?Givetheequationsfortheeffectiveflangewidthofisolated T andLbeams.

(OR)

6(b)Find effective flange width of a T beam with the following details. Effective span =5.5m,centretocentredistanceofadjacentpanels=4m,Breadthofweb=300mm,thicknessofslab =120mm.

PART-C

Answer**two**questions.Eachquestioncarries**five**marks **2x 5 =10 Marks**

7(a)DesignasimplysupportedRCCslabforaroomofcleardimensions3X9m.widthofsupportsis230mm. Superimposedloadis3kN/Sq.mandweightoffinishesis1.0kN/Sq.m.UseM 25 concrete and HYSD barsofFe415grade.

(OR)

7(b) Design a simply supported RC slab for a room of clear size 4 X 3.5 m. Superimposed load is2kN/Sq.m and weight of finishes is 1.0 kN/Sq.m. The corners of slab are nothelddown.Widthof supports is230mm. UseM25 grade concreteand Fe415steel.

8(a) A T beam of effective flange width 750 mm, thickness of slab 120mm, width of rib250mm,and effective depth 450mm is reinforced with 3500 Sq.mm of tension steel. Calculate themomentof resistanceof thesection. M20gradeconcreteareFe415 barsare used.

(OR)

8(b)A T beam of effective flange width 800 mm, thickness of slab 90 mm, width of rib230mm, andeffective depth 400mm is reinforced with 5 numbers of 20mm diameterbars. Calculate themomentof resistanceof thesection.M20gradeconcreteare Fe250barsare used.

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

CourseCode:CE-402 **Duration:2**
HoursCourseName:ReinforcedConcreteStructures **Max.Marks:40**

PART-A

Answer**all** questions.Eachquestioncarries **one** mark. **8 x 1=8 Marks**

1) Definecharacteristiccompressivestrengthofconcrete.
2) Writethecodeprovisions formaximum spacingof bars inslabs.
3) Howdoyoucalculateminimumeccentricityindesignof columns?
4) Definedevelopmentlength.
5) Statetheformulatocalculateeffectivespanincaseofacontinuousbeam.
6) Statetheadvantagesofacontinuous beam.
7) Whatarethespecifications forlateralties inacolumn?
8) Statetheformulafor calculatingminimum depthoffoundationusingRankine's formula

PART–B

*Answer**four**questions.Eachquestioncarries **three**marks* **4x 3 M= 12M**

9(a)Calculatethelimitingpercentageoftensionreinforcementif M20concreteandFe415steelareused.

(OR)

9(b) Draw the line diagram of a continuous beamand indicate salient points with bendingmomentequations as per codeat thoselocations.

10(a)Drawthe crosssectionand stressdiagramsforthree cases ofaTbeam.

(OR)

10(b)Listanysixcodalprovisionsforlongitudinalreinforcementin designof columns.

11(a)Findeffectiveflangewidthofa Tbeamwiththefollowing details.Effectivespan=5.5m,centre to centre distance of adjacent panels = 4m, Breadth of web = 300mm, thicknessofslab =120mm.

(OR)

11(b) A continuous RCC rectangular beam of size 250 X 500mm overall is supported on300 X300mmmasonrycolumns at clear intervals of 3 m. Calculatetheeffectivespans.

12(a) A short axially loaded column of size 300 X 350 mm is reinforced with 8 bars of 20mmdiameter Fe 415 grade steel. Concrete is M 30 grade. Calculate the load carrying capacityofcolumn.

(OR)

12(b)Listandexplainthestepsfordesignofisolatedsquarefooting.

PART–C

*Answer**four**questions.Eachquestioncarries **five** marks* **4x 5 M= 20 M**

13 (a) A singly reinforced rectangular section of size 230 X 450mm effective is reinforced with4numbers of 16mm diameter bars in tension. Factored shear force at the section is 120 kN.Statewhethershear reinforcementis required or not.Concrete is M20grade.

(OR)

13 (b)Calculatethemaximumbendingmomentatsupportnexttoendsupportforacontinuousbeam as per IS 456-2000. Size of beam is 300X500mm overall, effective span =4m, imposedload (not fixed) = 10kN/m, , imposed load (fixed) = 15kN/m excluding selfweight,effectivecover = 40mm.

14 (a) A T beam of effective flange width 800 mm, thickness of slab 90 mm, width of rib 230mmandeffective depth 400mm is reinforced with 5 numbers of 20mm diameter bars. Calculatethemomentof resistance ofthesection. M20gradeconcreteare Fe250barsareused.

(OR)

14 (b) Design a short Reinforced Concrete rectangular column with one side as 300mm to carry anaxialload of2000 kN. UseM25 concrete andFe415 steel.

15 (a)Drawthedetailingofreinforcementfora continuousslab withcrankingof mainbars.

(OR)

15 (b) Calculate the maximum shear force at end support for a continuous beam as per IS 456-2000.Size of beam is 300X600mm overall, effective span = 4m, imposed load (not fixed) =10kN/m,imposed load(fixed)=12kN/m excludingself-weight, effectivecover =40mm.

16 (a)Designacircularcolumnofdiameter400mmwithlateralties.Unsupportedlengthofcolumnis 3m, and is subjected to a working load if 1200 kN. The column is effectivelyheld inpositionat both ends but not restrained against rotation Use M25 concrete and Fe 415steel.

(OR)

16 (b) A RC Column of size 300mm X 300mm carries a load of 750 kN. The safe bearing capacityof soil is 200 $kN/m^{2.}$ Design an isolated square column footing of uniform thickness. UseM25 grade concrete and Fe 415 grade steel. Check for shear, development length andbearingpressurearenot required.

CE-403 IRRIGATION ENGINEERING

Course Title:	**Irrigation Engineering**	Course Code	**CE-403**
Semester:	**IV Semester**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**60:15:0**	Credits	**2.5**
Type of Course	**Lecture+Tutorials**	Total Contact periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

The student should know the basic knowledge about hydraulics and mechanics

Course Outcomes

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

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

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Basics of Irrigation	12	Q4	Q1		Q9(a)	Q13(a)
2	Basics of Hydrology	13					
3	Head works and weirs	10		Q2		Q10(a)	Q14(a)
4	Gravity dams and Earth dams	15					
5	Distribution works	13		Q3	Q5,Q6,	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Watershed Management	12			Q7, Q8	Q10(b), Q12(a), Q12(b)	Q14(b) , Q16(a), Q16(b)
	Total	75	8			8	8

Course Contents

UNIT 1: Basics of Irrigation

Duration:12Periods(L:10– T:2)

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

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

c) Principal crop seasons-Kharif and Rabi crops.

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

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

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

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

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

UNIT 3: Head Works and Weirs

Duration: 10Periods(L:8 – T:2)

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

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

UNIT 4: Gravity dams and Earth dams

Duration: 15Periods (L:12 – T:3)

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

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

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

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

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

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

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

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

UNIT 6: Watershed Management

Duration: 12 Periods (L:7.2 – T:4.8)

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

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

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

Reference Books

1. Punmia, B.C., Pande, B, Lal, Irrigation and water power engineering, Laxmi Publications
2. Irrigation Engineering by B.R.Gupta.
3. Irrigation Engineering and water power engineering by Birdie.
4. Watershed Management by JVS Murthy, - New Age International
5. Land and Water Management by VVN Murthy, -Kalyani Publications
6. Subramanayan, Engineering Hydrology, McGraw Hill.
7. Mutreja K N, Applied Hydrology, McGraw Hill
8. Sharma, R.K. and Sharma, T.K., Irrigation Engineering, S.Chand and Company
9. Basak, N.N., Irrigation Engineering, McGraw Hill Education India Pvt. Ltd.
10. Asawa, G.L., Irrigation and water resource Engineering, New Age International(P)
11. Dahigaonkar, J.G., Irrigation Engineering, Asian Book Pvt. Ltd., New Delhi.
12. Garg, S K, Irrigation and Hydraulic structures, Khanna Publishers, Delhi.
13. Priyani V.B., Irrigation Engineering, Charotar Book Stall, Anand.

Suggested E-learning references

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

Suggested Learning Outcomes

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

CO1 - Solve simple problems of irrigation by applying basic principles and methods.

1.1 Define Irrigation
1.2 State the necessity of irrigation.
1.3 List advantages and disadvantages of irrigation.
1.4 Distinguish between
    i) Perennial and inundation irrigation.
    ii) Flow and Lift irrigation.
    iii) Storage and direct irrigation.

1.5 Types of Lift irrigations as per commanding area and height of lift.
1.6 Distinguish the Major lift irrigation project and Minor Lift irrigation projects with a few examples in the state of the Telangana and the India.
1.7 State the advantages and disadvantages of Major Lift irrigations projects.
1.8 Discuss about the Kaleswaram project in the engineering point of view
1.9 Briefly describe various methods of Irrigation
1.10 State Principal crops in India and their seasons.
1.11 State different methods of expressing duty.
1.12 State the relationship between duty and delta.
1.13 State the factors affecting duty.

CO2 - Estimate rainfall over a catchment by various methods.

2.1 Define terms Catchment, intercepted catchment, free catchment, runoff, max flood discharge (and simple numerical problems only)
2.2 Define yield and dependable yield of a catchment and Calculation of dependable yield of a catchment (simple numerical problems only).
2.3 State the methods of measuring rainfall with Simon's rain gauge.
2.4 State the characteristics of good, average and bad catchments.
2.5 State the factors affecting run-off.
2.6 State the objectives for river gauging.
2.7 List the factors for selecting suitable site for a gauging station
2.8 List the methods to measure the velocity

CO3 - Explain different parts of head works and weirs and their functions.

3.1 State the classification of head works and their suitability under different conditions.
3.2 List the factors suitable for selection of site of Diversion works.
3.3 Describe with sketch the component parts of Diversion works.
3.4 Distinguish between barrages and Weirs
3.5 Describes with sketch the component parts of a weir and their functions.

3.6 Explain the terms percolation, uplift, creep and scour.
3.7 Explain the failure of weirs (Theory only)

CO4 - Describe the structural details, construction and maintenance of gravity and earth dams.

4.1 State the classification of Reservoirs and Dams.
4.2 State factors influencing selection of site for reservoirs and dams.
4.3 Define the terms: Full reservoir level. Maximum water level, top bund level,dead storage, livestorage, free board, gravity dam, spillway.
4.4 Briefly explain the causes of failure of gravity dams and their remedies.
4.5 Distinguish between low and high dams.
4.6 Draw the elementary profile of a gravity dam for a given height
4.7 Draw the practical profile of a low dam.
4.8 State the need of drainage galleries
4.9 State the different types of spillways and their suitability and draw sketches
4.10 State the situations in which earth dams are suitable.
4.11 Define saturation gradient, phreatic line.
4.12 State the three types of earth dams with sketches of typical cross sections.
4.13 Briefly explain the causes of failure of earth dams and states the remedial measures.

CO5 - Summarize the data of canals and maintenance of canals and design canals as per regime conditions.

5.1 Explain the importance of Irrigation canals.
5.2 State classifications of canals.
5.3 State the different methods of canal alignment and the situations in which each is suitable.
5.4 Sketch typical cross sections of canals in cutting, embankment and partial cutting.
5.5 Define terms: balancing depth of cutting.
5.6 State the functions of Head Regulator and cross regulator.
5.7 Design of channels according to kennedy's theory (simple numerical problems only).
5.8 Design of channels according to Lacey's theory (simple numerical problems only).
5.9 Distinguish between Kennedy's theory and Lacey's theory including limitations.
5.10 State the need and draws the sketches of different cross drainage structures.
5.11 State the necessity and types of canal linings, advantages and disadvantages of canal linings.
5.12 State the maintenance required for canals.

CO6 - Describe the concept of watershed, its objectives and maintenance.

