Civil Engineering CO of All Semesters

Program Outcomes (POs)

At the end of successful completion of program, the graduates will be able to-

- 1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
- 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

SEMESTER III

Sr. No	Code No.	Subject	Cre dits
1.	BSC-CV301	ENGINEERING MATHEMATICS-III	04
2.	PCC-CV302	SURVEYING-I	04
3.	ESC-CV303	STRENGTH OF MATERIALS	04
4.	PCC-CV304	FLUID MECHANICS-I	04
5.	PCC-CV305	BUILDING CONSTRUCTION AND MATERIALS	05
6.	ESC-CV306	NUMERICAL METHODS	04
			25

Sr. No	Sem	Code No.	Subject	Credit
				S
1	III	BSC- CV301	ENGINEERING MATHEMATICS-III	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Solve Liner differential equations and problems related to applications of differential equation.
- 2. Perform vector differentiation.
- 3. Find probabilities by using probability distributions.
- 4. Find Laplace transform, Inverse Laplace transform of various functions and applications.
- 5. Find analytic function.

Syllabus:

		Т	'eac	hing Sch	neme	Evaluation Scheme			
Course	т	F	п	a 1		Theo (Mai	ory rks)	Practical(Mark s)	
L		1	r	t	Scheme	Max	Min. for Passing	Max	Min. for passing
					ISE	-	-	25	40%
Engineering	03	01	-	04	MSE	30	40%	-	-
Mathematics-					ESE	70	40%	-	-
III									
(BSC-									
CV301)									

SECTION I

Unit 1: Linear Differential equations with constant coefficients: (7)

1.1 Linear Differential equations with constants coefficients and their methods of solutions

1.2 Applications of Linear Differential equations with constants coefficients to Civil engineering

problems (Beam, Cantiliver and strut)

Unit 2: Vector differential calculus: (5)

2.1 Differentiation of vectors Consistency of linear system equations

2.2 Gradient of scalar point function and directional derivative

2.3 Divergence of vector point function and solenoidal vector fields

2.4 Curl of a vector point function and irrotational vector field

Unit 3: Probability Distribution: (6)

- 3.1 Random Variable
- 3.2 Binomial Distribution
- 3.3 Poisson distribution.
- 3.4 Normal distribution

SECTION II

Unit 4: Laplace Transform: (7)

4.1 Definition and transforms of elementary functions.

4.2 Properties of Laplace transform.

Unit 5: Inverse Laplace Transform: (6)

5.1 Inverse Laplace Transform Formulae.

5.2 Inverse Laplace Transform by using partial fraction and convolution theorem.

5.3 Solution of Linear Differential equations with constants coefficients.

Unit 6: Complex Variable: (5)

6.1. Functions of complex variable.

6.2 Analytic function.

6.3 Necessary and sufficient condition for f(z) to be analytic.

6.4 Cauchy –Riemann equations in Cartesian and polar coordinates.

6.4 Milne- Thomson method.

6.5 Harmonic function.

Term work:

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per the university pattern for practical batches.

2. Minimum number of assignments should be 6 covering all topics.

Text Books:

1. A text book of Applied Mathematics, Vol.I by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.

2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.

3. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.

4. A text book of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K. Sengar, Cengage Learning.

Reference Books:

- 1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
- 2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
- 3. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.

Sr. No	Sem	Code No.	Subject	Credit
				S
2	III	PCC- CV302	Surveying-I	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes: After completing of this course, student will be able to:

- 1. Determine linear and angular measurements.
- 2. Record various measurements in the field book.
- 3. Find areas of irregular figures.
- 4. Prepare plans and sections required for civil engineering projects.

Syllabus:

		Τ	'eac	hing S	cheme	Evaluation Scheme			
Course	L	Т	Р	Cred	Sche	Theory (Marks)		Practical(Ma rks)	
				it	me	Ma x.	Min. for Passing	Ma x.	Min. for Passing
					ISE	-	-	50	40%
Surveying	03	-	02	04	MSE	30	40%	-	-
-I(PCC- CV302)					ESE	70	40%	25	40%

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION I

Unit 1: Levelling and Contouring: (8)

- a) Introduction to levelling.
- b) Permanent Adjustments of dumpy level.
- c) Reciprocal levelling, Sensitivity of bubble tube, Corrections curvature and refraction.
- d) Contouring methods and applications.

Unit 2: Areas and volumes: (5)

- a) Planimeter Area of Zero Circle and Numerical.
- b) Area- Trapezoidal, Simpsons rule, Mid ordinate rule, Average ordinate.
- c) Volume- Trapezoidal and Simpsons Rule, Capacity contouring.

Unit 3: Plane Table Surveying: (5)

- a) Principles, accessories, significance and adjustments.
- b) Methods and applications of plane table survey.

SECTION - II

Unit 4: Theodolite: (6)

- a) Vernier theodolite components, uses and adjustments.
- b) Applications Trigonometrical levelling.

Unit 5: Theodolite Traversing: (7)

- a) Objectives, traverse table, plotting.
- b) Omitted measurements.

Unit 6: Applications: (5)

- a) Usage of minor instruments- Hand Level, Abney Level, Ghat Tracer and Box Sextant.
- b) Hydrographic survey.
- c) Tunnel survey.

Term Work:

- 1. Differential and reciprocal levelling, by Auto or Dumpy Level.
- 2. Two Peg Method.
- 3. Sensitivity of bubble tube.
- 4. Methods of plane table survey any two methods.
- 5. Measurement of horizontal angles by any two methods.
- 6. Trigonometrical levelling- when base is accessible.
- 7. Project drawings

Survey Projects:

- 1. Block contouring project for at least 100m x 100m- By Auto Level.
- 2. Theodolite traverse Pentagon.

Textbooks:

- 1. Surveying and Levelling Vol. I and Vol. II by T. P. Kanetkar and S.V.Kulkarni, Pune
- 1. Vidyarthi Griha Prakashan.
- 2. Surveying and Levelling by Subramanian, Oxford University Press.
- 3. Surveying, Vol. I & II by Dr. B. C. Punmia, Ashok K. Jain, ArunK. Jain, Laxmi
- 4. Publications.
- 5. Surveying and Levelling by N. N. Basak, Tata McGraw Hill.
- 6. Surveying, Vol. I & II by S. K. Duggal, TataMc-Graw Hill.
- 7. Surveying and Levelling R. Agor, Khanna Publishers, New Delhi.

Reference Books:

- 1. Principles of Surveying. Vol. I by J. G. Olliver, J. Clendinning Van Nostrand Reinhold.
- 2. Plane Surveying by A. M. Chandra, New Age International Publishers.
- 3. Surveying Vol. I & II by Dr. K. R. Arora, Standard Book House.
- 4. Plane surveying David Clark.

Sr. No	Sem	Code No.	Subject	Credit
3	III	ESC- CV30 3	STRENGTH OF MATERIALS	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Evaluate the response of elastic body for external actions and compute design forces.
- 2. Evaluate shear force and bending moment of statically determinate structure.
- 3. Analyze the stress, strain and deformation of elastic bodies under bending and shear actions.
- 4. Analyze the stress, strain and deformation of elastic bodies under external actions.

Syllabus:

		Т	each	ing Sch	eme	Evaluation Scheme			
Course	L	Т	Р	Credi t	Schem e	Theo (Mar	ry ks)	Practical(Mar ks)	
						Max	Min. for Passin g	Max ·	Min. for Passin g
G (1	03 (02	04	ISE	-	-	25	40%
Strength of Materials		00			MSE	30	40%	-	-
					ESE	70	40%	25	40%

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION I

Unit 1: Stress & Strain: (6)

- 1.1 Engineering properties of different materials.
- 1.2 Simple stress and strain, Hooke's law, elastic behavior of the body under external actions.
- 1.3 Composite sections under axial loading, temperature stresses, elastic constants.
- 1.4 Normal stresses and strains in three dimensions.

Unit 2: Shear force diagram & bending moment diagram for determinate beams: (6)

- 2.1 Concept and definition of SF & BM, relation between SFD, BMD & loading.
- 2.2 SFD & BMD due to point load, UDL, UVL & moments/couples.

Unit 3: Analysis of trusses: (6)

3.1 Introduction to truss.

3.2 Analysis of truss using method of joints & method of sections.

SECTION II

Unit 4: Bending stresses: (6)

4.1 Theory of pure bending.

4.2 Derivation of flexural formula.

4.3 Bending stress for symmetrical & unsymmetrical section.

Unit 5: Shear stresses in beam: (6)

5.1 Shear stress distribution for symmetrical & unsymmetrical section.

Unit 6: Strain Energy: (6)

6.1 Strain energy due to different types of actions, suddenly applied load, gradually applied load & impact load, strain energy method for deflection of determinate beams.

6.2 Analysis of thin walled cylinder.

1. Text Books:

- 1. "Strength of Materials" R.K.Bansal., Laxmi Publications.
- 2. "Strength of Materials" S Ramamrutham, DhanapatRai Publications.
- 3. "Structural Analysis" Bhavikatti S.S, Vikas Publications house New Dehli.
- 4. "Strength of Materials" R.K.Rajput., S.Chand Publications.

2. Reference Books:

- 1. "Mechanics of Materials" Gere and Timoshenko, CBS publishers.
- 2. "Mechanics of Material" Beer and Johnston, M.
- 3. "Strength of Material" F. L. Singer and Pytel, Harper and Row publication.

List of Experiments

Term work shall comprise of –

- A) Perform at least any Seven from following:
 - i.) Study of Universal Testing Machine.
 - ii.)Tensile test on Mild steel and TMT steel.
 - iii.) Compression test on M.S. and C.I, cement bricks or paving blocks
 - iv.) Compression test on timber.
 - v.) Direct shear test on M.S. bar.
 - vi.) Charpy or Izod Impact test on different metals.
 - vii.) Bending test on Timber.
 - viii.) Water absorption and compression test on burnt bricks.
 - ix.) Hardness test on metals.
- B) At least one assignment on each unit.

Sr. No	Sem	Code No.	Subject	Credit s
4	III	ESC- CV304	FLUID MECHANICS-I	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After successful completion of this course, student will be able to:

1. Study the basic properties of fluids and their behavior under application of various force systems.

2. Discuss the basic concepts and principles in fluid statics, fluid kinematics and fluid dynamics with their applications in fluid flow problems.

3. Recognize the principles of continuity, momentum and energy as applied to fluid in motion.

4. Apply the equations to analyze problems by making proper assumptions and learn systematic engineering methods to solve practical fluid mechanics problems.

			,	Геас	hing Sc	heme	Evaluation Scheme			
	Course		Т	Р	• Credi	Schem	Theory (Marks)		Practical(Mark s)	
					t	e	Max •	Min. for Passin g	Max •	Min. for Passin g
Fluid	l Mechanics-					ISE	-	-	25	40%
I		03	-	02	04	MSE	30	40%	-	-
(ESC	C-CV304)					ESE	70	40%	25	40%

Syllabus:

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION-I

Unit-1: Properties of fluid: (6)

Introduction: Physical Properties of Fluids (Density, Specific Weight, Specific Volume, Specific Gravity, Viscosity: Dynamic and Kinematic Viscosity, Compressibility, Surface tension, Capillary Effect, Vapour Pressure and Cavitation), Newton's law of viscosity, Types of Fluids. Pressure, Types of Pressure, Pascal's Law, Hydrostatic Law.

Unit-2: Fluid Statics: (7)

A. Pressure Measuring Devices, Pressure Head, Pressure Diagram, Total Pressure and Centre of Pressure, Forces on Plane and Curved Surfaces. Forces on vertical walls, gates and dams.

B. Buoyancy and Floatation: Archimedes's Principle, Metacentre, Stability of Submerged and Floating Bodies.

Unit-3: Fluid Kinematics: (5)

Types of Flows, Stream lines, Streak Line, Path Line, Stream Tube, Stream Bundle, Equipotential lines, velocity and acceleration of fluid, Stream Function and Velocity Potential Function, Flow Net-(Properties and Uses), Continuity Equation (3-D Cartesian Form).

SECTION-II

Unit-4: Fluid Kinetics: (7)

Forces Acting on Fluid in Motion, Euler's Equation along a Streamline, Bernaulies equations, Bernoulli's Theorem assumptions, Limitations and modifications.

Bernoulli's Applications: Venturimeter (Horizontal andVertical), Orificemeter, Orifices, Time required for Emptying the Tank, Concept of HGL and TEL.Therotical and Experimental determination of hydraulic coefficients of orifice. Introduction of mouthpiece and Rotameter.

Unit-5: Laminar and Turbulent Flow: (6)

A. Laminar Flow and Turbulent Flow: Reynold's Experiment, Hazen Poisulle's Equation for Viscous Flow through Circular Pipes, Prandtl Mixing Length Theory, Introduction to Moody's Chart.

B. Boundary Layer Theory: Concept, Various Thicknesses (Nominal, Displacement, Momentum, Energy), Hydraulically Smooth and Rough Boundaries, Separation of Boundary Layer, Control of Separation.

Unit-6: Losses in Pipes: (5)

A. Major and Minor Losses, Darcy-Wiesbach Equation, Concept of Equivalent Pipe, Dupit's Equation.

B. Pipes in Series, Parallel and Syphon, Two Reservoir Problems, Three Reservoir Problems Concept of Water hammer. Surge Tanks (Function, Location and Uses).

Text Books:

1. Fluid Mechanics – A.K. Jain – Khanna Pub., Delhi.

2. Fluid Mechanics – Hydraulic and Hydraulic Mechanics -Modi/Seth – Standard Book House, Delhi.

- 3. Fluid Mechanics S. Nagrathanam Khanna Pub., Delhi.
- 4. Fluid Mechanics Garde-Mirajgaonkar Nemchandand Bros., Roorkee.
- 5. Fluid Mechanics Arora.
- 6. Fluid Mechanics through Problems Garde R. J.
- 7. Fluid Mechanics and hydraulic machine-R.K.Bansal, Laxmi Pubication.

Reference books:

- 1. Fluid Mechanics Streeter-McGraw-Hill International Book Co., Auckland.
- 2. Elementary Fluid Mechanics H. Rouse Toppan C. Ltd. Tokyo.
- 3. Fundamentals of Fluid Mechanics, Munson, Young, Okiishi, Huebesch, Wiley Publication.
- 4. Fluid Mechanics Shames McGraw-Hill International Book Co., Auckland.

List of Experiments

Perform at least Eight Experiments from the Following:

- 1.) Study of Pressure Measuring Devices.
- 2.) Measurement of Discharge.
- 3.) Determination of Metacentric Height for Floating Bodies.
- 4.) Verification of Bernoulli's Theorem.
- 5.) Calibration of Venturimeter.
- 6.) Calibration of Orificemeter.
- 7.) Determination of Hydraulic Coefficients of Orifice.
- 8.) Reynold's Experiment.
- 9.) Determination of Friction Factor for Given Pipe.
- 10.) Determination of Minor Losses in a Given Pipe.
- 11.) Study of Moody's Chart.

Sr. No	Sem	Code No.	Subject			Credit s
5	III	PCC - CV305	BUILDING MATERIALS	CONSTRUCTION A	AND	5

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Know the building Materials.
- 2. Describe properties and suitability of various building materials.
- 3. State the different building components.
- 4. Demonstrate different bonds in brick masonary.
- 5. Produce drawings of different building components.
- 6. Explain different types of roof coverings & types of flooring.

Syllabus:

	,	TE	ACH	ING SC	CHEME	EVAL	UATION	SCHE	ME
Course				Credi t	Schem e	Theory	y (Marks)	Practical(Mar ks)	
	L	Т	Р			Max •	Min. for Passin g	Max •	Min. for Passin g
Building					ISE	-	-	50	40%
Construction and	04	-	02	05	MSE	30	40%	-	-
Materials (PCC- CV305)					ESE	70	40%	-	-

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION I

Unit 1: Engineering properties and use of following materials: (9)

- **1.1 Stones** Requirements of good building stone, uses of building stones.
- **1.2 Bricks** Manufacturing, Types (clay bricks, fly ash, cellular light weight concrete brick, aerated cement concrete brick or autoclave brick) and Engineering Properties.
- **1.3 Timber** Natural and Artificial wood and their application in Civil Engineering.
- 1.4 Steel Standard structural sections, steel as reinforcement.
- **1.5 Tiles** Ceramic, Vitrified, Natural Stone, Paving Blocks.
- 1.6 Miscellaneous Aluminium, Glass, Plastic.

Unit 2: (9)

a) **Basic requirements of a building as a whole:** Strength and stability, Dimensional stability, comfort and convenience, damp prevention, water-proofing techniques, heat insulation, day lighting and ventilation. Sound insulation and anti termite treatment.

- b) **Building components and their basic requirements** : Foundations, plinth, walls and columns in superstructure, floors, doors and windows, sills, lintels and weather sheds, roofs, steps and stairs, utility fixtures.
- c) Formwork: Materials (wooden, steel and aluminium).
- d) Foundations: Types and their suitability (Stepped, isolated, combined, strip, raft, strap or cantilever, pile.)

Unit: 3 (6)

a) Stone Masonry – Random Rubble, Uncoursed Rubble, Coursed Rubble and Ashlar Masonry.
b) Brickwork and Brick Bonds - English, Flemish, Composite masonry.

SECTION II

Unit: 4 (8)

- a) Lintel: Necessity, Materials: wood, stone, brick, steel, R.C.C. and reinforced brick lintels.
- b) **Doors** Classification, T.W. Paneled Door, Flush Door, Aluminum Glazed Doors, Steel Doors, fixtures and fastening.
- c) Windows Classification, T.W. Glazed Windows, Aluminum Glazed Windows, fixtures and fastening.

Unit: 5 (8)

Stairs: Technical terms, requirements of a good stair, uses, types, materials for construction. Design of stairs (Dog Legged, quarter turn and Open Well), Ramps, lifts and escalator.

Unit: 6 (8)

- a) **Roofs and Roof coverings:** Terms used. Roof and their selection, pitched roofs and their types, Steel Trusses types and their suitability, roof covering, material, details, fixtures manglore tiles, A. C., G. I. and Precoated sheets, concept of proflex (truss less) roof and their selection.
- b) Construction of floors: Concrete Flooring, R.C.C. slabs, R.C.C. beams and slab. Flat slab floor.
- c) Waterproofing: Materials, methods and systems.

Text Book:

- 1. Building Construction B.C.Punmia (Laxmi Publications).
- 2. Basic Civil Engineering G. K. Hiraskar (DhanpatRai Publications).
- 3. A Text Book of Building Construction S.P. Arora, S.P. Bindra (Dhanpat Rai Publications).
- 4. Construction Technology (Volume 1 to 4) R. Chudley (ELBS).
- 5. A Course in Civil Engineering Drawing V.B.Sikka (S.K.Kataria and Sons)
- 6. Civil Engineering Drawing M. Chakraborty.
- 7. Engineering Materials R.K.Rajput (S Chand).

References Book:

- 1. A to Z of Practical Building Construction and Its Management- Sandeep Mantri SatyaPrakashan, New Delhi.
- 2. Handbook of Building Construction- M. M. Goyal (Amrindra Consultancy).

Codes of standards:

- 1. SP 7- National Building Code Group 1 to 5- B.I.S. New Delhi.
- 2. I.S. 962 1989 Code for Practice for Architectural and Building Drawings.

List of Experiments:

1. Drawing to a Scale, Draw on Half Imperial Drawing Sheet.

- a. Foundations: Isolated, Combined Footing, Under Reamed Piles. (With reinforcement details)
- b. Stone Masonry: UCR, Course Rubble.
- c. Brick masonry: English bond, Flemish bond.
- d. Doors: T.W. Paneled Door.
- e. Windows: T.W., Glazed and aluminium Window.
- f. Stairs: Dog legged, quarter turn and Open well.

2. Sketch Book:

- a. Lettering, Symbols, Types of lines and dimensioning as per IS 962.
- b. Doors: Flush doors, Revolving door, Collapsible door and rolling shutter.
- c. Windows: Louvered window, Sliding Window, Bay window, Casement window, Dormer Window, Corner Window.
- d. Roofs: Line Sketches of steel trusses for different spans.
- e. Stairs: Quarter turn, bifurcated, Spiral, Geometrical.
- f. Lifts and Ramps.
- g. Formwork: footing, column and beam.