6.1 Define terms: watershed, watershed management.
6.2 State the necessity of watershed management.
6.3 List the objectives of watershed management
6.4 List the characteristics of watershed

6.5 List the factors affecting water shed management.
6.6 State the causes of watershed deterioration and their result.
6.7 Explain Watershed management practices
6.8 Explain rain water harvesting.
6.9 Explain soil moisture conservation methods
6.10 Explain various techniques to control soil erosion.

Suggested Student Activities

1. Tech fest/Srujana
2. Paper/Poster presentation
3. Quiz
4. Group discussion
5. Field visit to nearby irrigation structures and prepare notes.
6. Give a feasibility report on your home town of existing and proposed projects.
7. Observe watershed management system in your village and prepare presentation.

CO-PO Mapping Matrix

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

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State Board of Technical Education and Training,Telangana

Model Question paper
DCE IV semester
Mid Semester-I Examination

Course Code:CE-403 **Duration:1 hour**
Course Name: IRRIGATION ENGINEERING **Max.Marks:20**

PART-A

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

1. Define irrigation.
2. Differentiate between flow irrigation and lift irrigation
3 .List the important components of Hydrological cycle.
4. Define the terms 1) catchment 2) intercepted catchment

PART –B

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

5(a). Write the necessity of irrigation.

(OR)

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

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

(OR)

6(b)What is runoff and write its types

PART-C

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

7(a)What are the advantages of Irrigation

(OR)

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

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

(OR)

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

State Board of Technical Education and Training, Telangana

Model Question paper
DCE IV semester
Mid Semester-II Examination

Course Code: CE-403 **Duration:1 hour**
Course Name: IRRIGATION ENGINEERING **Max.Marks:20 Marks**

PART-A

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

1. Define head works?
2. What is creep length.
3. Define full reservoir level and maximum water level
4. Define live storage and Dead storage.

PART –B

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

5(a).Differentiate between barrage and a weir

(OR)

5(b). List the component parts of a weir.

6(a).Differentiate between low and high dam

(OR)

6(b). Draw the practical profile of a low dam.

PART-C

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

7(a)Draw the layout of a Diversion headwork and list various parts.

(OR)

7(b) Draw the cross section of a weir and name various parts.

8(a)What are the points to be considered for selection of site for a dam

(OR)

8(b)What is Elementary Profile of a gravity dam. Find the minimum base width of elementary profile for reservoir full condition.

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

Course Code: CE-403 **Duration:2 hours**
Course Name: IRRIGATION ENGINEERING **Max.Marks:40 Marks**

PART-A

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

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

PART-B

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

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

(OR)

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

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

(OR)

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

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

(OR)

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

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

(OR)

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

PART-C

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

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

(OR)

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

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

(OR)

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

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

(OR)

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

16(a) Explain about different soil conservation methods.

(OR)

16(b)Write the characteristics of watershed.

CE-404 Basic Quantity Surveying

Course Title:	**Basic Quantity Surveying**	Course Code :	**CE-404**
Semester:	**IV Semester**	Course Group :	**Core**
Teaching Scheme in Periods(L:T:P):	**60:15:0**	Credits :	**2.5**
Methodology :	**Lecture+Tutorials**	Total Contact Periods :	**75**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

Knowledge of basic Mathematics, Materials of Construction, construction practice, reading drawings and plans.

Course Outcomes

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

CO1	Identify different items of works and their units and specifications.
CO2	Prepare approximate estimates for given civil engineering works.
CO3	Prepare detailed estimates, estimate of quantities of different items of works.
CO4	Evaluate and prepare rate analysis data sheets and leads statements for various item of works and materials.
CO5	Prepare data sheets for different items of works and abstract estimate
CO6	Prepare the data sheet for quantity of steel for steel roof trusses

Course Content and Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Introduction, Units of measurements and Specifications</td><td>12</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>2</td><td>Approximate estimates</td><td>12</td></tr>
<tr><td>3</td><td>Detailed estimate of buildings</td><td>15</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>4</td><td>Analysis of Rates</td><td>10</td></tr>
<tr><td>5</td><td>Abstract Estimates</td><td>10</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>6</td><td>Steel roof truss for an Industrial Building with sloped roof</td><td>16</td><td>Q7,Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
<tr><td colspan="2">TOTAL</td><td>75</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT 1: Introduction, Units of measurements and Specifications

Duration: 12Periods (L:9.6 – T:2.4)

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

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

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

d) Specifications – Necessity – Types of specifications – General specifications of:

i. Earth works
ii. Brick / Stone Masonry with C.M
iii. Reinforced Cement Concrete
iv. Plastering with C.M
v. Floor finishes with ceramic tiles and marbles
vi. White washing / Colour washing

UNIT 2:Approximate estimates Duration: 12 Periods (L:9.6 – T:2.4)

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

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

c) Problems in Preliminary estimate

UNIT 3: Detailed estimate of buildings Duration: 15 Periods (L:12 – T:3)

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

a) Single Room Building

b) Single Room with Verandah

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

d) Residential building with one bed rooms (1 BHK)

UNIT 4: Analysis of Rates Duration: 10 Periods (L:8 – T:2)

a) Analysis of Rates-Definition and Purpose

b) Standard Data Book, SSR, Standard data sheet

c) Cost of materials at source and at site

d) Standard Schedule of Rates of different materials in buildings works

e) Types of labour – Wages as per SSR

f) Lead and Lift – Preparation of Lead Statement

g) Data Sheets – Standard data for materials and labour components for different items of work

UNIT 5: Abstract Estimates **Duration: 10 Periods (L:8 – T:2)**

a) Preparation of unit rates for finished items of works using Standard data and SSR

b) Methods of calculating quantities of ingredients of various proportions of cement concrete.

c) Provisions for different building services and other overhead charges

d) Prepare abstract estimate for:

i. Single bedroom building (1 BHK)

ii. Two bedroom building with veranda (2 BHK)

UNIT 6: Steel roof truss for an Industrial Building with sloped roof

Duration: 16 Periods (L:12.8 – T:3.2)

a) Define the component parts of truss and sloped roof

b) Estimation of a steel for roof trusseswithSlopedroofslike

i) Pitchedroof ii) leantoroof iii) hippedroof

iv) King post truss v) queen post truss vi) Fink truss

vii) Steel frames

Suggested Learning Outcomes

CO1 - Identify different items of works and their units and specifications.

1.1 UnderstandbasicconceptsofQuantitySurveying,Unitsand Specifications

1.2 Define:

a) QuantitySurveying

b) Estimate

1.3 Statetheneedforquantitysurveying

1.4 Statedifferenttypesofestimates

1.5 Explaintheneedfordifferentestimates

1.6 Distinguish amongelement ofstructure,itemofa work&materials ofconstruction

1.7 ListthedutiesofQuantitySurveyor

1.8 Statetheunitsofmeasurements,dataandpaymentfordifferentitemsofworkandmaterialsusin gIS:1200

1.9 Statetwotypesoftakingoutmeasurement.

1.10 ExplainCentreLineMethod-LongandShortWallMethod

1.11 Explaintheprocessoftakingmeasurementsfordifferentworksandtolerances

1.12 Define specifications

1.13 Statetheneedforspecifications

1.14 Statedifferenttypesofspecifications

1.15 Givethegeneralspecificationsforimportantitemsofwork

CO2 - Prepare approximate estimates for given civil engineering works.

2.1 Understanddifferenttypesofestimates

2.2 Statedifferenttypesofestimates

2.3 Explain:

a) Approximateorpreliminaryestimate

b) Detailedestimate

c) Abstractestimate

2.4 State the methods of preparing approximate estimates

2.5 Explain:

d) Plinthareamethod

e) Cubiccontentmethod

f) Service unit method or unit cost method

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

2.7 Differentiate between detailed estimate and abstract estimate

2.8 Write formats of detailed estimate and abstract estimate

CO3 - Prepare detailed estimates, estimate of quantities of different items of works.

3.1 Prepare detailed estimates for various Civil EngineeringStructures

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

3.3 State different methods of taking out quantities

3.4 Explain different methods of taking out quantities

3.5 Prepare the detailed estimates for various buildings from the given drawings, specificationsandsiteconditions:

a) CompoundwallandSteps

b) SingleRoomBuilding

c) SingleRoomwithVerandah

d) SinglestoriedResidentialbuildingwithonebedroom(1BHK)

e) SinglestoriedResidentialbuildingwithtwobedrooms(2BHK)

CO4 - Evaluate and prepare rate analysis data sheets and leads statements for various item of works and materials.

4.1 Understand the Analysis of Rates and Abstract estimations

4.2 Define analysis of rates

4.3 Explain the purpose of analysis of rates

4.4 Explain the following in rate analysis:

a) Standard data book

b) Standard schedule of rates

c) Standard data sheet

4.5 Explain cost of material at source

4.6 Explain cost of material at site

4.7 Explain the following terms:

a) Blasting charges

b) Seinorage charges

c) Cess charges

d) Stacking charges

e) Water charges

f) Crushing charges

g) Lead charges

4.8 Compute rate of an item of work

4.9 Explain different types of labour wages as per latest SR

4.10 Define lead statement

4.11 Prepare the format for Lead Statement

4.12 Prepare Lead Statement and data for different items of work

CO5 - Prepare data sheets for different items of works and abstract estimate

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

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

5.3 Prepare abstract estimate for the following buildings:

a) Single bedroom building (1 BHK)

b) Two bedroom building with verandah (2 BHK)

CO6= Prepare the data sheet for quantity of steel for steel roof trusses

6.1 Estimate of a steel roof truss for an Industrial Building with sloped roof

6.2 Define the component parts of truss and sloped roof, types of roofs

6.3 Estimate of a steel roof truss withSlopedroofslike.

a) Pitchedroof b) leantoroof c) hippedroof

d) King post truss e) queen post truss f) Fink truss

Reference Books

1. Estimating and Costing - B.N. Dutta
2. Estimating and Costing - S. C. Rangawala
3. Estimating Construction Costs - Robert L. Peurifoy&Garold D. Oberlend

Suggested E-learning references

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

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	1	1	1	1	1	1	1,5,6,7
CO2	3	2	2	2	2	1	2	1,2,3,5,6
CO3	3	2	2	3	1	1	1	1,2,3,5,6
CO4	2	2	1	2	2	1	2	1,2,3,6
CO5	3	2	2	1	1	1	1	1,2,3,5,6
CO6	3	2	2	1	1	1	2	1,2,3,5,6

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

Course Code:18C-404C **Duration:1 hour**
Course Name: Quantity Surveying **Max.Marks:20 Marks**

PART-A

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

1. What is estimation?
2. write the units for the quantities of a) brick masonry. b) plastering.
3. Write the methods of taking out quantities for buildings.
4. Write the table form for detailed estimate.

PART- B

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

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

(OR)

5.(b) Write the units for the quantiles of i) RR masonry ii) Cement concrete iii) flooring.

6(a). Write different types of estimates.

(OR)

6(b)Write any three differences between abstract estimate and detailed estimate.

PART-C

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

7(a) Write the necessity of specifications?

(OR)

7(b) Write the specifications of brick masonry.

8 (a) Prepare a plinth area estimate of a building with a total plinth area of 240m^2.from the following data

i) Plinth are rate Rs 9000/m^2.
ii) Electrical installations = 14% of the building cost
iii) water supply and sanitary installations =5%
iv) contingencies = 3%

(OR)

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

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

Course Code:18C-404C **Duration:1 hour**
Course Name: Quantity Surveying **Max.Marks:20 Marks**

PART-A

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

1. Write the format for lead statement.
2. What is cost of material at source and cost of material at site.
3. Define the terms lead and lift. .
4. Define Rate Analysis.

PART- B

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

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

(OR)

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

6(a) Explain cost of material at source and cost of material at site.