Sr. No	Sem	Code No.	Subject	Credit s
6	III	ESC - CV306	NUMERICAL METHODS	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Identify, classify and choose the most appropriate numerical method for solving a problem.
- 2. Illustrate basic theory of correlation and regression.
- 3. Form and solve Linear Programming Problem.
- 4. Use methods of solutions to solve classical problems.
- 5. Deploy skills effectively in the solution of problems in civil engineering.

Syllabus:

	TEACHING SCHEME					EVALUATION SCHEME			
Course						Theor (Mark	y (s)	Practical(Ma rks)	
	L	Т	Р	Cred it	Sche me	Ma x.	Min. for Passi ng	Ma x.	Min. for Passi ng
Numerical Methods (ESC-CV306)	03	_	02	04	ISE	-	-	50	40 %
					MS E	-	-	-	-
					ESE	-	-	-	-

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION I

Unit 1: Numerical Differentiation: (6)

- 1.1 Finite differences and difference operators.
- 1.2 Newton's forward and backward formulae.
- 1.3 Lagrange's interpolation formula.
- 1.4 Sterling central difference formulas.

Unit 2: Numerical Integration: (6)

- 2.1 Trapezoidal Rule.
- 2.2 Simpson's 1/3rd and 3/8th rules Gradient of scalar point function and directional derivative.
- 2.3 Romberg integration-recursive formula.

Unit 3: Curve Fitting:

- 3.1 Correlation and regression. (6)
- 3.2 Lines of regression of bivariate data.
- 3.3 Fitting of curves by methods of least squares (straight-line and parabola).

SECTION II

Unit 4: Linear Programming: (6)

- 4.1 Types of solutions to linear programming problems.
- 4.2 Formation of L.P.P.
- 4.3 Simplex method to solveLinear Programming Problem.

Unit 5: Partial Differential Equations: (6)

- 5.1 Elliptical equation.
- 5.2 Laplace equation.
- 5.3 Liebmen's method.

Unit 6: Calculus of variation: (6)

- 6.1. Introduction and definition.
- 6.2 Euler's Equation, Extremal.
- 6.3 Isoperimetric problem.

Text Books:

- 1. A text book of Applied Mathematics, Vol.I by P. N. Wartikar & J. N. Wartikar, Pune, Vidyarthi Griha Prakashan, Pune.
- 2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.

Reference Books:

- 1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
- 2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
- 3. A text book of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K.Sengar, Cengage Learning.
- 4. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
- 5. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.

List of Experiments:

 \square Batch wise Practical's are to be conducted. The number of students per batch should be as per University pattern for practical batches.

 \Box \Box Programs on applications to civil engineering problems using C and C++ Language

- 1. Trapezoidal Rule
- 2. Simpson's 1/3rd rule.
- 3. Simpson's 3/8th rule.
- 4. Newton's forward formula.
- 5. Least square method.
- 6. Linear Programming Problem by simplex method.
- 7. Solution of Laplace equation.
- 8. Lagrange's interpolation formula.

Minimum number of practical should be 6 covering all topics.

SEMESTER IV

Sr. No	Code No.	Subje ct	Credits
1.	ESC-CV401	STRUCTURAL MECHANICS	04
2.	PCC-CV402	SURVEYING-II	04
3.	PCC-CV403	CONCRETE TECHNOLOGY	04
4.	ESC-CV404	FLUID MECHANICS-II	04
5.	PCC-CV405	BUILDING DESIGN AND DRAWING	05
6.	ESC-CV406	ENVIRONMENTAL STUDIES	03
7	ESC-CV407	COMPUTER AIDED DESIGN	01
		Total=	25

Sr. No	Sem	Code No.	Subje ct	Credit s
1	IV	ESC- CV401	STRUCTURAL MECHANICS	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Identify the response of elastic body for external actions.
- 2. Distinguish engineering properties of the materials are understood.
- 3. Compute the design forces in the structures.
- 4. Analyze the stress, strain and deformation of elastic bodies under external forces.

Syllabus:

		Т	each	ing Sch	eme	Evaluation Scheme			
Course	L	Т	P	Credi t	Schem	Theory (Marks)		Practical(Mar ks)	
					e	Ma x.	Min. for Passin g	Ma x.	Min. for Passin g
Structural Mechanics					ISE	-	-	25	40 %
(ESC- CV401)	03	01	-	0	MSE	30	40 %	-	-
				4	ESE	70	40 %	-	-

SECTION I

Unit 1: Principal planes & stresses: (6)

- 1.1 Normal and shear stresses on any oblique plane.
- 1.2 Concept of principal planes and stresses by analytical & graphical methods (Mohr's circle of stress 2-D).
- 1.3 Theories of failure: Maximum normal stress, maximum shear stress and maximum strain energy theory.

Unit 2: Combined direct and bending stresses: (6)

- 2.1 Combined direct and bending stresses, eccentric load, core /kernel of section.
- 2.2 Stability analysis of gravity dam, retaining wall & chimney.

Unit 3: Influence line diagrams: (6)

- 3.1 Muller's Breslau's principle & its applications to statically determinate simple and compound beam.
- 3.2 ILD for member forces in statically determinate truss.

SECTION II

Unit 4: Buckling of long columns: (6)

- 4.1 Effective length for various end conditions.
- 4.2 Slenderness ratio.
- 4.3 Euler's theory & Rankine's theory.

Unit 5: Slope and deflection of determinate beams: (6)

- 5.1 Double integration method.
- 5.2 Macaulay's method.
- 5.3 Moment-Area method & Conjugate beam method.

Unit 6: Torsion of circular shaft: (6)

- 6.1. Analysis of circular shaft subjected to torsion.
- 6.2 Power transmitted to circular shaft.
- 6.3 Shafts subjected to combined bending, torsion & axial thrust.

Recommended Books:

- 1. "Strength of Materials" R.K.Bansal., Laxmi Publications.
- 2. "Strength of Materials" S Ramamrutham, DhanapatRai Publications.
- 3. "Structural Analysis" Bhavikatti S.S, Vikas Publications house New Dehli.

Reference Books:

- 1. "Mechanics of Materials" Gere and Timoshenko, CBS publishers.
- 2. "Mechanics of Material" Beer and Johnston, M.
- 3. "Strength of Material" F. L. Singer and Pytel, Harper and Row publication.
- 4. "Strength of Materials" R.K.Rajput., S.Chand Publications.

List of Experiments:

1. One assignment per unit (minimum 4 problems per assignment)

Sr. No	Sem	Code No.	Subject	Credit s
2	IV	PCC-CV402	SURVEYING-II	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Adopt the principles of advanced surveying instruments.
- 2. Formulate triangulation stations, Flight planning and Ground control points (GCPs).
- 3. Apply GIS and GPS concepts to civil engineering problems.
- 4. Design and setout curves by different methods.

Syllabus:

		Tea	aching	Scheme		Evaluation Scheme				
Course	_	-	1	a b	~ •	Theory	Theory (Marks)		Practical(Marks)	
	L	T	Р	Credit	Scheme	Max.	Min. for Passing	Max.	Min. for Passing	
Commencia de H					ISE	-	-	25	40%	
PCC-CV402	03	-	02	04	MSE	30	40%	-	-	
					ESE	70	40%	25	40%	

SECTION I

Unit 1-Measurement of distances and elevations: (7)

- a) Tachometry Principles, Suitability, Methods
- b) Stadia diaphragm, Stadia formulae.
- c) Tachometric contouring.

Unit 2 – Geodetic Surveying: (7)

- a) Triangulation Principle and Classification, system, Selection of station, Base line,
- b) Measurement, Correction and use of sub tense bar.
- c) Signals, satellite station, Reduction to center, Trilateration.

Unit 3 – Modern Surveying Equipment's and Project Surveys (4)

a) Principle of EDM, Use and applications of Total Station.

b) Reconnaissance, Preliminary and Detailed survey for road project.

SECTION II

Unit 4 – Curves: (7)

- a) Significance of curves and curve setting.
- b) Type of horizontal curve, elements of Simple, Compound curve, Transition curve introduction only, setting out of simple curve by linear and angular methods.
- c) Vertical curves types, lengths of vertical curves.

Unit 5 – Photogrammetry: (5)

- a) Types of photogrammetry, Terrestrial Photogrammetry- introduction only.
- b) Aerial photogrammetry Scale of vertical photographs, Flight planning.

Unit 6 – Modern methods of surveying: (6)

- a) Remote sensing Definition, relevance, types, electromagnetic radiation and energy sources and its characteristics, applications to civil engineering.
- b) GPS basic principles, GPS segments, receivers, applications in survey.
- c) GIS Terminology, advantages, basic components of GIS, data types, GIS analysis, applications of GIS software.

Textbooks:

- 1. Surveying and Levelling Vol. I and Vol. II by T. P. Kanetkar and S.V.Kulkarni, Pune Vidyarthi Griha Prakashan.
- 2. Surveying and Levelling by Subramanian, Oxford University Press.
- 3. Surveying, Vol. I & II by Dr. B. C. Punmia, Ashok K. Jain, ArunK.Jain, Laxmi Publications.
- 4. Surveying and Levelling by N. N. Basak, Tata McGraw Hill.
- 5. Surveying, Vol. I & II by S. K. Duggal, TataMc-Graw Hill.
- 6. Surveying and Levelling R. Agor, Khanna Publishers, New Delhi

Reference Books:

- 1. Principles of Surveying. Vol. I by J. G. Olliver, J. Clendinning Van Nostrand Reinhold.
- 2. Plane Surveying by A. M. Chandra, New Age International Publishers.
- 3. Surveying Vol. I & II by Dr. K. R. Arora, Standard Book House.
- 4. Elements of Photogrammetry Paul R. Wolf, McGraw Hill Publication.
- 5. Remote sensing and Geographical Information System- A. M. Chandra and S. K. Ghosh, Narosa Publishing House.
- 6. Advanced Surveying -Total Station, GIS and Remote Sensing Satheesh Gopi, R. Sathikumar and N. Madhu, Pearson publication.
- 7. The GIS Book, 5Th Edition, George B. Korte, PE onwards press.

List of Experiments:

- 1. Tacheometry
 - a. Determination of tacheometric constants.
 - b. Determination of grade of a given line.
 - c. Determination of area of polygon.
 - d. Measurement of horizontal distance by Substance Bar.
- 2. Experiments using total station any two.
- 3. Setting out of simple curve- one linear and one angular method

- 4. Use of GPS.
- 5. Project drawings.

Survey Projects:

- 1. Road project at least 1000m.
- 2. Radial contouring.

Sr. No	Sem	Code No.	Subject	Credit s
3	IV	PCC-CV403	CONCRETE TECHNOLOGY	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Impart knowledge of physical properties of ingredients of concrete and their effect on strength and durability.
- 2. Explain the fundamentals of process of making good quality concrete and its elastic properties.
- 3. Understand the factors affecting properties of concrete.
- 4. Design the concrete mix proportion as per Indian standard code of practice.
- 5. Demonstrate Non Destructive Testing (NDT) and evaluate quality of existing concrete.
- 6. Understand different types of concrete and their applications.

Syllabus:

			Те	eaching So	cheme	Evaluation Scheme				
~						Theo	ry (Marks)	Pract	Practical(Marks)	
Course	L	Т	Р	Credit	edit Scheme N		Min. for Passi	Ma x.	Min. for Passi	
							ng		ng	
Concrete					ISE	-	-	25	40	
Technology	03	-	02	04					%	
PCC-CV403					MSE	30	40	-	-	
							%			
					ESE	70	40	25	40	
							%		%	

SECTION I

Unit 1 Ingredients of Concrete: (7)

Cement: Manufacturing process of cement, chemical composition, grades of cement, hydration, types of cement, Tests for cement: fineness, Standard consistency, setting time, soundness and compressive strength.

Aggregates: classification, requirements, Tests for coarse aggregates: specific gravity, grading of aggregate, Flakiness index, Elongation Index, Impact value, abrasion value, crushing value. Tests for

fine aggregates: specific gravity, sieve analysis, fineness modulus. Alkali aggregate reaction, bulking of sand, Artificial and Recycled aggregate.

Water: general requirements, quality of water.

Unit 2 Fresh Concrete: (6)

Workability: factors affecting, different tests for measurement of workability. Segregation, bleeding. Manufacturing process of concrete: batching, mixing, transportation, compaction, curing of concrete, curing methods.

Unit 3 Hardened concrete: (8)

Strength of concrete: w/c ratio, gel/space ratio, gain of strength with age, maturity concept of concrete, effect of maximum size of aggregate on strength. Test on hardened concrete: compressive strength, comparison of compressive strength between cube test and cylinder test, flexural strength. Relation between compressive and tensile strength. Elastic constants, factors affecting modulus of elasticity, definition and factors affecting creep and shrinkage. Nondestructive testing: Schmidt's rebound hammer, Ultrasonic pulse velocity method.

SECTION II

Unit 4 Concrete Mix Design: (8)

Objectives of mix design, different methods of mix design, factors affecting mix proportions, quality control of concrete, statistical methods, acceptance criteria, Numerical on mix design by ACI 211.1-1991, IS 10262-2009andIS 456-2000. Mix design of fly ash concrete by IS 10262-2009.

Unit 5 Admixtures in concrete: (5)

- a) Chemical Admixtures: Plasticizers, Super plasticizers, Retarders, Air entraining agents, IS 9103Specifications
- b) Mineral Admixtures: Fly ash, Silica Fume, GGBS, Rice husk ash, metakaolin

Unit 6 Special Concretes and Durability of concrete: (6)

- a. Special Concretes: Light weight concrete, Polymer modified concrete, concept of fibre reinforced concrete, High performance concrete, Pumpable concrete, Roller compacted concrete, Self compacting concrete.
- b. Durability of concrete: Significance, Permeability and Durability, Chemical Attack, Sulphate attack, Attack by Seawater, Acid attack, Chloride attack, Carbonation of concrete and its determination.

Text books:

- 1. Shetty, M.S., Concrete Technology, S. Chand Publication.
- 2. Gambhir, M.L., Concrete Technology, Tata McGraw Hill.

Reference books:

- 1. A. M. Neville, J. J. Brooks, "Concrete Technology" Pearson Education India
- 2. A. M. Neville, "Properties of Concrete", Pearson Education India.
- 3. R.S. Varshney, "Concrete Technology", Oxford and IBH.
- 4. P. Kumar Mehta, "Microstructure and properties of concrete", Prentice Hall.SP-26.

IS codes:

- 1. IS: 10262 2009, Recommended guidelines for Concrete Mix Design.
- 2. IS: 456- 2000, Indian Standard Plain and Reinforced Concrete.

List of Experiments:

Perform At least any 12 experiments from following:

- 1. To determine fineness of cement by Sieve analysis and/or Blaine's air permeability method.
- 2. To determine the standard consistency of cement using Vicat's apparatus.
- 3. To determine initial and final setting time of cement.
- 4. Determination of soundness of cement by Le-Chatelier's apparatus and/or Auto Clave test.
- 5. To determine compressive strength of cement.
- 6. Determination of particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate).
- 7. Determination of specific gravity of fine aggregates.
- 8. Determination of specific gravity and water absorption of coarse aggregates.
- 9. To determine flakiness and elongation index of coarse aggregates.
- 10. To determine workability of fresh concrete by using slump cone.
- 11. To determine compaction factor for workability of fresh concrete.
- 12. To determine workability of fresh concrete by using Vee Bee Consitometer.
- 13. Nondestructive test on concrete by: Rebound Hammer Test, Ultrasonic Pulse Velocity Test.
- 14. Tests for compressive strength of concrete cubes for M20 or M30 (ACI 211.1-91, IS 10262- 2009 and IS 456 2000).

Sr. No	Sem	Code No.	Subject	Credit
				S
4	IV	ESC-CV404	FLUID MECHANICS-II	04

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After successful completion of this course, student will be able to:

1. Provide students with basic knowledge of fluid properties and utilizing principles developed in fluid mechanics.

2. Develop the principle and equation for pressure flow and momentum analysis.

3. Provide the students with the analytical knowledge of pressure and velocity distribution in an open channel in order to solve practical problems.

4. Illustrate and develop the equations and design principles for open channel flows, including sanitary and storm sewer design and flood control hydraulics.

Syllabus:

		Т	eachir	ng Scheme	<u>)</u>	Evaluation Scheme			
Course						Theory	v (Marks)	Practical(Marks)	
Course	L	Τ	Р	Credit	Scheme	Ma x.	Min. for Passi ng	Ma x.	Min. for Passi ng
Fluid Mechanics-II					ISE	-	-	25	40%
ESC-CV404	03	-	02	04	MSE	30	40 %	-	-
					ESE	70	40 %	-	_

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION I

Unit-1: Uniform Flow in Open Channel: (6)

- A. Introduction, Difference between Pipe Flow and Open Channel Flow. Types of Open Channels, Types of Flows in Open Channel, Geometric Elements, Velocity Distribution, Measurement of Velocity- (Pitot tube, Current Meter)
- B. Steady and Uniform Flow: Characteristics of uniform flow, Chezy's and Manning's Formula, Uniform Flow Computations, Hydraulically Efficient Section (Rectangular, Triangular, Trapezoidal)

Unit -2: Gradually Varied Flow (GVF): (6)

- A. Depth Energy Relationship in Open Channel Flow: Specific Energy (Definition and Diagram, Critical, Sub-Critical, Super-Critical Flow), Specific Force (Definition and Diagram)
- B. Gradually Varied Flow (GVF): Definition, Classification of Channel Slopes, Dynamic Equation of GVF (Assumption and Derivation), Classification of GVF Profiles- Practical Examples, Direct Step Method of Computation of GVF Profiles.

Unit-3: Rapidly Varied Flow (RVF): (6)

- A. Rapidly Varied Flow (RVF): Definition, Hydraulic Jump- Phenomenon, Conjugate Depth Relationship, Characteristics, Hydraulic Jump (uses, types, location and application) ,Hydraulic Jump as an Energy Dissipater, Surges in open channel- Positive and Negative Surge.
- B. Spatially Varied Flow: Introduction, Basic Principles and Assumptions.

SECTION II

Unit-4: Notches and Weirs: (7)

Types, Derivation of Discharge Equation, Velocity of Approach, Francis Formula, Calibration of Notches, Errors in Measurement of Discharge, Sharp, Broad and Round Crested Weirs, Calibration of Weir, Time of Emptying Tank with Weir.

Unit-5: Impact of Jet : (6)

Impulse Momentum Principle, Impact of Jet on Vanes- Flat, Curved (Stationary and Moving), Inlet and Outlet Velocity Triangles, Series of Flat, Curved Vanes Mounted on Wheel.

Unit-6: Pumps and Turbines: (5)

A. Hydraulic Turbines: Importance of Hydro-Power, Classification of Turbines- Pelton, Francis and Kaplan Turbine (Detailed Design Need Not To Be Dealt With), Unit Quantities, Specific Speed, Performance Characteristics, Selection of Type of Turbine, Concept of Draft Tube.

B. Centrifugal Pump: Classification, Component Parts, Working of Centrifugal Pump, Performance Characteristics, Common Pump Troubles and Remedies, Net Positive Suction Head (NPSH).

Text Books:

- 1. Fluid Mechanics A.K. Jain Khanna Pub., Delhi.
- 2. Open Channel flow Rangaraju Tata McGraw-Hill Pub. Co., Delhi.
- 3. Fluid Mechanics K. Subramanyam Tata McGraw-Hill Pub. Co., Delhi.
- 4. Fluid Mechanics Hydraulic and Hydraulic Mechanics -Modi / Seth Standard Book House, New Delhi.
- 5. Flow in open channel K. Subramanyam Tata McGraw-Hill Pub. Co., Delhi.
- 6. Fluid Mechanics and hydraulic machine-R.K.Bansal, Laxmi Pubication.

Reference Books:

- 1. Fluid Mechanics Streeter-McGraw-Hill International Book Co., Auckland.
- 2. Flow in open channel V. T. Chaw McGraw-Hill International Book Co., Auckland.
- 3. Fluid Mechanics K. L. Kumar Eurasia Publication House, Delhi.

List of Experiments:

- A. Perform at least three experiments from the Following:
 - 1. Study of Specific Energy Curve for Different Discharges.
 - 2. Calibration of V-Notch / Rectangular Notch.
 - 3. Study of Hydraulic Jump.
 - 4. Study of Flow over Weirs.
 - 5. Impact of Jet.
 - B. Study of Turbines (Demonstration).
 - C. Test on Centrifugal Pump.
 - D. Visit report of Hydropower Plant.
 - E. Assignments on GVF and SVF.