(OR)

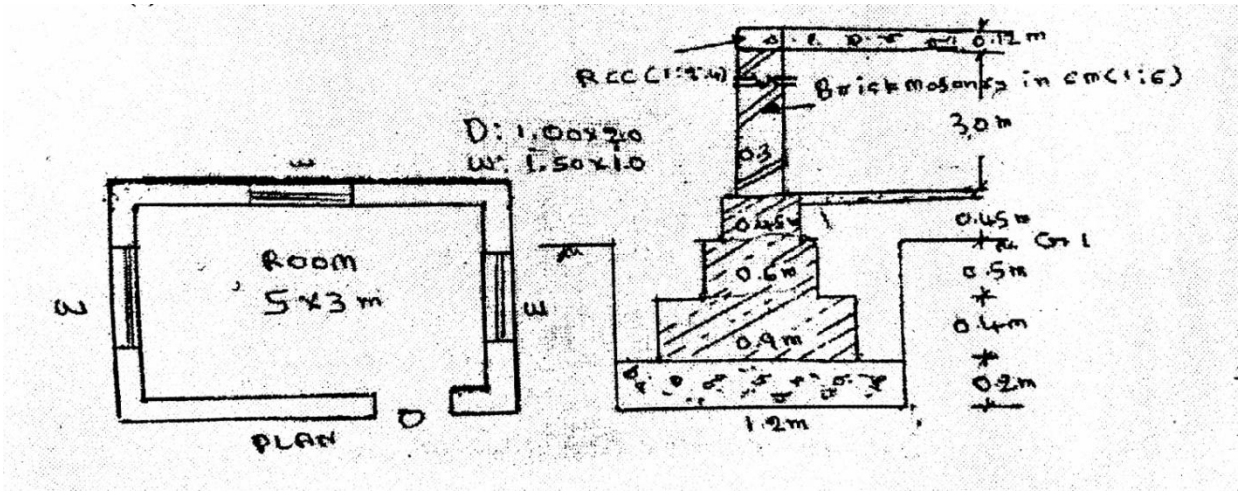
6(b) List types of leads

PART-C

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

7(a) Prepare the detailed estimate the following items of works for the fig.

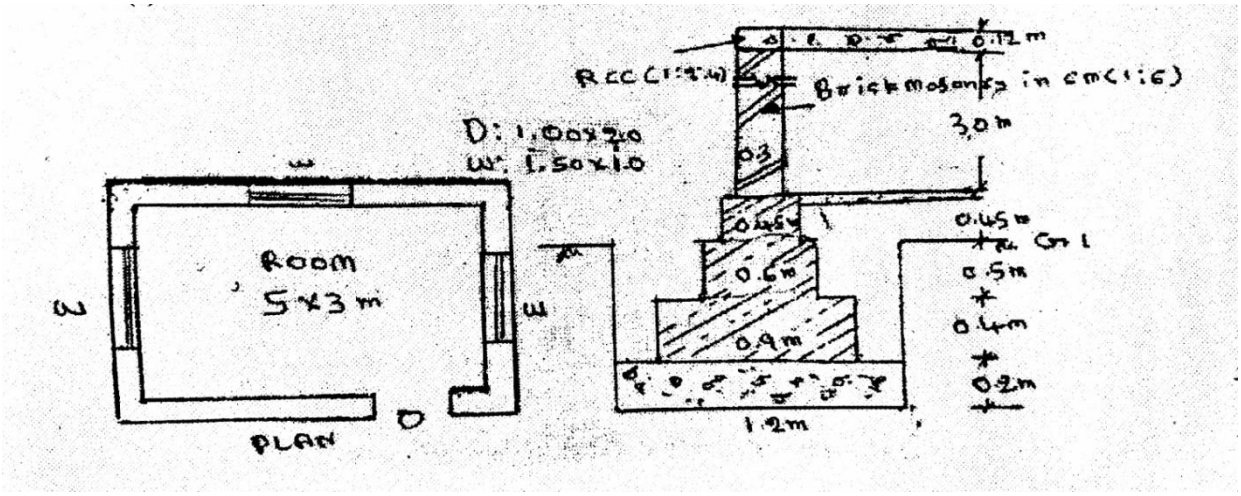
a) Earth work excavation
b) CC bed for the foundation



7(b) Prepare the detailed estimate for the following items of works for the fig.

a)RCC for Slab

b) Brick masonry without deductions



8.(a). Find the cost of material at site for the following.

sno	Materials	Rate at source	lead	Conveyance charges
1	40 mm HBG metal	Rs 300/m^3	10 km	15/ km/m^3
2	sand	Rs 75/m^3	20 km	10/km/m^3
3	Rough stone	Rs 250/m^3	8 km	12/km/m^3

(OR)

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

Lead statement of materials:

S.No.	Materials	Rate	Per	Lead	Conveyance charges
1.	40mm size HBG metal	Rs.360/-	$1m^3$	15km	Rs.3.00 per.k.m.
2.	Rough stone	Rs.200/-	$1m^3$	10km	Rs.4.00 per k.m.
3.	Sand	Rs.50/-	$1m^3$	20km	Rs.3.00 per k.m
4.	Cement	Rs.2400/-	M.T/10kN	Local	-

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

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

PART-A

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

1. Write the units for the following items a) plain CC in foundation) b) plastering
2. Write the purpose of rate analysis.
3. Define principle rafters.
4. A room internal dimensions are 4mx3m the wall thickness in super structure is 300mm.calculate the centre line length.
5. Cement concrete flooring 100mm thick laid in a room size of 5m x 5m. Find the quantity of CC required for flooring.
6. Define abstract estimation.
7. Define Truss.
8. Define pitch of the truss.

PART-B

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

9.a).Prepare an estimate of a four stored office building having a carpet area of 2000sq.m. it may be assumed that 40% of the built-up area taken by the corridors, verandahs, lavatories & staircase &15% of the built up area will be occupied by walls , Considering the following data

1. Plinth area rate : 1000 per sq.m.
2. Add due to deep foundation : 1% of the cost
3. Add for water proof & termite proof treatment : 0.5% of the cost
4. Add for water supply & sanitary works : 6% of the cost
5. Add for electrical wiring & fittings : 10% of the cost
6. Contingencies : 1.5% of the cost
7. Supervising charges : 3.5% of the cost

(OR)

9.b). Calculate the cost at site for the following materials

Lead statement of materials:

S.No.	Materials	Rate	Per charges	Lead	Conveyance
1.	40mm size HBG metal	Rs.360/-	$1m^3$	15km	Rs.3.00 per.k.m.
2.	Rough stone	Rs.200/-	$1m^3$	10km	Rs.4.00 per k.m.
3.	Sand	Rs.50/-	$1m^3$	20km	Rs.3.00 per k.m
4.	Cement	Rs.2400/-	M.T/10kN	Local	-

10(a). Calculate the quantity of cement required in bags to prepare 4 cum of P.C.C. (1:4:8) HBG metal required to prepare 1 cum of P.C.C. (1:4:8) = 0.92 cum

(OR)

10(b). sketch any two types of roof trusses.

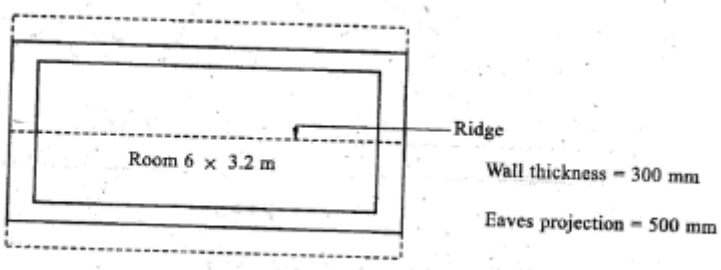
11(a). Calculate the quantity of cement required in bags for following items of works:

a) Plastering with CM 1:4 12mm thick for 100 m^2 of work if 0.15 m^3 of CM is required for $10m^2$ of plastering.

(OR)

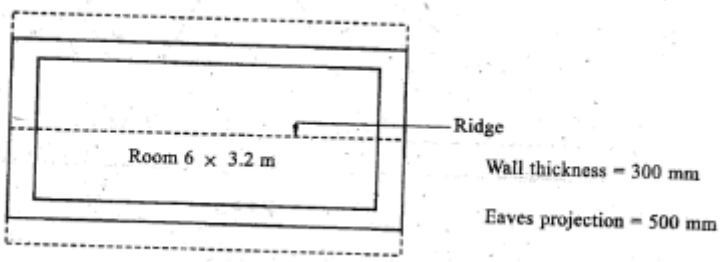
11(b)Calculate the quantity of cement required in bags to prepare R.R masonry in C.M (1:6) for 18 cum of work. (Take 0.3 cum of C.M. (1:6) for 1 cum of masonry)

12(a). For a gabled end roof shown in figure, calculate the length of ridge piece.



(OR)

12(b) From the given Fig. Calculate the number of common rafters required



PART-C

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

13.a).

Prepare an approximate of building project with total plinth area of building is 600 m^2. From the following data calculate the total cost of the project.

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

(b) Cost of water supply @ $7\frac{1}{2}$ of cost of building.

(c) Cost of sanitary and electrical installations each $7\frac{1}{2}$ of cost of building.

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

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

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

(OR)

13(b)

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

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

0.92 m^3	40 mm HBG metal
0.46	Sand
0.23	Cement
0.06 Nos.	Mason I
0.14 Nos.	Mason II class
1.80 Nos.	Man Mazdoor
1.40 Nos.	Women Mazdoor
L.S.	Sundries

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

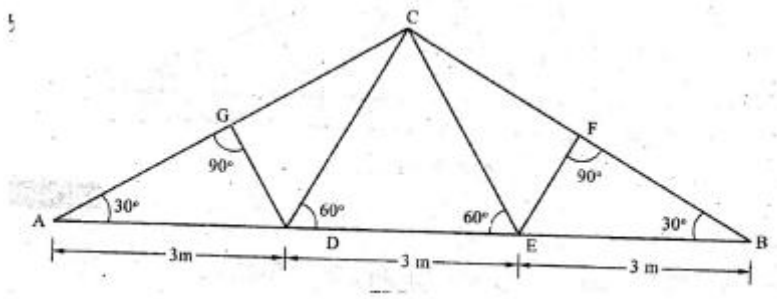
1.05 cu.m.	Rough stone
0.05 cu.m.	Bond stone
0.34 cu.m.	C.M. (1:6)
0.54 cu.m.	Mason I^{st} class
1.20 Nos.	Mason 2^{nd} class
1.40 Nos.	Man Mazdoor
1.40 Nos.	Women Mazdoor
LS	Sundries

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

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

(OR)

14.b).From a simple steel truss shown in figure , find the length of principal rafter AC &CB.



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

i. 12 m^3 of cc 1:3:6.
ii. 20m^3 of brick masonry CM 1:6.

(OR)

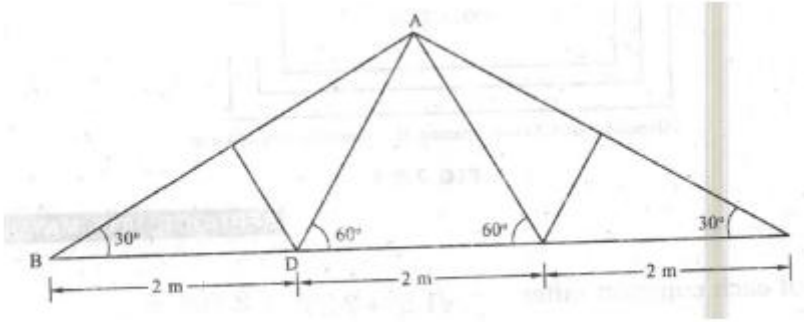
15.b). Calculate the quantity of cement required in bags for following items of works:

a) CRS masonry in CM 1:6 using granite stone for 15 m^3 of work if 0.32 m^3 CM is required for 1 m^3.