Sr. No	Sem	Code No.	Subject	Credit s	
5	IV	PCC-CV405	BUILDING DESIGN AND DRAWING	05	

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

After completion of this course students will be able to:

- 1. Know principles of building planning.
- 2. Describe Building Bye-Laws and regulations.
- 3. Plan and draw residential building considering principle of planning and Building Bye- Laws and regulations.

- 4. Explain techniques of maintenance, repair and rehabilitation of structure.
- 5. Draw the working drawing of foundation detail, plumbing and electrification of building.
- 6. Illustrate the concept of ventilation, air conditioning and thermal insulation.
- 7. Describe different types of building finishes.

Syllabus:

		Teaching Scheme					Evaluation Scheme				
~						Theor	y (Marks)	Practi	cal(Marks)		
Cour se	L	Т	Р	Credit	Scheme	Ma x.	Min. for Passing	Ma x.	Min. for Passing		
Building Design and Drawing	03	_	04	0	ISE	-	-	50	40 %		
PCC-CV405				5	MS E	30	40 %	-	-		
					ES E	70	40 %	50	40 %		

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION I

Unit: 1 (4)

Site Selection criteria: Principles of Building planning, Significance Sun path diagram, Wind Diagram, Orientation, Factors affecting, criteria under Indian condition.

Unit: 2 (9)

Building Planning Byelaws and regulations: As per SP-7, 1983 National Building code of India `group 1 to 5.

Planning of Residential Building: (Bungalows, Row Bungalows, Apartments and Twin Bungalows) Procedure of Building Permission, significance of commencement, plinth completion or occupancy certificate.

Unit: 3 (5)

Low cost Housing: Materials and Methods (conceptual introduction only) Maintenance, Repairs, Rehabilitation of Structures: (Conceptual introduction only) Green building: Concept and rating..

Unit: 4 (6)

SECTION II

Plumbing system: Various Materials for system like A-PVC, C-PVC, GI, and HDPE. Various types of traps, Fittings, Chambers, Need of Septic Tank, Concept of Plumbing and Drainage plan, introduction to rainwater harvesting.

Electrification: Concealed and Open Wiring, Requirements and Location of various points, Concept of Earthing.

Fire resistance in building: Fire protection precautions, confining of fire, fire hazards, Characteristics of fire resisting materials, building materials and their resistance to fire.

Unit: 5 (7)

Ventilation: Definition and necessity of Ventilation, functional requirement, various system and selection criteria.

Air conditioning: Purpose, Classification, Principles, Systems and Various Components of the same.

Thermal Insulation: General concept, Materials, Methods.

Introduction to Acoustics: Absorption of sound, various materials, conditions for good acoustics.

Sound Insulation: Methods of noise control.

Unit: 6 (5)

Paints: Different types and application methods.Plastering: Pointing and various techniques.Wall cladding: Skirting, dado work with various materials.Miscellaneous finishes: POP, Gypsum plaster.

Text Book:

- 1. Building Construction B.C.Punmia (Laxmi Publications).
- 2. Basic Civil Engineering G. K. Hiraskar (DhanpatRai Publications).
- 3. A Text Book of Building Construction S.P. Arora, S.P. Bindra (Dhanpat Rai Publications).
- 4. Construction Technology (Volume 1 to 4) R. Chudley (ELBS).
- 5. A Course in Civil Engineering Drawing V.B.Sikka (S.K.Kataria and Sons).
- 6. Civil Engineering Drawing M. Chakraborty.
- 7. Engineering Materials R.K.Rajput (S. Chand).

References Books:

- 1. A to Z of Practical Building Construction and Its Management- Sandeep Mantri (SatyaPrakashan, New Delhi).
- 2. Handbook of Building Construction- M. M. Goyal (Amrindra Consultancy (P. Ltd.).
- 3. Form follows feelings, the Architectural Pramod Beri, Anjali Prakashan.

Code of Standards:

- 1. SP 7- National Building Code Group 1 to 5- B.I.S. New Delhi.
- 2. I.S. 962 1989 Code for Practice for Architectural and Building Drawings.

List of Experiments:

1. Imperial size sheet based on actual measurement of existing residential building consisting of plan, elevation, section passing through staircase, Site plan, Area statement and brief Specifications (G+1 building and minimum 5 rooms, Measurement drawing should be done in group of maximum 5 students).

Note: The center line plan drawn expected to be transferred on ground as an exercise.

- 2. Planning and design of residential building (G+1).
- 3. Full set of drawings for the building planned in 2- (a) Municipal Submission drawing. (b) Working Drawings (Max. 2 student group).
- Foundation / Center Line Drawing.
- Furniture layout plan.
- Electrification plan.
- Water supply and drainage plan.
- 4. Project report giving details of following systems
- Stair Case
- Drainage System
- Water Supply System

- Water Tank
- Septic Tank
- Design of terrace Drainage System.

5. Site visit along with report.

Sr. No	Sem	Code No.	Subje ct	Credit s
6	IV	ESC-CV406	ENVIRONMENTAL STUDIES	03

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

COs:

- 1. To study about environment and ecosystems.
- 2. To study about different types of natural resource.
- 3. Knowledge and concept of biodiversity and its conservation.
- 4. Basic knowledge and concept of causes, effect and control of different type of environmental pollution.
- 5. To study population growth and its impact on environment.

		Tea	aching	Scheme		Evaluation Scheme			
Course	L	Т	Р	Credit	Scheme	Theory (Marks)		Practical(Mark s)	
						Ma x.	Min. for Passing	Ma x.	Min. for Passing
Environmental					ISE	-	-	-	-
studies	03	-	-	0	MSE	30	40 V	-	-
				3	ESE	70	40		
					LSL	,0	%		

Syllabus:

Unit1. Nature of Environmental Studies:

(2 lectures)

Definition, scope and importance. Multidisciplinary nature of environmental studies. Need for publicawareness.

Unit2. Natural Resources and Associated Problems:

(8 lectures)

a) Forest resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using

mineral resources. d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and non- renewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individuals in conservation of natural resources.

Unit3. Ecosystems :

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers.

Energy flow in the ecosystem. Ecological succession. Food chains, food webs and

ecological pyramids. Introduction, types, characteristics features, structure and function of

the following ecosystem :-

a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem, d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit4. Biodiversity and its conservation :

Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghat as a biodiversity region. Hot-spots of

biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit5. Environmental Pollution :

Definition: Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of a individual in prevention of pollution.

Unit6. Social Issues and the Environment :

Disaster management: floods, earthquake, cyclone, tsunami and landslides Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and

(8 lectures)

(8 lectures)

(8 lectures)

(8 lectures)

rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.

Unit7. Environmental Protection :

From Unsustainable to Sustainable development Environmental Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act Wildlife Protection Act ForestConservation Act

Population Growth and Human Health, Human Rights.

Unit8. Field Work :

Visit to a local area to document environmental assets - River/forest/grassland/hill/mountain.

or

Visit to a local polluted site - Urban/Rural/Industrial/Agricultural

or

Study of common plants, insects, birds.

or

Study of simple ecosystems - ponds, river, hill

slopes, etc.(Field work is equal to 10 lecture hours)

Sr. No	Sem	Code No.	Subje ct	Credit s
07	IV	ESC- CV407	COMPUTER AIDED DRAWING(CAD)	01

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Outcomes:

At the end of the course the students should be able to:

- 1) Describe Auto-Cad Commonds .
- 2) Draw 2D Auto-Cad Drawing of residential Building.
- 3) Draw Muncipal and Working Drawings

(8 lectures)

(10 lectures)

or

Syllabus:

		Ί	eac	ching So	cheme	Evaluation Scheme			
Course		_	Р	Credi t	Schem e	(Marks)		Practical(Mar ks)	
Code And Title	L	T				Ma x.	Min. for Passi ng	Max •	Min. for passin g
Computer Aided					ISE	-	-	50	40%
Drawing ESC-CV407			02	01	MSE	-	-	-	-
					ESE	-	-	-	-

ISE: InSemesterEvaluation MSE: MidSemesterEvaluation ESE: End Semester Evaluation List of Experiments:

Assignment No 1

Study of Auto Cad Commonds

Assignment No 2

Preparation of 2D Auto Cad drawing consisting of plan and elevation of 2BHK house with minimum needs.

Assignment No 3

Preparation of 2D Auto Cad Muncipal Drawing

Assignment No 4

Preparation of ANY one of the working drawings Project prepared in the term work of subject building design and Drawing.

Reference Books:

- 1. Auto Cad David Frey (BPB Sybex Publications)
- 2. Auto Cad George Omura

	SEMESTER-V											
Sr. No	Code No.		Course(Subject Title) Semester									
1	PCC-CV501	WRE-I	Water Resource Engineering-I	5	4							
2	PCC-CV502	DSS	Design of Steel Structures	5	5							
3	PCC-CV503	EE-I	Environmental Engineering-I	5	4							
4	PCC-CV504	GTE-I	Geotechnical Engineering-I	5	5							
5	PCC-CV505	BPD	Building Planning and Design	5	4							
6	OEC-CV506	OE-I	Open Elective-I	5	3							
тот	AL				25							

Third Year B. Tech.(Civil)Semester-V Water Resources Engineering–I

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
1	PCC-CV501	WRE-I	Water Resource Engineering-I	5	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To impart the basic knowledge of importance of Hydrology & irrigation in water resources development.
- 2. To know various hydrometeorological parameters and their estimation.
- 3. To create awareness about floods, their estimation using various methods.
- 4. To understand the importance of irrigation in Indian agricultural industry considering cropping patterns.
- 5. To understand the principles of water shed management and water harvesting.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Apply the knowledge of estimation of hydrometeorological parameters.
- 2. Estimated irectrun off and peak discharge using hydrograph technique.
- 3. Apply different method so efficient irrigation and water conservation.
- 4. Determine reservoir capacity based on crop water requirement.

Course	Teaching Scheme				Evaluation Scheme				
				Credit		Theory(Marks)		Practical(Marks)	
	L	Т	Р		Scheme	Max.	Min. for	Max	Min. for
							passing	Ivian.	passing
	03		02	04	ISE			50	20
(PCC-CV501)					CIE	30	12		
					ESE	70	28	25	10

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

SECTION I

Unit1: Hydrology and Precipitation

- 1.1 Introduction of Hydrology: Definition, Importance and scope of hydrology, Hydrologic cycle.
- 1.2 *Precipitation:* Forms and types of precipitation, Methods of measurement, Rain-gauge Network, Determination of average precipitation over the catchment & its numerical,

6hrs

Estimation of missing rainfall data, Graphical representation of rainfall - Mass rainfall curves, Double mass rainfall curve, Rainfall hyetograph.

Unit2: Evaporation and Runoff

- 2.1 *Evaporation:* Process, Factors affecting, Measurement and control of evaporation.
- 2.2 Evaporation Transpiration: Process, factors affecting, Measurement.
- 2.3 *Infiltration:* Process, Factors affecting and measurement of infiltration, in filtration indices & its numerical.
- 2.4 *Runoff:* Classification, Factors affecting runoff, Determination of runoff-empirical equations, Rainfall runoff co-relation.

Unit3: Hydrograph and Floods

3.1 *Hydrograph:* Components of Storm hydrograph, Base flow and Separation of base flow, Directrunoffhydrograph,Unithydrograph–theory,assumptionsandlimitations,

Derivation and use of unit hydrograph, Conversion of UH of different durations using Principle of Superposition & S-curve hydrograph.

3.2 *Floods:* Introduction of river gauging, Estimation of peak flow- empirical equations, rational method; Importance of -Design flood, Standard project flood, Maximum probable flood.

SECTION II

Unit4: Ground Water Hydrology

- 4.1 *Ground Water Hydrology:* Occurrence, Distribution and classification of ground water, Darcy's law, Aquifer parameters Permeability, Specific yield, Specific retention, Porosity, Storage coefficient, Transmissibility.
- 4.2 Hydraulics of Well: Under steady flow conditions in confined and unconfined aquifers.
- 4.3 *Construction:* Tube well sand open wells.(Construction features only)

Unit5: Irrigation and Minor Irrigation Works

- 5.1 *Introduction to Irrigation:* Definition and necessity of irrigation, ill-effects of irrigation, Systems of irrigation- Surface, Sub-surface (Drip irrigation), Sprinkler irrigation; Water logging and land drainage, Assessment of irrigation water.
- 5.2 *MinorIrrigationWorks*: Generallayout, maincomponents and functioning of 1. Percolation tanks 2.K.T.Weir, 3.Bandharairrigation4.Lift irrigation

Unit6: Water Requirements of Crops

6.1 *Water Requirement of Crops*: Principal crops and crop seasons cropping pattern and crop rotation, Classes and availability of soil water, depth and frequency of watering, Duty, delta, base period and their relationship, factors affecting duty, methods of improving duty, Numerical on command area calculations and reservoir capacity based on crop water requirement.

Term Work:

Assignments on the following topics

- 1. Determination of average annual rainfall using Thiessens polygon & Isohyetalmap method.
- 2. Consistency of rain gauge station by double mass rainfall curves.
- 3. Determination of evaporation losses, effective rainfall hyetograph in filtration losses–Phi index calculation, Horton's infiltration curve.
- 4. Todevelopaunithydrographfromatotalrunoffhydrographresultingfromisolated storms.
- 5. AlterationofbaseperiodofgivenunithydrographusingmethodofsuperpositionandS- curve technique.
- 6. Determination of well discharge in a confined /unconfined aquifer.
- 7. Layout of Percolation tank, K .T. Weir, Bandhara Irrigation, Lift Irrigation.
- 8. Estimating depth and frequency of irrigation on the basis on soil moisture regime concept.
- 9. Crop water requirement and irrigation command are calculations.

6hrs

6hrs

6hrs

6hrs

6hrs

- 10. AbriefreportonintroductiontoGISsoftwareinWaterResourceEngineering.
- 11. Site visit & report on meteorological station.

Text Books:

- 1. "Irrigation engineering"-S. K .Garg- Khanna Publishers, Delhi.
- 2. "Water Resource s& Irrigation engineering"-Dr .K. R. Arora, Standard Publisher.
- 3. "Irrigation, Water Resources and Water Power Engineering" Dr P.N. Modi, Standard Book House.
- 4. "IrrigationandWaterPowerEngineering"–Dr.PunmiaandDr.Pande–LaxmiPublications, Delhi
- 5. "Engineering Hydrology"-Dr.K. Subramanya,-Tata Mc Graw Hill, NewDelhi.
- 6. "Hydrology"-Dr.P. Jayarami Reddy ,Laxmi Publications, New Delhi
- 7. "Engineering Hydrology"–Dr. Raghunath H.M.-New Age International Publishers.
- 8. "Watershed Management in India"–J.V. S .Murthy–Wiley Eastern Publications, Delhi.
- 9. "Irrigation Engineering"–Dahigaonkar, Asian Book Pvt Ltd.
- 10. "Irrigation Engineering"-S.R. Sahastrabudhe, Katson Publishers.

Reference Books:

- 1. "Hydrology and water resources"-R.K.Sharma, Dhanpatraiandsons, NewDelhi.
- 2. "Theory and design of irrigation structures" Varshney, Gupta and Gupta, vol. I and II and III, New Chand and Brothers.
- 3. "Irrigation Theory and practice"-Michael, Vikas Publications House.
- 4. "Water management"-Jaspal Sing, M.S.Acharya, Arun Sharma, HimanshuPublications.
- 5. "Design of M.I. and Canal Structure" -Satyanarayan and R. Murthy, Wiley Eastern Ltd, New Delhi.
- 6. "Irrigation Engineering"-Raghunath, Wiley Eastern Ltd, New Delhi.

Guidelines Regarding Question Paper Setting:

- 1. Q.No.4andQ.No.8are compulsory and it should be based on all units of respective sections.
- 2. Attempt any two questions from Q. No.1, 2,3 and any two questions from Q. No.5, 6, 7.

End Semester Examination Paper Pattern

Question No.	Based on Unit No.	Marks
1.	1	10
2.	2	10
3.	3	10
4.	1,2 & 3 (Compulsory)	15
5.	4	10
6.	5	10
7.	6	10
8.	4,5 & 6 (Compulsory)	15

Third Year B. Tech. (Civil) Semester –V Design of Steel Structures

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
2	PCC-CV502	DSS	Design of Steel Structures	5	5

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To understand the behavior of elements of steel structure.
- 2. To understand the design concept of steel structure and its members by LSM.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Describe the design philosophy, behavior of steel structure and failure mechanism.
- 2. Analyze and design different types of bolted & welded connections.
- 3. Assess the strength of structural members as per Indian Standards.
- 4. Analyze and design members subjected to tension, compression and flexure.

Syllabus

Course	,	Teach	ning S	cheme	Evaluation Scheme					
				Credit		Theory(Marks)		Practical(Marks)		
	L	Т	Р		Scheme	Max	Min. for	Max	Min. for	
							Passing		Passing	
DCC					ISE			25	10	
DSS	04		02	05	CIE	30	12			
(FCC-CV302)					ESE	70	28			

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

SECTION-I

Unit1: Introduction and Connections

1.1 *Introduction:* Design philosophy, Advantages and disadvantages of steel structures, Types of steel structures, Grades of structural steel, Loads and load combinations, Partial safety factors for load and materials for steel structures.

1.2

ctions: Bolted & welded- Analysis and design of axially and eccentrically loaded bolted and welded connections.

Unit2: Tension Members

8hrs

Conne

- 2.1 Common sections, Net area, Modes of failure, Load carrying capacity.
- 2.2 Design of tension members.

Unit3:Compression Members

- 3.1 Compression members as struts common Sections, Economical sections, Effective length, Slenderness ratio, Modes of failure, Classification of cross section, Behavior of compression member, Load carrying capacity
 3.2 Design of compression members- Single and double angle.
 - SECTION-II

Unit4:Column and Column Bases

- 4.1 *Columns:* Design of column subjected to axial and eccentric loading, Design of lacing, Battening system, Column splices.
- 4.2 *Column Bases* :Design of slab base & gusseted base subjected to axial and eccentric loading, Design of concrete pedestal (dimensions only)

Unit 5: Beams

- 5.1 Beam in flexure Types of sections, Behavior, Design of laterally supported and unsupported beams, Rolled steel sections, Built up beams/compound beams using flange plates, Curtailment of flange plates,
- 5.2 Design for strength and serviceability
- 5.3 Web buckling & web crippling.

Unit6: Gantry Girder

- 6.1 Forces acting on gantry girder ,Commonly used sections
- 6.2 Design of gantry girder as laterally unsupported beam
- 6.3 Connection details

Term Work:

One assignment per unit with minimum four numerical in each assignment

Text Books:

- 1. "Limit State Design of Steel Structures"-Duggal S.K.-Tata McGraw-Hill Education private Ltd., New Delhi, 2nd Edition 2014
- 2. "Design of Steel Structures: By Limit State Method as Per IS: 800 –2007"-Bhavikatti S. S., I K International Publishing House.
- 3. "Limit State Design in Structural Steel"-ShiyekarM.R,2nd Edition ,PHI Publisher
- 4. "Design of Steel Structures"-Dayaratnam, Wheeler Publications, NewDelhi.
- 5. "Design of Steel Structures"-B.C.Punmia ,A.K. Jainand Arun Kumar Jain ,Laxmi Publication

Reference Books:

- 1. "LRFD Steel Design"-William T .Segui, PWS Publishing
- 2. "Design of Steel Structures" Edwin H. Gaylord, Charles N. Gaylord James, Stallmeyer, Mc-Graw Hill
- 3. "Design of Steel Structures"-Mac .Ginely T.
- 4. "Design of Steel Structures"-Kazimi S .M. and Jindal R.S., Prentice Hall India.
- 5. "Design of Steel Structures"-Breslar, Lin Scalzi, John Willey, New York.
- 6. "Steel Structure" Controlling Behaviour through Design, Englekirk, WILEY.

I.S. Codes:

1. IS:800-2007

8hrs

8hrs

8hrs

8hrs
- 2. IS:875(part I, II and III)
- 3. SP6(1)& SP 6(6),
- 4. IS:816
- 5. IS: 808.