16.a). From the simple steel truss shown in figure , calculate steel required for the following

a) Principal rafter AB @ 0.108 kN/m

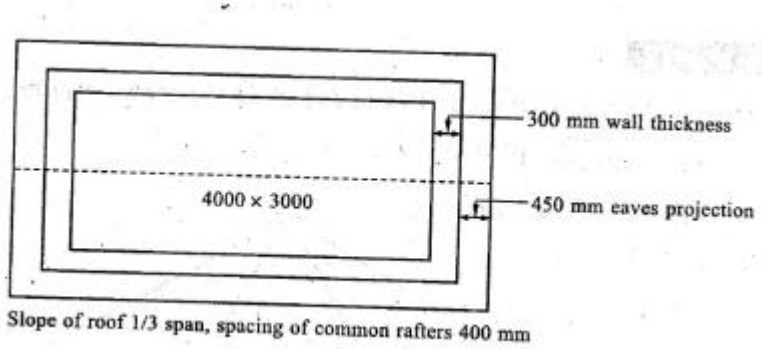
b) Tie AD @0.054 kN/m



(OR)

16.b) Calculate the quantities of following items for the figure shown below.

1. Length of common rafter
2. Length of ridge piece
3. Total number of common rafters



Slope of roof 1/3 span, spacing of common rafters 400 mm

CE-405WATER SUPPLY AND SANITARY ENGINEERING

Course Title:	**Water Supply and Sanitary Engineering**	Course Code :	**CE-405**
Semester:	**IV Semester**	Course Group :	**Core**
Teaching Scheme in Periods(L:T:P):	**60:15:0**	Credits :	**2.5**
Methodology:	**Lecture+ Tutorials**	Total Contact Periods :	**75**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This subject requires the basic knowledge of the coursesEngineering Chemistry and Environmental Studies is needed.

Course Outcomes

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Water Supply Scheme, Quantity of water. Sources and Conveyance of Water.	10	Q4	Q1		Q9(a)	Q13(a)
2	Quality and Purification of Water	15					
3	Distribution System and Water supply arrangements in buildings	15		Q2		Q10(a)	Q14(a)
4	Introduction to Wastewater Engineering and Quantity of Sewage	10					
5	Sewersand Sewer appurtenances	10		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Sewage Characteristics, and treatment	15			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
	Total	75	8			8	8

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

CO1	Estimate water requirement for public water supply scheme and Illustrate the different sources and various methods of conveyance of water
CO2	Ascertain the quality of water and study the various stages of purification of water to select the appropriate treatment method.
CO3	Identify the suitable distribution system for a locality and their related appurtenances and plan the arrangement of water supply in a building.
CO4	Categorize the types of sewage, sewerage system, surface drain and estimate the quantity of sewage.
CO5	Summarize the cross section of sewers and sewer appurtenances
CO6	Categorize the sewage characteristics, methods involved in sewage treatment

Course Contents

UNIT - 1: Water Supply Scheme, Quantity of Water,Sources andConveyance of Water

Duration: 10Periods(L: 8 – T:2)

a) Need for protected water supply – objectives ofa protected water supply scheme – Flow chart of a typical water supply scheme.
b) Total quantity of water for a town, per capita demand, and factors affecting demand – Variation in demand– seasonal, daily, and hourly variation.
c) Forecasting population by arithmetical, geometrical, and incremental increase methods – Problems on above methods.
d) Surface sources – Lakes, streams, rivers, and impounded reservoirs.
e) Underground sources – springs, wells, infiltration wells, and galleries.
f) Types of intakes – Reservoir, River, Canal, and Lake Intakes

UNIT - 2: Quality and Purification of Water

Duration: 15Periods(L: 12 – T:3)

a) Impurities of water – Need for laboratory tests – sampling.
b) Tests on water – physical, chemical, and bacteriological tests.
c) Flow diagram of different treatment units.
d) Objectives – aeration, sedimentation, filtration and disinfection
e) Process of sedimentation with coagulation.
f) Filtration – Construction and operation of rapid sand and pressure filters.
g) Disinfection of water Methods – necessity and methods of chlorination – pre, post, super, double, and break point chlorination.

NOTE: No design of treatmentunits

UNIT - 3: Distribution system and water supply arrangements in Building

Duration: 15 Periods(L: 12 – T: 3)

a) Requirements of Distribution system –Systems of distribution – gravity system, combined system, direct pumping.
b) Methods of supply - Intermittent and continuous.
c) Types of layouts– grid, radial and ring system, their merits &demerits and their suitability.
d) Location and functioning of:
    i. Sluice valves.
    ii. Check valves or reflux valves.
    iii. Air valves.
    iv. Drain valves or blow-off valves.
    v. Scour valves.
    vi. Fire Hydrants
    vii. Water meters
f) Definition of terms: water main, service pipe, communication pipe, supply pipe, distribution pipe, back flow, and air gap.
g) General layout of water supply arrangement for single storied building as per I.S Code of practice.

UNIT - 4: Introduction to Wastewater Engineering and Quantity of Sewage

Duration: 10Periods(L: 8 – T: 2)

a) Define the terms: Sullage, sewage, sewer, sewerage, refuse, garbage, Strength of sewage
b) Objectives of providing sewerage works.
c) System of sewage collection and disposal –water carriage systems.
d) Types of sewerage systems and their suitability – separate, combined and partially separate systems.
e) Surface drains– requirements, shapes and their merits, demerits &construction.
f) Simple problems on design of sewers (running half full only), using Manning's and Hazen Williams formulae.

UNIT -5: Sewers and Sewer Appurtenances

Duration: 10Periods(L: 8 – T: 2)

a) Different shapes of cross section for sewers – circular and non-circular – figures, merits and demerits.
b) List Types of sewers based on material – stoneware, cast iron, cementconcrete sewers and A.C Pipes
c) Brief description, location, function and construction of
    i) Manholes
    ii) Drop manhole
    iii) Street inlets
    iv) Catch basins

UNIT -6: Sewage Characteristics and treatment

Duration: 15 Periods(L: 12 – T: 3)

a) Strength of sewage, sampling of sewage, characteristics of sewage – physical, chemical, and biological.

b) Analysis of sewage – significance of the following tests for (No test details)

(i) Solids (ii) C.O.D (iii) B.O.D

(iv) PH Value v) Chlorides

c) Preliminary treatment - Functions of following units.

i) Screens (ii) Skimming tanks (iii) Grit chambers

d) Primary treatment - Brief description of Plain sedimentation

e) Secondary treatment - Brief description of

i) Trickling filters ii) Activated sludge process

NOTE: No design of treatment units

Reference Books

1) Environmental Engineering – G.S. Birdie
2) Elements of Public Health engineering – K.N. Duggal
3) Environmental Engineering – Baljeet Kapoor
4) Public Health Engineering – S.K. Hussain
5) Water supply and sanitary Engineering – V.N. Vazirani.
6) Environmental Engineering – N.N. Basak /TMH
7) Water Supply Engineering – S.K. Garg
8) Environmental Engineering – N. Srinivasulu
9) Environmental Engineering – S.R. Laxmi Prasad

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes

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

CO1 - Estimate water requirement for public water supply scheme and Illustrate the different sources and various methods of conveyance of water

1.1 State the need of protected water supply.
1.2 List the objectives of a protected water supply scheme.
1.3 Draw the flow chart of a typical water supply scheme of a town.
1.4 List the factors affecting per capita demand of a town / city.
1.5 Explain the variation in demand for water supply.

1.6 Estimate the quantity of water required by a town.
1.7 State the necessity of forecasting population in the design of water supply scheme.
1.8 State different methods of forecasting population
1.9 Work out simple problems on forecasting population by different methods
1.10 State different types of surface and subsurface sources of water.
1.11 Explain with sketches:
    a) Infiltration galleries.
    b) Infiltration wells.
1.12 Describe with sketches the intakes for collection of water(reservoir, river, canal and lake intakes.

CO2 - Ascertain the quality of water and study the various stages of purification of water to select the appropriate treatment method.

2.1 State the different types of impurities present in water.
2.2 State the need for laboratory tests for testing water.
2.3 Explain the method of obtaining samples for testing.
2.4 List the different tests for analysing quality of water.
2.5 Define: E-coli index, most probable number (MPN).
2.6 State the various water borne diseases in India.
2.7 State the objectives of treatment of water.
2.8 Sketch the overall layout of a water treatment plant indicating the different stages.
2.9 State the objects of aeration, plain sedimentation, sedimentation with coagulation, filtration, and disinfection.
2.10 Explain the process of sedimentation with coagulation.
2.11 Describe the construction and operation of rapid sand and pressure filters.
2.12 List various methods of disinfection of water.
2.13 Explain the different forms of Chlorination (Pre, post, super, double and break-point chlorination).

*NOTE: No design of treatment units

CO3 - Identify the suitable distribution system for a locality and their related appurtenances and plan the arrangement of water supply in a building.

3.1 State the requirements of good distribution system.
3.2 Explain with sketches the different systems of distribution.
3.3 Explain different methods of water supply system with their merits and demerits.
3.4 Explain with sketches the different layouts (Grid, radial and ring) in distribution system.
3.5 List the merits and demerits of layouts (Grid, radial and ring) with their suitability for a given locality.
3.6 List various appurtenances used in a distribution system of water supply system to a town.

3.7 Explain with sketches the location and functioning of various appurtenances used in a distribution system of water supply.

3.8 Define terminology used while designing and construction of water supply arrangements in buildings.

3.9 Explain the general layout of water supply connections of buildings with mains

3.10 Layout of water supply arrangement for single storied buildings as per I.S Code.

CO4 - Categorize the types of sewage, sewerage system, surface drain and estimate the quantity of sewage.

4.1 Define the terms: Sullage, sewage, sewer, sewerage, refuse, garbage.

4.2 List the objectives of sewerage works.

4.3 State the various methods of sewage collection works and explain about water carriage system

4.4 Explain different sewerage systems and their suitability.

4.5 Compare the three systems of sewerage.

4.6 List the requirements of good surface drains.

4.7 Describe different types of surface drains with their merits and demerits.

4.8 Work out simple problems on design of sewers running half full only.

CO5 - Summarize the cross section of sewers and sewer appurtenances

5.1 State the various shapes of sewers.

5.2 List the circular and noncircular sewers with sketches.

5.3 List any two merits and demerits of each shape.

5.4 Mention the different materials used for sewers.

5.5 List the various sewer appurtenances on a sewer line.

5.6 Explain the construction, function, and location of the different sewer appurtenances.

CO6 - Categorize the sewage characteristics, methods involved in sewage treatment

6.1 Define strength of sewage.

6.2 Describe the method of sampling sewage.

6.3 State the physical, chemical, and biological characteristics of sewage.

6.4 Define C.O.D and B.O.D.

6.5 State the significance of the following tests to Analyse sewage.
i) Solids ii) C.O.D. iii) B.O.D. iv) PH -Value v) Chlorides.

6.6 State the objects of sewage treatment.

6.7 Draw the conventional sewage treatment plant of a town and indicate the main function of each unit.

6.8 State the function of screens, skimming tanks and grit chambers.

6.9 Explain briefly the working of screens, grit chambers, skimming tanks.

6.10 Describe with sketch the following treatment works.

a) Trickling filters.

b) Activated sludge process.

Suggested Student Activities

1. Estimate the total quantity of water required for a town/locality/Institute.
2. Visit nearby Intake works of water of your place and collect details.
3. Prepare charts for BIS and WHO quality standards for drinking water.
4. Visit nearbyWater Treatment Plant and collect details of unit operations and processesinvolved in it.
5. Study the distribution system of water supply of your locality.
6. To visit a newly constructed building for plumbing works.
7. Estimate total quantities of sewage generated from a locality and design the sewagedischarge. Prepare a report on effects due to untreated disposal of municipal sewage
8. Prepare a report on performance of the existing sewage treatment plant at any hospital
9. Visit Sewage Treatment Plant and collect details each unit operations for treatment of Sewage and prepare the charts.
10. Prepare a mini project report for Sewerage System for a locality.
11. To conduct market survey of sanitary ware.
12. Treatment and reuse of automobile service station wastewater for vegetation
13. Impact of industrial solid wastes on soil and sub-surface water
14. Effects due to untreated disposal of municipal sewage
15. Quality study of sewage in your district
16. Soil-industrial effluent interaction and their engineering behaviour
17. Tech fest/Srujana
18. Paper/Poster presentation
19. Quiz
20. Group discussion
21. 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	1,4,5,7
CO2	1	2	1	2	2	-	1	1,2,3,4,5,7
CO3	2	1	2	3	3	1	2	1,2,3,4,5,6,7
CO4	1	1	1	3	3	-	1	1,2,3,4,5,7
CO5	1	1	2	3	3	-	1	1,2,3,4,5,7
CO6	1	1	2	3	3	-	1	1,2,3,4,5,7

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

Course Code:CE-405 **Duration:1 hour**
Course Name: Water supply and Sanitary Engineering **Max.Marks:20 Marks**

PART-A

Answer **ALL** questions and each question carries **one** Mark 4 x 1 = 4 Marks

1. State any two needs of protected water supply
2. List out the variations in demand for water supply
3. Write any two objectives of treatment of water
4. Define aeration

PART-B

Answer **Two** questions and each question carries **Three** Marks **2 x 3 = 6 Marks**

5(a). State different types of surface and sub-surface sources of water.

(OR)

5(b). Draw a flow chart of typical water supply scheme of a town

6(a). What is the process sedimentation with coagulation? Give two examples of coagulants used.

(OR)

6 (b). State the objective of filtration and disinfection in water treatment

PART-C

Answer **Two**questions and each question carries **five** Marks 2 x 5 = 10 Marks

7(a). Explain with a neat sketch canal intake.

(OR)

7(b).Estimate the population for the year 2021 from the following census data of a town by arithmetic methods.

year	1981	1991	2001	2011
population	86400	98800	115700	130500

8(a). Draw layout of water treatment plant indicating the different stages.

(OR)

8(b). Write about Pre, Post and Super Chlorination.

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

Corse Code:CE-405 **Duration:1 hour**
Course Name: Water supply and Sanitary Engineering **Max.Marks:20**

PART-A

Answer **ALL** questions and each question carries **one** Mark **4 x 1 = 4 Marks**

1. List any four appurtenances used in water supply distribution system
2. State the function of water main while making water supply arrangements in buildings
3.Mention any two shapes of surface drains.
4. Name the methods of sewage collection and disposal

PART-B

Answer **two** questions and each question carries **three** Marks **2 x 3 = 6 Marks**

5(a). State any four requirements of good distribution system.

(OR)

5(b).Write two merits and two demerits of radial layout of distribution system

6(a). Write four requirements of good surface drains.

(OR)

6(b).Define i) Sewage ii) Sewer iii) Garbage

PART-C

Answer **two** questions and each question carries **five** Marks **2 x 5 = 10 Marks**

7(a). Sketch reflux valve and state the function of it.

(OR)

7(b).Draw a layout of water supply arrangements for single storeybuilding

8(a).Find the velocity flow in a sewer, which runs half full. Assume the value of coefficient of Rugosity as 0.013 and bed slope of 1 in 100

(OR)

8(b). Write about partially separate sewerage system.

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

Corse Code:CE-405 **Duration:2 hours**
Course Name: Water supply and Sanitary Engineering **Max.Marks:40**

PART-A

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

1) State any two objectives of protected water supply scheme
2) Define Communication pipe
3) What is strength of sewage
4) List any two methods of disinfection of water
5) Mention any two shapes of non-circular sewers
6) State the function of catch basins
7) What do you mean by COD in sewage analysis
8) List any two chemical characteristics of sewage

PART-B

Answer **four** questions and each question carries **three** Marks **4 x 3 = 12 Marks**

9(a) What is disinfection of water and state its necessity in water treatment.

(OR)

9(b)State the different types of materials used for sewers

10(a)Write Manning's formula for velocity and significance of terms used in it

(OR)

10(b)Brief the significance of PH value in sewage analysis

11(a) What is the function of sewer appurtenances
i) Regulator ii) Flushing tank

(OR)

11(b) State the conditions where Circular sewer and Double egg sewer are commonly used

12(a) Write about BOD and its significance in sewage treatment

(OR)

12(b) What is activated sludge process.

PART C

Answer **four** questions and each question carries **five** Marks **4 x 5 = 20 Marks**

13 (a) Explain the working of rapid sand filter

(OR)

13 (b) Sketch a drop manhole and label the parts

14(a) Distinguish between intermittent and continuous water supply

(OR)

14(b) Write briefly about working and use of trickling filters

15(a) Explain the construction of ordinary manhole

(OR)

15 (b) Write any two merits and demerits of any two sewers based on shape

16(a) Write a brief description of plain sedimentation

(OR)

16(b)Brief about any two physical and chemical characteristics of sewage. Also mention the related tests.

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CE-406 ADVANCED SURVEYING

Course Title:	**Advanced Surveying**	Course Code :	**CE-406**
Semester:	**IV Semester**	Course Group :	**Core**
Teaching Scheme in Periods(L:T:P):	**60:15:0**	Credits :	2.5
Methodology:	**Lecture+Tutorials**	Total Contact Periods :	**75**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

Knowledge of Chain, Compass surveyingand Levelling

Course outcomes

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

CO1	Understand the principles of Trigonometric Levelling.
CO2	Explain the working principles and use of Tacheometric survey in rough terrain
CO3	Discuss the basic concepts of simple curves
CO4	Interpret data from Theodolite survey in setting out curves.
CO5	Distinguish basic concepts and principles of GPS and GIS in Surveying
CO6	Apply the skills 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	Trigonometric Levelling	12	Q4	Q1		Q9(a)	Q13(a)
2	Tacheometric Surveying	13					
3	Elements of Simple Curves	13		Q2		Q10(a)	Q14(a)
4	Curve Setting	12					
5	Advanced surveying instruments	13		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
6	Total Station	12			Q7,Q8	Q10(b),Q12(a) , Q12(b)	Q14(b),Q16(a), Q16(b)
	Total	75	8			8	8

Course Contents

UNIT 1: Trigonometric levelling

Duration:12 Periods (L:10– 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 2: 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 3: 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 4: Curve setting

Duration: 13 Periods (L: 10 – T: 3)

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 5: Advanced Surveying InstrumentsEDM,GPS and GIS

Duration: 10 Periods (L:8– T:2)

Principle and uses of EDM

Global positioning system (G.P.S) – principle – segments – space, control and user segments – receivers – observation and data processing - applications in Civil Engineering – advantages and disadvantages of GPS.

Geographical Information System (GIS) – definition – Map – Map projections – types data used – use and application of GIS in Civil Engineering.

Introduction to Photogrammetry – types of Photogrammetry – basic principles – terrestrial photogrammetry – stereo and plane table photogrammetries – stereoscope

UNIT 6: Total station

Duration: 15 Periods (L:12– T:3)

Parts and functions – setting up total station for taking observations - Use of Total Station - Measurement of distances and angles - multiple number of observations on a single station - measurement of area with single station setup - orientation of total station by resection method - establishing TBM by station elevation method - marking the centre line for a typical residential building - LS and CS for proposed road / canal / pipe line.

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

CO1 - Understand the principles of Trigonometric Levelling.

1.1 Calculate the height of an object when the base of the object is accessible.
1.2 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.

CO2 - Explain the working principles and use of Tacheometric survey in rough terrain

2.1 Explain the methods and advantages of Tacheometry.
2.2 Explain the principle of Tacheometry.
2.3 Determination of Tacheometric constants by field measurements.
2.4 Find vertical and horizontal distance of stations by Stadia observations.

2.5 Explain the principle of Tangential Tacheometry
2.6 Solve Simple problems in Tangential Tacheometry

CO3 - Discuss the basic concepts of simple curves

3.1 State the definition and notation of a simple curve.
3.2 Difference between types of curves
3.3 State and derive the relation between degree and radius of curves
3.4 Compute the elements of simple curve

CO4 - Interpret data from Theodolite survey in setting out curves..

4.1 Explain the procedure for setting out a simple curve by linear methods using Chain and Tape.
4.2 Explain the procedure for setting out a simple curve by Angular Methods- Single and Double Theodolite.
4.3 Solve problems on setting out a simple curve by linear and angular methods

CO5 - Distinguish basic concepts and principles of GPS and GIS in Surveying

5.1 Understand the principles and uses of Electronic Distance Meter (EDM) and Electronic Theodolite.
5.2 Understand Concept, application and uses of GIS in Civil Engineering
5.3 Brief introduction to Photogrammetric surveying
5.4 Understand principle, uses, application and features of Total station
5.5 Understand principle, uses, application and fundamentals of G.P.S.

CO6 - Apply the skills of Total Station in different field activities.

6.1 Explain the setting up total station for taking observations
6.2 Explain the procedure for measurement of distances and angles
6.3 Explain procedure of taking multiple number of observations on a single station
6.4 Explain the procedure for measurement of area with single station setup
6.5 Explain the procedure of traversing using total station
6.6 Explain the orientation of total station by resection method
6.7 List the steps involved in marking the centre line for a typical residential building

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 subjectapproved 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	1		2			1	1,2,4,7
CO2	2	1		2			1	1,2,4,7
CO3	2	1		2			1	1,2,4,7
CO4	2	1		2			1	1,2,4,7
CO5	2	1		3			3	1,2,4,7
CO6	2	1		3		1	3	1,2,4,6,7

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

Course Code: CE-406 **Duration:1 hour**
Course Name: Advanced Surveying **Max.Marks:20**

PART-A

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

1) Define trigonometric levelling.
2) Mention the three cases that occur in trignometric leveling.
3) Write the principle of tacheometry.
4) What is the difference between Theodolite and Tacheometer.

PART-B

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

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

(OR)

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

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

(OR)

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

PART-C

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

7(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 28º 42’ and 18º 6’ respectively. The staff readings upon the benchmark of elevation 287.28m were respectively 2.870 and 3.750 when the instrument was a 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)

7(b)A theodolite was set up at A and the angle of elevation to the top of tree was 8°-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.

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

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

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

(OR)

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

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

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

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

Course Code: CE-406 **Duration:1 hour**
Course Name: Advanced Surveying **Max.Marks:20 Marks**

PART-A

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

1) List the different types of curves.
2) What a is relation between the radius and degree of curve?
3) List the different types of curves.
4) What a is relation between the radius and degree of curve?

PART-B

Answer two questions. Each question carries *Three*marks2x3 = 6 Marks

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

(OR)

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

6(a) List the linear and angular methods of curve setting.

(OR)

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

PART-C

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

7(a) Derive a relationship between a radius and degree of a curve.

(or)

7(b) Explain the elements of simple curve?

8(a)Two straights intersect at chainage 2056.44 m and the angle of intersection is 130 0 . If the radius of the simple curve to be introduced is 50 m, set out the curve by offsets from long chord for 5m interval. find the following: (i) Chainage of the point of commencement (ii) Chainage at point of tangency (iii) Length of the long chord

(or)

8(b) Calculate the ordinates at 10m distances for a circular curve having long chord of 80m and versed sine of 4 m.

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

Course Code: CE-406 **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) List any two advantages of tangential tacheomertry.
2) Mention any two methods of setting out circular curve by chain and tape.
3) Define Deflection angle?
4) Define Point of Commencement?
5) State the principle of EDM.
6) Define photogrammetry?
7) What is Total station?
8) How does Total station work?

PART-B

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

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

(OR)

9(b) Write the uses of GPS in Civil Engineering

10(a)Two straights intersect at a chainage 1060 m and the angle of intersection is 120^0.Calculate (a) Length of long chord(b) Tangent length (c) versed sine of the curve (d) Degree of the curve.

(or)

10(b) Mention three Advantages and dis advantages of total station.

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

(or)

11(b) Uses and applications of GIS in civil engineering.

12(a) write the Precautions to be taken while using total station?

(OR)

12(b)Mention the applications of total station.