Guidelines Regarding Question Paper Setting:

- 1. IS: 800–2007ispermittedin examination.
- 2. Q. No. 1 and Q. No. 5 are compulsory.
- 3. Attempt any two questions from Q. No.2, 3,4 and any two questions from Q. No.6, 7, 8

End Semester Examination Paper Pattern

Question No.	Based on Unit No.	Marks
1.	1,2, 3 -Theory	7
2.	1 -Problem	14
3.	2 -Problem	14
4.	3 -Problem	14
5.	4,5,6-Theory	7
6.	4 -Problem	14
7.	5 -Problem	14
8.	6 -Problem	14

Third Year B. Tech. (Civil)Semester-V

Environmental Engineering-I

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
3	PCC-CV503	EE-I	Environmental Engineering-I	5	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To understand various sources of water with respect to quality and quantity of water.
- 2. To describe and design the various water treatment units.
- 3. To learn the special water treatments and sequencing of treatment for various qualities of surface & ground water.
- 4. To design the various components related to transmission and distribution of water.
- 5. To understand various water supply appurtenances.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Describe the various sources of water with respect to quality and quantity of water.
- 2. Design the various water treatment units.
- 3. Illustrate the special water treatments and sequencing of treatment for various qualities of surface & ground water.
- 4. Describethevariouscomponentsrelatedtotransmissionanddesignofdistribution of water.
- 5. Summarize the different water supply appurtenances.

Syllabus

Course	T	each	ing S	cheme	Evaluation Scheme				
						Theory(Marks)		Practical(Marks)	
	L	Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for
							passing		passing
					ISE			25	10
EE-I	03 -		02	04	CIE	30	12		
(PUU-UV505)					ESE	70	28		

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

SECTION I

Unit1: Introduction to Water Supply Scheme

- 1.1 Introduction to Water Supply Scheme: Data collection for water supply scheme, Components and layout, Design period, Factors affecting design period.
- 1.2 Quantity: Rate of water consumption for various purposes like domestic, industrial,

institutional, commercial; Fire demand and water system losses, Factors affecting rate of demand, Population forecasting.

1.3 Quality: Water quality parameters, Characteristics & significance in water treatment, Drinking water quality standards- BIS, WHO Standards.

1.4

Intake Structures: General design considerations, Types such as river intake, canal intake and reservoir intake, Concept of rising main and pumping station.

Unit2: Water Treatment

- 2.1 Water Treatment: Principles of water treatment processes. Introduction to different types of water treatment flow sheets.
- 2.2 Aeration: Principle and concept, Necessity, Methods, Design of cascade aerator.
- 2.3 Coagulation & Flocculation: Theory, Factors affecting, Destabilization of colloidal particles, Types of dosing of coagulants, Selection of coagulants, Jar tests, Design of rapid mixer & flocculate, Theory of clariflocculator.
- 2.4 Sedimentation: Theory, Types of settling, Types of sedimentation tanks, Principles & design, Concept of tube & plate settler.

Unit3: Water Treatment

- 3.1 Filtration: Mechanism, Head loss development, Negative head loss, Types of filtersslow sand filter, rapid sand filter & pressure filter, Operation & design of slow sand & rapid sand filter.
- 3.2 Disinfection: Theory, Factors affecting disinfection, Types of disinfectants, Types and methods of chlorination break point chlorination
- 3.3 Water Softening Processes: Lime-soda process, Ion exchange
- 3.4 Demineralization: Reverse osmosis, Electro-dialysis

SECTION II

Unit4: Distribution Reservoirs and Service Storages

- 4.1 Necessity, Location, Head requirement, Capacity determination by analytical & graphical method.
- 4.2 Transmission of water, Pumping & gravity mains, Choice of pipe materials, Forces acting on pressure pipes, Leakage & pressure testing of pipes, Corrosion types & control measures, Thrust block concept,

Unit5: Water Distribution Systems

- 5.1 Method of distributing water, Layout pattern, Basic system requirements for water distribution system
- 5.2 Methods of Network Analysis: Equivalent pipe method, Hardy-Cross method, Design problem.

Unit6: Water Supply Appurtenances

- 6.1 Types of Valve: Sluice valve, Air relief valve, Gate valve, Non-return valve, Scour valve
- 6.2 Fire hydrants water meter, Service connections, and Maintenance & leak detection of water distribution system.
- 6.3 Necessity of water audit, Water audit in domestic sector, Concept of preparation of DPR.

Term Work:

- A. Analysis of any10 of the following test parameters for water
 - 1. pH
 - 2. Acidity
 - 3. Alkalinity
 - 4. Chlorides content
 - 5. Hardness–Total, temporary and permanent
 - 6. Turbidity
 - 7. Residual Chlorine
 - 8. Total dissolved solids through measurement of electrical conductivity

6hrs

Water

6hrs

6hrs

6hrs

- 9. Dissolved Oxygen
- 10. Most Probable Number
- 11. Optimum dose of alum by jar test.
- 12. Fluorides & Nitrogen
- 13. Iron and Manganese
- B. Design/analysis problems on water treatment unit& distribution system.
- C. Visit to a water treatment plant &visit report.

Text Books:

- 1. "Environmental Engineering"-Peavey, H.S.Rowe, D.R. and Tchobanoglous McGraw Hill Book Company.
- 2. "Water Supply and Pollution Control"- Viessman W.and Hammer M.J.Harper Collins College Publishers.
- 3. "Water and Waste Water Technology"- Hammer M.J. Prentice-Hall of India Private Ltd.
- 4. "Water and Waste water Technology"- G. S. Birdie and J.S. Birdie
- 5. "Water Supply"-Duggal K.N.S. Chand and Company.
- 6. Water Supply-Garg S.K., Khanna Publishers.
- 7. "Water Supply and Waste water Disposal"-Fair and Gayes, John Wiley Publication.
- 8. "WaterSupplyEngineering"-B.C.Punmia,AshokJain,ArunJain,LaxmiPublications

Reference Books:

- 1. Manual on Water Supply and Treatment-Government of India Publication, 1993
- 2. "Water and Waste Water Engineering" Fair G. M, Geyer J. C, and Okun D. A, Vol. I& II", John Wiley Publication, 1966.
- 3. "WaterandWasteWaterTechnology",PrenticeHallofIndiaPrivateLimited,1996.Hammer Structure of question paper for End Semester Evaluation

Guidelines Regarding Question Paper Setting:

- 1. Section I-Q. No.1 to3and Section II- Q. No.4to 6
- 2. All questions are compulsory.
- 3. Internal optional questions are allowed, weightage of optional question should not be more than 30% of total marks i.e. 21 marks out of 70 marks.

End Semester Examination Paper Pattern

Question No.	Based on Unit No.	Marks
1	1	12
2	2	12
3	3	11
4	4	12
5	5	12
6	6	11

Third Year B. Tech. (Civil) Semester -V

Geotechnical Engineering-I

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
4	PCC-CV504	GTE-I	Geotechnical Engineering-I	5	5

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. Toprovideacoherentdevelopmenttothestudentsforthecoursesinsectorof Geotechnical Engineering & Soil Improvement Techniques etc.
- 2. TopresentthefoundationsofmanybasicEngineeringtoolsandconceptsrelated Geotechnical Engineering.
- 3. To give an experience in the implementation of Engineering concepts which are applied in field of Geotechnical Engineering
- 4. Toinvolvetheapplicationofscientificandtechnicalprinciplesofplanning, analysis, design of foundation along with soil improvement techniques.

Course Outcomes:

After successful completion of this course, student will be able to:

- 1. Able to evaluate the Index and Engineering properties of soil
- 2. Understand the fundamental relationships in properties of soils
- 3. Evaluate the stress calculations in soil under different soil conditions
- 4. Understands the process and importance of compaction and consolidation
- 5. Know the shear strength of soil and its determination
- 6. Analyze the lateral pressure on vertical retaining walls

Syllabus

Course	Т	each	ing S	cheme	Evaluation Scheme				
						Theory(Marks)		Practical(Marks)	
	L	Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for
							passing		passing
					ISE			50	20
(PCC-CV504)	04		02	05	CIE	30	12		
					ESE	70	28	25	10

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

Unit1: Soil Properties

1.1 Origin Of soil, Soil structure, Soil phase systems, Weight volume relationship

1.2 Index Properties of Soil: Unit weights, water content, specific gravity, void ratio, porosity, air content, degree of saturation their relationships and significance

1.3

distribution by sieve analysis and hydrometer analysis

1.4Atter Berg's consistency limits (Liquid limit, plastic limit, shrinkage limit), Consistency indices, Activity IS Classification of soil, Casa Grande plasticity chart

Unit2: Permeability and Seepage Analysis

- 2.1 Darcy's law and its validity, Factors affecting permeability
- 2.2 Determination of permeability of soil by constant head, Variable head, Permeability of stratified (layered) soil
- 2.3 Concept of total stress, Pore pressure and effective stress, Different forms of water
- 2.4 Seepage pressure, Seepage force ,Seepage force per unit volume ,Critical hydraulic gradient, Quick sand condition, Piping
- 2.5 Flow net construction and characteristics ,Applications off low net ,Determination of seepage loss

Unit3: Compaction and Consolidation

- 3.1 Concept of compaction, factors affecting compaction, Standard proctor test and modified proctor test as per IS 2720, Dry density and moisture content relationship, Zero air void line, Placement water content
- 3.2 Field compaction control, Field compaction equipment with their suitability.
- 3.3 Concept of consolidation, Factors affecting consolidation, Terzaghi's piston and spring analogy model, Terzaghi's theory of one-dimensional consolidation, Lab consolidation test to find coefficient of consolidation, Coefficient of volume change, Compression index, Coefficient of compressibility, NCC, UCC, OCC
- 3.4 Determination of coefficient of consolidation by square root of time fitting method and logarithm of time fitting method.