PART-C

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

13(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	-2º18'	1.500,1.800,2.4500
A	B	+8º36'	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)

13(b) Explain briefly five components of GIS..

14(a)Two tangents intersect at point B of chainage 380.00m, the deflection angle being 36^0.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)

14(b) Explain establishing TBM by station elevation method.

15(a) Explain the types of terrestrial phtogrammetry.

(OR)

15(b)Write the basic functions of the EDM instrument?

16(a) Explain the working principle of Total station?

(OR)

16(b) List the parts of total station and their functions.

CE- 407 CIVIL ENGINEERING DRAWING

Course Title:	**Civil Engineering Drawing**	Course Code :	**CE- 407**
Semester:	**IV Semester**	Course Group :	**Practical**
Teaching Scheme in Periods(L:T:P):	**15:0:30**	Credits :	**1.25**
Methodology :	**Lecture+ Practical**	Total Contact Periods :	**45**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites:

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

Course Outcomes:

On completion of the course the student will be able to

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

Course Content and Blue Print of Marks for SEE

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

Course Contents

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

a) Pipe culvert (Single Pipe)
b) R.C.C slab culvert with square return walls
c) Two-Span R.C.C T-beam Bridge with square return walls.

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

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

a) Earthen bunds – Two types.
(i) Homogeneous type (ii) Non Homogeneous type.

b) Tank surplus weir with splayed wing walls.

c) Tank sluice with tower head.

d) Canal drop (notch type)

e) Canal regulator

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

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

b) Septic tank and soak pit with details of connections

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

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

Recommended Books

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

Suggested E-learning references

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

Suggested Learning Outcomes

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

CO1 - Draw and illustrate the plan, elevation and section of culverts drawings

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

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

CO2 - Prepare the plan, elevation and section of Bridge drawings

2.1 Draw the plan, cross sectional elevation and longitudinal sectional elevation of

Pipe culvert and identify the component parts from the given set of specifications

2.2 Draw the plan, cross sectional elevation and longitudinal sectional elevation

R.C.C –slab culvert and identify the component parts from the given set of specifications.

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

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

CO3 - Sketch and draw the plan, elevation and section of Earthen bunds and Tank surplus weirs drawings

3.1 Draw the cross section view of Earthen bunds – Two types
(i) Homogeneous type (ii) Non-Homogeneous type.

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

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

CO4 - Develop the plan, elevation and section of Tank sluice and Canal drop drawings

4.1 Draw the plan, cross sectional elevation and longitudinal sectional elevation of Canal drop (notchtype)

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

CO5 - Illustrate and draw the plan, elevation and section of Sanitary block and Septic tank drawings

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

5,2 Draw the plan, cross-section elevation of Septic tank and soak pit with details of connections

CO6 - Draw the plan, elevation and section of R.C.C Overhead tank and Rain water harvesting pit drawings

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

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

Suggested Student Activities

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

CO-PO Mapping Matrix

	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		2	2	1	2	1,2,4,5,7
CO2	3	3	2	2	2	1	2	1,2,3,4,5,6,7
CO3	3	3	1	2	2	1	2	1,2,3,4,5,6,7
CO4	3	2	2	1	2	1	2	1,2,3,4,5,6,7
CO5	3	3	1	2	2	1	2	1,2,3,4,5,6,7
CO6	3	2	2	1	2	1	2	1,2,3,4,5,6,7

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

Course Code: CE- 407 **Duration:1 hour**
Course Name: CIVIL ENGINEERING DRAWING **Max.Marks:20 Marks**

PART-A

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

1. Draw the cross section of pipe culvert for following particulars.
   Internal dia of pipe = 1000mm
   External dia of pipe = 1200mm
   Width of bedding = 1600mm
   Thickness of bedding = 300mm
   Thickness of benching = 250mm
2. Draw the cross section of an abutment of slab culvert for the following data:
   Bottom level of CC bed = +45.20m
   Top level of CC bed = +45.80m
   Width of CC bed = 2.2m
   Bed level = +47.00m
   Masonry footings of abutments = Consists of two below B.L.
   Footings of equal depth and offsets on rear side only
   Width of first footing = 1.8m,
   Width of second footing = 1.6m
   Top level of abutment = + 48.50m,
   Thickness of bed block flushing
   With of top abutment = 0.3 m
   Top width of abutment = 0.9 m having batter on rear face
   Thickness of slab = 200 mm,
   Thickness of wearing course = 60mm

PART-B

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

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

i) Drain particulars
   Bed level : +50.350
   Bed width near the pipe culvert: 1200mm
   Side slopes of drain : 1:1
   General G.L. near the drain : +51.550
   Bed pitching and side slope revetment on both U/S and D/S = 200mm, rough

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

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

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

ii) Pipes Details:

Internal diameter of C.C. pipe : 1000mm
External diameter of C.C. pipe : 1200mm
Bedding for the Pipe : 250mm CC
Benching for the pipe : 300mm CC
Width of both bedding and pitching : 1800 mm
Bottom level of C.C. bedding : +50.00m
No. of pipes : One

iii) Head walls:

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

Length of head wall : 7200mm
Bottom level of head wall : +49.10
Top level C.C. bed provided under head walls : +49.10
Bottom level of C.C. bed provided under head walls: +48.80
Width of C.C. Bed : 1800mm
Bottom width of head wall : 1200mm

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

Top level of head wall : +52.00

iv) Earth fill and Embankment:

Formation width : 10,000 mm
Side slopes : 2 horizontal to 1 vertical
Formation level : +54.00
Height of earth fills : top level of formation – top level of pipe = 54.00 - 51.450 = 2.550m

v) Guide stones on both the sides of formation:

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

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

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

Specifications:

i). General

No. of spans =2
Clear width of each span =3.5m
Bed level of canal =+50.00
F.S.L =+52.00

Free board =1.0m
Road formation level =+53.58
Side slopes of canal =1:1
Road width between parapets =4.40m
Road width between kerbs =4.10m
Kerb one either side =150mmx150mm
Wing walls =Return type

ii). Foundation:

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

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

Width of CC bed:

a. For abutments =1700mm
b. for wing walls =1400mm
c. For pier =1000mm

Bottom width of stone masonry abutment at +49.70 level = 1300mm: length = 5.9m. Bottom width of stone masonry wing walls at + 49.70 level = 1000mm Length
(as measured on outer side) = 3.9m

iii). Pier:

Width of stone masonry for pier is 600 mm and is same throughout its height
(up to bed block). Cut water sharp to 60º and ease water semi-circular shape are provided.

iv). Top width of abutments and wing walls:

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

Top width of abutment = 700mm

Top width of wing wall =500mm

v). T-beams:

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

Width of rib =250 mm

Depth of rib =500 mm

Bearing for T-beams over abutments =500mm

vi). C.C bed blocks:

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

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

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

200mm thick R.C.C (1:2:4) slab is provide with 20mm thick wearing course
(C.C 1: 1 ½:3) with 8mm size stone chips. Width of R.C.C deck slab = 4.9m.

viii). Parapet:

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

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

ix.) Side revetment: Canal sides which are at 1:1 slope are provided with rough stone revetment 300mm thick over a gravel bed of 150mm thick for sufficient length. The toe wall for revetment is taken to a level of +49.40 with its bottom width equal to 450mm.
Note: Any other data required may be assumed suitably.

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

Course Code: CE- 407 **Duration:1 hour**
Course Name: CIVIL ENGINEERING DRAWING **Max.Marks:20 Marks**

PART-A

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

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

PART-B

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

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

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

(a) Tank bund :

Top width = 1·8 m

TBL = +163·500 m

MWL = +162·000

FTL = +161·300

Bed level = +159·100

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

(b)Tower head :

Internal diameter = 1·2 m

Top of RCC slab over well = +162·50

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

Opening = 600 mm dia opening is provided in the CCdiaphragm 75 mm thick for allowing water into thebarrel.

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

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

(c) Sluice barrel :

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

Roof for barrel = RCC roof slab 150 mm thick

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

CC foundation = 450 mm thick and 2550 mm wide islaid under barrel

(d) Lead chamber :

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

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

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

Profile of wing walls = Wing walls start from +

(e) Stilling cistern :

Internal dimensions : 3·0 m × 3·0 m

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

The slope fromGL to bed level is 1½ : 1.

wallhaving an opening of 600 mm for discharging waterinto field channel are 600 mm thick at bottom and450 mm thick at top, having batter on rear side. Thesewalls are taken to canal bund level +160·75

(f) Canal particulars :

Bed width = 600 mm

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

Bed level = +159·10

Width of canal bund = 900 mm
Canal bund level = +160·750
(g) Rough stone revetment :
(i) 450 mm rough stone revetment is provided on U/s over150 mm thick gravel backing from bed level to TBL
(ii) Sides of canal are provided with 300 mm thick roughstone revetment over 150 mm thick gravel backing for alength of 1·5 m. Bed pitching is also provided in thecanal to a length of 1·20 m with 300 mm size roughstone and a toe is provided at its end and taken to adepth of 600 mm below bed level of canal.Width of toe = 300 mm
(h) General ground level at the site = +159·50

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

Course Code: CE- 407 **Duration:2 hours**
Course Name: CIVIL ENGINEERING DRAWING **Max.Marks:40**

PART-A

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

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

PART-B

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

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

Top of RCC slab over well = +162·50
Thickness of well staining = 450 mm from top to adepth of 2 m and 600 mm for the remaining height
Opening = 600 mm dia opening is provided in the CC Diaphragm 75 mm thick for allowing water into thebarrel.
Shutter = Wooden shutter 750 mm wide, 1500 mmdepth and 50 mm thick is provided for regulating water
Foundation for well = 3·0 m dia and 600 mm thick
(c) Sluice barrel :
Internal dimensions = 750 mm wide × 1·0 m height
Roof for barrel = RCC roof slab 150 mm thick
Side walls of the barrel = 450 mm thick at top and600 mm thick at bottom with water face vertical
CC foundation = 450 mm thick and 2550 mm wide islaid under barrel
(d) Lead chamber :
Length of wing walls = 1·8 m (horizontal distance)
Distance between wing walls inside to inside at thereceiving end = 2·0 m
Thickness of walls = 450 mm at top and 600 mm atbottom with water face vertical
Profile of wing walls = Wing walls start from +160·25
(top of barrel slab) at the entrance of the barrel andslopes down to the bed level +159·10. The slope fromGL to bed level is 1½ : 1.
(e) Stilling cistern :
Internal dimensions : 3·0 m × 3·0 m
Side walls = All the side walls including the outer wallhaving an opening of 600 mm for discharging waterinto field channel are 600 mm thick at bottom and450 mm thick at top, having batter on rear side. Thesewalls are taken to canal bund level +160·75
(f) Canal particulars :
Bed width = 600 mm
Side slopes = 1:1 on water side and 1½:1 on rear sideup to GL
Bed level = +159·10
Width of canal bund = 900 mm
Canal bund level = +160·750
(g) Rough stone revetment :
(i) 450 mm rough stone revetment is provided on U/s over150 mm thick gravel backing from bed level to TBL
(ii) Sides of canal are provided with 300 mm thick roughstone revetment over 150 mm thick gravel backing for alength of 1·5 m. Bed pitching is also provided in thecanal to a length of 1·20 m with 300 mm size roughstone and a toe is provided at its end and taken to adepth of 600 mm below bed level of canal.
Width of toe = 300 mm
(h) General ground level at the site = +159·50

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

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

CE-408 Advanced Surveying Lab

Course Title:	**Advanced Surveying Lab**	CourseCode :	**CE-408**
Semester:	**IV Semester**	Course Group :	**Practical**
TeachingSchemeinPeriod(L: T:P):	**15:0:30**	Credits :	**1.25**
Methodology :	**Lecture+Practical**	TotalContactPeriods:	**45Periods**
CIE :	**60 Marks**	SEE :	**40 Marks**

Prerequisites

Basic knowledge of Theodolite surveying, Tacheo metric surveying, working principles of Electronic Theodolite, EDM, Total station and GPS

Course Outcomes

CO1	Apply the knowledge of Theodolite in different operations of civil engineering projects
CO2	Apply the knowledge of principles and purpose of tacheometry in finding out the constants
CO3	Formulate the setting out of curve and marking building on ground by linear and angular methods
CO4	Employ GP Sin the field for measurement of coordinates of given point on the earth
CO5	Practice operation of Total station in the field for measurement of Horizontal distance, slope distance and difference in Height between two points and area calculations

Course Contents

Unit No	UnitName	Periods
1	Trigonometric Levelling & Tacheometric Surveying	15
2	Setting out of Curves and Building Marking	12
3	EDMGPS and Total Station	18
	Total	**45**

Course Contents

UNIT1

a) Trigonometric levelling **Duration:9 Periods (L:3-P:6)**

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

b) Tacheometry **Duration: 6 Periods (L:2-P:4)**

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

UNIT2

a) Curve setting: **Duration: 9 Periods (L:3-P:6)**

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

b) Settingoutof Building **Duration:03Periods(L:1-P:2)**

Setting out center lines and foundation widths from the given drawings for excavation

UNIT3

a) Study of EDM and GPS Instruments **Duration:03 Periods (L:1-P:2)**

Demonstration of EDM Instruments – parts and functions – Study of hand held G.P.S.– measurement of coordinates (latitude, longitude and Altitude) of given point on the earth-selection and marking of routings (Way points) -navigation to any fixed point on the earth

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

Study of Total Station–General commands used-Instrument preparation and setting for taking observations – Measurement of Horizontal distance, slope distance, difference in elevation between two points – Remote Elevation Method-Remote Distance Measurement-Measurement of horizontal angle between two given station points, using Total station. -Determination of area of a field or plot and divide the area- Stakeout the Points to mark on the ground using Total Station. Establish points lines, arcs on the ground using total station

KEY Competencies to be achieved by the student

S. No	ExperimentTitle	Key Competency
1a	**TrigonometricLevelling** -	✓ Determinationof heightandreducedlevelof the top and bottom of accessible object. ✓ Determination of distance and elevation of an inaccessible object involving two instrument stations. • SinglePlane Method • DoublePlane Method
1b	**FieldExercisesusing Tacheometer**	✓ TodeterminetheTacheometricConstantsofagiven instruments by field methods ✓ Computesheightsanddistancesfromfieldobservations
2a	**Settingoutcurves**	✓ Setsout agivensimplecurveusingchain and tapeby o Offsetsfromlongchord o Radialandperpendicular offsetsfromtangent ✓ Setsout agiven simplecurveusing oneTheodolite ✓ Setsout agiven simplecurveusing Two Theodolite
2b	**BuildingMarking**	✓ Setsoutabuildinginthefieldaspertownplanning rules
3a	**StudyofEDMandGPS Instruments**	✓ DeterminetheCo-ordinates(latitude,longitudeand Altitude) of various points on the ground ✓ Navigatetoany fixedpointon theearthusing G.P.S ✓ Selectionandmarkingofroute(Waypoints)using G.P.S
3b	**FieldExercisesusing Total Station**	✓ Centeringoftotalstationoveragivenpointandsighting reflecting prism to measure distance ✓ MeasuretheHorizontalandVerticalangles.

		✓ MeasureHorizontaland slopedistances ✓ Measureareaofgivenfieldanddividethe area. ✓ FindsHeightandwidth ofanelevated object ✓ Establishpoints,Linesand Arcson the ground ✓ LocatesCentrelineof abuilding on theground

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(NewAgeInt)

Suggested E-learning references

1. http://nptel.ac.in

Suggested Learning Outcomes

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

CO1 - Apply the knowledge of Theodolite in different operations of civil engineering projects

1.1 Compute heights and distances from field observations.

1.2 Determine horizontal and vertical distances of accessible objects by using a Theodolite.

1.3 Determine horizontal and vertical distances of inaccessible objects by using two Theodolite stations

CO2 - Apply the knowledge of principles and purpose of tacheometry in finding out the constants

2.1 Determine constants of a given Tacho meter in the field

2.2 Take Tacheometric observations.

CO3 - Formulate the setting out of curve and marking building on ground by linear and angular methods

3.1 Compute the elements of curve.

3.2 Sets out simple curve by chain and tape

3.3 Setting out simple circular curve by one Theodolite and two Theodolite methods.

CO4 – Employ GPS in the field for measurement of coordinates of given point on the earth

4.1. Demonstrate of Electronic Distance meter.

4.2. List component parts of Electronic Distance meter and their functions.

4.3. Identifies the parts and the functions of GPS

4.4. Determines the Co-ordinates (latitude, longitude and altitude) of various points on the ground Navigate to any fixed point on the earth using G.P.S

4.5. Select and mark of routings (Way points) usingG.P.S.

CO5 - Practice operation of Total station in the field for measurement of Horizontal distance, slope distance and difference in Height between two points and area calculations

5.1. Demonstrate of Total Station, list the component parts of Total Station and functions

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

5.3. Determine the Horizontal and vertical angles from instrument station toany point using Total Station

5.4. Determine the Horizontal and Slope distance from instrument station toany point using Total Station

5.5. Determine the difference in Height between two points using Total Station

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

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

5.8. Prolong a straight line using Total Station

5.9. Calculate of area of a given land using Total Station

SuggestedStudentActivities

1. Roadsurvey(at leastfor150m) bytotal station.

2. Conducta traversesurvey ofagiven plot and find out thearea.

3. Preparethecontour maps of thegiven areain your locality.

4. Setout acenterlineofagiven building using theodolite.

5. Findouttheparameters ofacurveforanexisting roadinyour locality

7. Detailedstudy reporton telescopeused insurveying instrument.

8. Tosetouttwoparallellinesalongboththesides ofanobstaclebyusingtheodolite

9. Tofindthedistancebetweentwo inaccessiblepointsbyusingtrigonometriclevelling.

	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	
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2		2	1	2	2	1,2,4,5,6,7
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	1	2	2	1,2,4,5,6,7
CO5	1	1	1	2	1	2	2	1,2,3,5,7

State Board of Technical EducationandTraining,Telangana MID

SEMESTER –I Model Question paper

DCEIII Semester

CourseCode:CE-408P **Duration:1hour**

CourseName:AdvancedSurveying Lab **Max.Marks:20Marks**

Instructionstothe Candidate:

PickandAnsweranyOneof thefollowingQuestionsfromgiven list.

1. Determinetheheightofanobjectshownwhosebaseisaccessiblebyusing Transit Theodolite
2. DeterminetheElevationofanobjectwhosebaseisinaccessiblebyimplementing Single Plane Method.
3. DeterminetheElevationofanobjectwhosebaseisinaccessiblebyimplementing Double Plane Method.
4. DeterminationofHorizontaldistanceandelevationforHorizontallineofsightwith staff held vertical by Stadia hair method.
5. DeterminationofHorizontaldistanceandelevationforinclinedlineofsightwithstaff held vertical by Stadia hair method.

StateBoardofTechnicalEducationandTraining,Telangana MID

SEMESTER-II Model Question paper

DCEIII Semester

CourseCode:CE-408P **Duration:1hour**

CourseName:AdvancedSurveying Lab **Max.Marks:20Marks**

Instructionstothe Candidate:

PickandAnsweranyOneof thefollowingQuestionsfromgiven list

1. Setoutthesimplecircularcurve foraradiusof curve100mbyoffsetsfromlongchord method
2. Setoutthesimplecircularcurveforaradiusofcurve100mbyoffsets fromtangents by radial offsets method.
3. Setoutthesimplecircularcurveforaradiusofcurve100mbyoffsetsfromtangents by perpendicular offsets method.
4. Prepareasettingouttableformarkingthesimplecircularcurveongroundofradius 100m by using one Theodolite method
5. Prepareasettingouttableformarkingthesimplecircularcurveongroundofradius 100m by using two Theodolite method
6. DeterminetheCo-ordinates(latitude,longitudeandAltitude)forvariouspoints shown on ground using G.P.S.
7. Navigatetogiven fixedpointon theearthusing G.P.S

StateBoardofTechnicalEducationandTraining,Telangana

Semester End Examination

ModelQuestionpaper

DCE III Semester

Course Code: CE-408P **Duration:2 hours**

CourseName:AdvancedSurveying Lab **Max.Marks:40 Marks**

Instructionstothe Candidate:

PickandAnsweranyOneof thefollowingQuestionsfromgiven list.

1. Determinetheheightofanobjectshownwhosebaseisaccessiblebyusing Transit Theodolite
2. DeterminetheElevationofanobjectwhosebaseisinaccessiblebyimplementing Double Plane Method.
3. DeterminationofHorizontaldistanceandelevationforinclinedlineofsightwithstaff held vertical by Stadia hair method.
4. Setoutthesimplecircularcurveforaradiusofcurve100mbyoffsetsfromlongchord method
5. Setoutthesimplecircularcurveforaradiusofcurve100mbyoffsetsfromtangents by radial offsets method.
6. Prepareasettingouttableformarkingthesimplecircularcurveongroundofradius 100m by using one Theodolite method
7. DeterminetheCo-ordinates(latitude,longitudeandAltitude)forvariouspoints shown on ground using G.P.S.
8. Navigatetogiven fixedpointon theearthusing G.P.S
9. Determine the Horizontal distance fromInstrument station to any point using TotalStation
10. DeterminetheslopedistancefromInstrumentstationtoanypointusingTotalStation
11. Determinethedifference inHeightbetweentwopointsusingTotal Station
12. Setoutrightangles atdifferentpoints onabaseline usingTotal Station
13. GiveMarking planofabuilding on thegroundusing Total Station
14. Calculateofareaof agiven landusing Total Station

CE-409 BASIC CIVIL ENGINEERING CAD LAB

Course Title:	Basic Civil Engineering CAD Lab	Course Code	CE-409
Semester:	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.25
Methodology	Lecture + Practical	Total Contact Periods	45
CIE	60Marks	SEE	40Marks

Prerequisites

This course requires the basic computer skills and knowledge of Building drawing and Building services.

Course Outcomes

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

CO1	Importance and advantages of CAD.
CO2	Set drawing area and draw geometric shapes and modify as per requirement.
CO3	Develop 2D drawings for Panelled door and window, Load bearing wall and isolated column footing using CAD
CO4	Prepare 2D drawings for Civil engineering School and Hospital building drawings Using CAD
CO5	Create 2D drawings for various building services by applying the concept of layers using CAD
CO6	Practice of various 3D commands

CourseContent

Unit No	UnitName	Periods
1	Introduction to CAD Software and practice of commands & Geometric Constructions	15
2	2-DdrawingsusingCAD Software	15
3	Servicedrawingsand 3-DdrawingsusingCADSoftware	15
Total		45

CourseContents

UNIT1: Introduction to CAD Software and practice of commands & Geometric Constructions

Duration:15 Periods(L: 5– P:10)

Introduction to Computer aided Drafting (CAD) - Applications and advantages of CAD - Hardware requirements to run CAD – Practice on Draw, Modify, Construct, Edit, View, Hatch, Insert commands - Practice of Geometric constructions using above commands

UNIT2:2-DDrawingsusing CADSoftware

Duration:15 Periods(L: 5– P:10)

Planandsectionalelevationofadog-leggedstaircase–2BHK building with site plan –Plan of Primary school building –Plan of Rural Hospitalbuilding–Typical floor plan ofApartmentconsistingG+5floors

UNIT3:ServicedrawingsusingCAD Softwareand Introduction to 3-D CAD

Duration:15 Periods(L: 5– P:10)

Introduction to layers- Preparation of a simple water supply and sanitary layout –Preparation ofFire fighting layout for college building –Preparation of Plan and Section of a Manhole and Septic tank with soak pit –Shallowwell Rain water harvesting&Solarwaterheater forterrace

Introduction to 3D CAD - Practice of 3Dcommands-Viewcommands-solidscommand - solid editing/modifycommands.

ReferenceBooks

1) LearnAUTOCADin aeasywaybySunil K. Pandey,Unitech books
2) MasteringAUTOCADbyGeorge OmuraandBrainC.Benton
3) Onlinemanualsandtutorials-AUTODESK

SuggestedE-learningreferences

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

SuggestedLearningOutcomes

Aftercompletion of thecourse,thestudentshallbeableto

CO1 - Importance and advantages of CAD.

1.1 Introduction to Computer aided Drafting (CAD)

1.2 Applications and advantages of CAD

1.3 Hardware requirements to run CAD

1.4 Practiceof Drawcommands

1.5 Practiceof Modifycommands

1.6 Practiceof Constructcommands

1.7 Practiceof Editcommands

1.8 Practiceof Viewcommands

1.9 Practiceof Hatchcommands

1.10 Practiceof Insertcommands

CO2 - Set drawing area and draw geometric shapes and modify as per requirement.

2.1 DrawconventionalsignsusedincivilengineeringusingCAD

2.2 Practice of Geometric Constructions.

CO3 - Develop 2D drawings for Panelled door and window, Load bearing wall and isolated column footing using CAD

3.1 Draw crosssectionof LoadbearingwallusingCAD

3.2 Drawisolated column footingshowingdifferent componentsusingCAD

3.3 DrawPlan andsection elevation ofadog-leggedstair caseusingCAD

CO4 - Prepare 2D drawings for Civil engineering School and Hospital building drawings using CAD

4.1 PreparedrawingPlan, Elevation, section and siteplan of2BHK buildingusingCAD

4.2 Drawaplan ofaprimaryschoolusingCAD

4.3 CreatedrawingPlanofRural HospitalusingCAD

4.4 PracticedrawingtypicalfloorPlanofApartmentconsistingof 4 flats for G+5floors usingCAD

CO5 - Create 2D drawings for various building services by applying the concept of layers using CAD

5.1 CreatevariouslayerswithdifferentpropertiesinCAD

5.2 Create alayerof asimple watersupplyandsanitarylayout of abuildingusingCAD

5.3 Createalayer showingfirefightingarrangementsina building usingCAD

5.4 Createalayer showingthefoundation plan foraresidential building usingCAD

CO6 -Practice of various 3D commands

5.5 Drawplanand section ofamanholeand septictank with a soak pitusingCAD

5.6 DrawshallowwellrainwaterharvestingstructureusingCAD

5.7 DrawsolarwaterheaterusingCAD

5.8 Introduction to 3D CAD

SuggestedStudentActivities

1 Collect informationregardingvariousCAD softwareavailable andgive a presentationon them.

2 VisitanEngineeringconsultancywhichdealswithbuildingdesignanddraftingandpreparereport based onthe observations made.

3 Collectvideosshowing3Dmodelsof variousbuildings.

4 Visitaconstructionsiteofabuildingandmatchdrawingswiththeexecutionofworkandgiveaseminar basedon the observationsmade.

5 Techfest/Srujana

6 Paper/Posterpresentation

7 Quiz

8 Groupdiscussion

9 Surprisetest

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Sustainability Society, and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	1	2	2	1		1	1,2,3,4.5,7
CO2	3	2	2	3	1		2	1,2,3,4.5,7
CO3	2	2	3	3	2		2	1,2,3,4.5,7
CO4	2	3	3	3	3	2	3	1,2,3,4.5,6,7
CO5	3	3	3	3	3	2	3	1,2,3,4.5,6,7
CO6	3	2	3	3	2	1	2	1,2,3,4.5,6,7

State Board of Technical Education and Training,
TelanganaMIDSEM-I Examination
Model Question
paperDCEIV
semester

CourseCode:CE-409 **Duration:1 Hour**
CourseName:Basic Civil Engineering CAD Lab **Max.Marks:20**

InstructionstotheCandidate:

(i) PickandAnswerany One ofthefollowingQuestionsfromgivenlot.

1x20=20M

1) Drawalineof50mmanddrawfiveparallellinesat10mmdistancebyusingoffsetcommand.
2) Drawanellipsewithmajoraxis80mmandminoraxis30mmbyusinganyCADsoftware.
3) Writetext"CADLab"withCalibrifontstyleandfontsize10byusinganyCADsoftware.
4) Drawalineof10mmanddivideitintofourequalpartsbymodifyingthepointstyleto xshape and addcontinuous dimensionstodividedline.
5) Draw apentagon ofside60mm andcalculate its areabyusinganyCADsoftware.

State Board of Technical Education and Training,
TelanganaMIDSEM-II Examination
Model Question
paperDCEIVsemester

CourseCode:CE-409 **Duration:1Hour**
CourseName:Basic Civil Engineering CAD Lab **Max.Marks:20**

InstructionstotheCandidate:

(i) PickandAnswerany One ofthefollowingQuestionsfromgivenlot.

1x20=20M

1) Prepareadrawingshowingthesectionandelevation ofadogleggedstaircaseinCAD
2) PreparedrawingPlan, Elevation,section and site plan of2BHKbuildingin CAD
3) Draw atypical floorplanofPrimarySchoolin CAD
4) CreatedrawingPlan ofRural Hospital in CAD
5) Drawthetypicalfloor Plan ofApartment consistingof4 flats forG+5 floors in CAD

State Board of Technical Education and Training,
TelanganaSemesterEnd Examination
Model Question
paperDCEIVsemester

CourseCode:CE-409 **Duration:2 hours**
CourseName: Basic Civil Engineering CAD Lab **Max.Marks:40**

InstructionstotheCandidate:

(i) PickandAnsweranyOneofthefollowingQuestionsfromgivenlot.

1x40=40M

1) Prepareadrawingshowingthesectionandelevation ofadogleggedstaircaseinCAD
2) PreparedrawingPlan, Elevation,section and site plan of2BHKbuildingin CAD
3) Draw atypical floor planof PrimarySchool in CAD
4) CreatedrawingPlanofRuralHospitalin CAD
5) Drawthetypicalfloor Plan ofApartment consistingof4flats forG+5 floorsin CAD
6) Createalayershowingthewatersupplyandsanitarylayoutforthegivenplanofabuildingin CAD
7) Createalayer showingtheFirefightinglayoutforcollegebuildinginCAD
8) Preparethefoundation planforthegiven framedstructureinanotherlayerinCAD
9) UsinglayershowthePlanandSectionofaManholeandSeptictankwithsoakpitforthegiven buildingin CAD
10) CreateanotherlayershowingShallowwellrainwaterharvesting&Solarwaterheateronterrace for the given building in CAD

HU-410 EMPLOYABILITY SKILLS LAB

Course Title	**Employability Skills Lab**	**Course Code**	**HU-410**
Semester	**IV**	**Course Group**	**Practical**
Teaching Scheme in periods (L:T:P)	**15:0:30**	**Credits**	**1.25**
Methodology	**Lecture + Practical**	**Total Contact Hours**	**45(3 periods per week)**
CIE	**60 Marks**	**SEE**	**40 Marks**

Rationale:

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

Prerequisites:

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

Course Contents

Module 1: Presentation Skills: **Duration: 9 Periods (L3 P6)**

a) Significance of presentation
b) What makes a good presentation?

i. Understand, Collect, Organize, Use presentational aids and Practice
c) Tips for an effective presentation.

ii. Good Beginning – Greeting, Confidence, Body Language, Opening Ideas (Funny Videos, Ridicule. Asking Questions, Quote someone/Proverb or telling a story/referring an historical event)

iii. Unveiling – Develop systematically, usage of appropriate linkers or discourse markers. Eye contact and Effective usage of PPTs

iv. Conclusion – Summarize - Giving time to the audience for queries and Time management d) Guidelines for PPTs

Module 2: JAM **Duration: 6 Periods (L 2 P 4)**

a) What is JAM?
b) Significance of JAM
c) Enhancing Speaking skills, fluency, usage, coherence, spontaneity, voice modulation, eye contact, body language, Creativity, Sense of humor, Confidence and Time management.
d) Learn avoiding hesitation, deviation and repetition

Module 3: Group Discussion **Duration: 9 Periods (L 3 P 6)**

a) Purpose of Group Discussion
b) Types of Group Discussion
c) Different expressions and phases and their effective usage
d) Dos and Don'ts of a Group Discussion
e) Practice.

Module 4: Interview Skills **Duration: 6 Periods (L 2 P 4)**

i. Importance of interview skills
ii. Types of interviews
a) Face to Face / One to Many,
b) Telephonic.
iii. Understanding the process of interview.
a) Before the interview
b) On the day of the interview
c) After the interview
iv. FAQs, Common expressions of an interviewer and interviewee
v. Body language, Grooming and Attire.

Module 5: Workplace Awareness and Professional Ethics

Duration: 9 Periods (L 3 P 6)

a) Workplace etiquette
b) Knowledge, skills and attributes useful at workplace
c) Workplace Relationships
d) Gender sensitization
e) Professional Ethics

Module 6: Writing Skills at Workplace: **Duration: 6 Periods (L 2 P 4)**

a) Various writing formats useful at workplace

i) Emails

ii) Notice

iii) Agenda

iv) Minutes of meeting

v) Circular Memo

vi) Press release

Course Outcomes

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

CO-PO Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	Mapping POs
CO1					2	2	2	5,6,7
CO2					2	2	3	5,6,7

CO3					1	3	2	5,6,7
CO4					2	2	3	5,6,7
CO5					2	2	3	5,6,7
CO6					2	3	3	5,6,7

References:

- Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003. Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.
- Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004. Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.
- Fen sterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011.

E-Learning Resources :http://www.dailywritingtips.com/

- http://www.englishdaily626.com/c-errors.phphttp://www.owlnet.rice.edu/~cainproj/http://www.thehumorsource.com/
- http://www.indiabix.com/group-discussion/topics-with-answers/http://networketiquette.net/
- https://public.wsu.edu/~brians/errorshttp://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15

BOARD DIPLOMA EXAMINATION (C-24)
MID SEMESTER EXAMINATION – I
HU-410 EMPLOYABILITY SKILLS LAB

Time: One Hour **Total Marks: 20**

Part – A **10 marks**

Instruction: Answer any one of the following questions.

1. Write the guidelines of making a PPT?
2. What are some common mistakes which should be avoided during presentation?
3. How can you use audio -visual aids effectively to enhance your presentation?

Part – B **10 marks**

Instruction: Answer any one of the following questions.

1. What are the tips to be followed to start a JAM session?
2. What are the do's and don'ts of presenting JAM?
3. What is JAM? Write significance of JAM in communication skills.

BOARD DIPLOMA EXAMINATION (C-24)
MID SEMESTER EXAMINATION – II
HU-410 EMPLOYABILITY SKILLS LAB

Time: One Hour **Total Marks: 20**

Part – A **10 marks**

Instruction: Answer any one of the following questions.

1. List the abilities required by a person to succeed in a Group Discussion.
2. Explain how to initiate, continue and conclude a Group Discussion and mention some suitable phrases to be used in each step.
3. Mention the guidelines to be followed in a Group Discussion.

Part – B **10 marks**

Instruction: Answer any one of the following questions.

1. What precautions do you take for a telephonic interview?
2. How do you prepare for an interview?
3. Explain interview process and suitable attire for an interview?

BOARD DIPLOMA EXAMINATION (C-24)
SEMESTER END EXAMINATION
HU-410 EMPLOYABILITY SKILLS LAB

Time: Three Hours **Total Marks: 40**

Part – A **10 marks**

Instruction: Pick any one question from the given lot.

1. Write the guidelines involved in making a good presentation?
2. Describe the steps involved in JAM.
3. Mention different types phrases used in Group Discussion.
4. List few professional ethics useful at workplace.
5. Write a notice, agenda and minutes of meeting on any occasion.

Part – B **15 marks**

6. Interview / Group Discussion

Part – C **15 marks**

7. Viva Voce