SECTION II

Unit4: Stress Distribution in Soil

- 4.1 Bousinessq theory assumptions and application to point load, Strip load, Circular sections, Pressure distribution diagrams on horizontal and vertical plane, Radial shear stress
- 4.2 Isobars and pressure bulbs, Use of Newmark's charts, Westergaard theory assumptions and application to uniformly loaded rectangular area.
- 4.3 Contact pressure for different footings indifferent soils ,Equivalent point load method for stress calculation, Approximate method (2V:1H) method for stress calculation

Unit5: Shear Strength of Soil

- 5.1 Concept of shear stress and shear strength, Mohr-Coulomb's theory and failure envelopes for different types of soils such as C-soil, Ø-soil, and C-Øsoils, Representation of stress on Mohr's circle
- 5.2 Terzaghi's total stress and effective stress approach ,Factors affecting shear strength of Cohesive and cohesion less soils
- 5.3 Determination of shear strength of soil by Direct shear test, Triaxial compression test,

SECTION I

Particle

6hrs

10hrs

10hrs

size

8hrs

under UU, CU & CD conditions, Unconfined compression test and vane shear test, Sensitivity, Skempton pore water pressure parameters

Unit6: Earth Pressure Theory

8hrs

- 6.1 Concept of earth pressure, Plastic equilibrium, Earth pressure at rest, Active and passive condition, its practical applications.
- 6.2 Rankine's earth pressure theory for cohesion less soils under dry, Partially and fully submerged condition, Horizontal back fill with surcharge, Total lateral force on wall
- 6.3 Bell-Rankine's theory for cohesive soils under dry, partially and fully submerged condition, tension cracks in soil, Critical height, Coulomb's wedge theory for earth pressures

Term Work:

A. Performance of at least ten experiments from the following:

- 1. Determination of specific gravity by pycno meter /density bottle method
- 2. Determination of water content by oven drying method & Pycno meter method
- 3. Particle size distribution by dry sieve analysis
- 4. Particle size distribution by hydrometer analysis
- 5. Determination of consistency limits(LL,PL,SL)
- 6. Determination of field density by core cutter method
- 7. Determination of field density by sand replacement method
- 8. Determination of MDD & OMC by standard/ Modified proctor test
- 9. Determination of coefficient of permeability by variable head method / Constant head method
- 10. Determination of shear strength parameters of soil by using direct shear test
- 11. Determination of shear strength of soil using Tri axial ,Unconfined and Vane shear Test (Any one)
- B. One assignment per unit with minimum four numerical in each assignment

Text Books:

- 1. "Soil Mechanics and Found action Engineering"-B.C .Punmia ,Laxmi Publication
- 2. "Soil Mechanics and Foundation Engineering"-K.R. Arrora, Standard Publisher
- 3. "Soil Mechanics and Foundation Engineering"-V.N.S. Murthy, Marcell Decker
- 4. "Basic and Applied soil Mechanics"-A.S.R .Rao and Gopal Ranjan, Newage International Publication
- 5. "Geotechnical Testing and Instrumentation"-Alam Singh, CBS Publisher
- 6. "Geotechnical Engineering"-C. Venkatramaiah, Newage International Publication
- 7. "Geotechnical Engineering"-Purushottam Raj

Reference Books:

- 1. "Soil Mechanics"-Terzaghi and Peak ,Jony Willey and Sons, NewYork
- 2. "Soil Testing"-T.W. Lambe, Willey Eastern Ltd ,New Delhi

Guidelines Regarding Question Paper Setting:

- 1. Section I-Q. No. 1to 3andSectionII-Q. No.4to 6
- 2. All questions are compulsory.
- 3. Internal optional questions are allowed, weightage of optional question should not be more than 30% of total marks i.e. 21 marks out of 70 marks.

End Semester Examination Paper Pattern

Question No.	Based on Unit No.	Marks
1.	1-Theory and Problem	12
2.	2-Theory and Problem	11
3.	3-Theory and Problem	12
4.	4-Theory and Problem	11
5.	5-Theory and Problem	12
6.	6-Theory and Problem	12

Third Year B. Tech.(Civil)Semester-V

Building Planning and Design

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
5	PCC-CV505	BPD	Building Planning and Design	5	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To study dimensions and space requirements for various elements of the building in relation to human body measurements.
- 2. To study Planning, designing of various public buildings considering principles of planning and Building Bye- Laws and regulations.
- 3. To study procedures for preparing perspective drawings of various objects as well as buildings.
- 4. To study Architectural composition and terms.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Specify dimensions and space requirements for various elements of the building in relation to human body measurements.
- 2. Plan, design public building considering principles of planning and Building Bye- Laws and regulations.
- 3. Prepare the submission and working drawings of public building.
- 4. Illustrate the procedures for preparing perspective drawings of various objects as well as buildings.
- 5. Apply knowledge of architectural composition and terms for better men to aesthetic view.

Course	T	each	ing S	cheme		Evaluation Scheme				
			P C		Scheme	Theory(Marks)		Practic	Practical(Marks)	
	L	Т		Credit		Max.	Min. for passing	Max.	Min. for passing	
מתת					ISE			50	20	
(PCC-CV505)	02 -		04	04	CIE					
					ESE			50	20	

Unit 1: Introduction	2hrs
1.1 Dimensions & space requirement in relation to body measurements	
1.2 Human body figures and its applications in space design of service elements.	
Unit2: Planning and Design	14hrs
Site selection, site layout for various types of building such as:	
2.1 Educational Buildings : Younger age range, Middle age range	
2.2 Building for Health : Health centers, Hospitals	
2.3 Assembly Buildings: Recreational halls, Cinematheatres, Restaurants, Hotels, Clubs	
 2.1 Educational Buildings : Younger age range, Middle age range 2.2 Building for Health : Health centers, Hospitals 2.3 Assembly Buildings: Recreationalhalls, Cinematheatres, Restaurants, Hotels, Clubs 	

- 2.4 Business and Mercantile Buildings : Shops, Banks, Markets and malls
- 2.5 Industrial Buildings : Factories, Workshops, Cold storages
- 2.6 Office Buildings: Administrative buildings, Corporate office
- 2.7 Buildings for Transportation : Bus stations, Railway/metro stations

Unit3: Perspective Drawings

- 3.1 Elements of perspective drawings
- 3.2 Parallel perspective and angular perspectives of different objects and small buildings

Unit4: Nature of Architecture

4.1 Architectural composition and terms such as mass, space , proportion, symmetry, balance, contrast, pattern.

6 hrs

2 hrs

Term Work:

- 1. Sheet for human body dimensions for space design (different human body figures ,dimensions and their relevant applications)
- 2. Visit to a building complex and report based on that.
- 3. Planning and designing of a public building project (Max. five students group) for which drawings shall be prepared covering scope of:
 - i) Municipal drawing
 - ii) Layout plan showing site development details (Internal roads, parking ,secondary structures for allied services)
 - iii) Working drawings with suitable scale(Furniture, electrification, plumbing)
 - iv) Elevation treatment.
- 4. Perspective view of the buildings planned above.
- 5. Line plan of buildings on graph paper of at least five remaining types of buildings not covered in 2.
- 6. Two exercises on parallel and angular perspective of simple objects.
- 7. Report for the building project stated in 2, including necessary sketches and design details.
- 8. Minimum one exercise of preparing a plan and elevation on CAD.

Text Books:

- 1. "Building Drawing with an integrated approach to Built-Environment" Shah, Kale and Patki, Tata McGraw Hill publication.
- 2. "Principles of Building Drawing"-M.G. Shah and C.M. Kale, Macmillan Indialtd.
- 3. "Planning and Designing Building"–Y.S.Sane, Modern Publication House, Pune

References Books:

- 1. "Building Planning"–Kumar Swami, Charotar Publication
- 2. "Civil Engineering Drawing"-M. Chakaborty, UBS publication

Third Year B .Tech. (Civil) Semester -V

Open Elective–I (Energy & Environment) (Offered by Faculty of Civil Engineering to All Faculties)

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
6	OEC-CV506	OE-I	Open Elective-I	5	3

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To study energy needs, demand and various renewable alternatives.
- 2. To undress and potential of renewable energy resources.
- 3. To study technologies to harness the energy.
- 4. To understand advantages, limitations of resources and energy management.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Compare conventional and renewable energy resources
- 2. Identity scope and potential of renewable energy
- 3. Analyze suitability of renewable energy resource.
- 4. Explain energy management principles and strategies

Course	Т	'each	ing S	cheme	Evaluation Scheme				
	L					Theory(Marks)		Practical(Marks)	
		Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for
							passing		passing
OF I	03			03	ISE				
(OEC-CV506)					CIE	30	12		
					ESE	70	28		

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE : End Semester Examination

SECTION I

Unit 1: Introduction

- 1.1 Global energy, Environmental resources
- 1.2 Energy needs
- 1.3 Indian scenario-Energy consumption, Needs and crisis

Unit2: Renewable Sources of Energy	9 hrs
2.1 Biogas : Types & factors affecting , Community biogas plant	
2.2 Solar Energy: Introduction, Utilization methods, Merits and demerits & potential	
2.3 Wind Energy: Site selection criteria, Potential & scope	
2.4 <i>Tidal Energy:</i> Site suitability, Types	
Unit3: Non-Renewable Sources of Energy	4 hrs
3.1 Energy from Coal and Oil : Introduction, Merits and demerits	
3.2 Natural Gas & Geothermal Energy: Introduction, Merits and demerits	
3.3 Relevance to other branches, Green building	
SECTION II	
Unit 4: Environmental Impacts	5 hrs
4.1 Global Warming	
4.2 Green house effect	
4.3 Acid rain	
Unit5: Environmental Impact Assessment (E.I.A.)	6 hrs
5.1 Objectives	
5.2 General E.I.A. process	
5.3 Capability & limitations	
Unit6: Energy Audit and Management	7 hrs
6.1 Definition and objectives	
6.2 Types and general guide lines for energy audit	

6.3 Principles of energy management, Energy planning

NOTE: One assignment on each unit.

Text Books:

- 1. "Non-Conventional Energy Sources"-G .D .Rai, Khanna Publishers, 5th Edition, 2014.
- 2. "Solar Energy and Non-Conventional Energy Sources"-Dr. V. M. Domkundwar, Dhanpar Rai & Co. Ltd., 1st Edition, 2010.
- 3. ``Non-Conventional Energy Sources''-R.K.Singal, Katson Publication, 2009

Reference Books:

- 1. "Renewable Energy Resources" Jhon Twidell and Tony Weir, Roultledge Publication, 2nd Edition, 2005.
- 2. "Solar Energy"-Dr. S.P. Sukhatme, McGraw HillPublication, 2nd Edition, 2005.
- 3. "Non-Conventional Resources of Energy"- G. S. Sawhney, PHI Publication, 5th Edition, 2010.

Guidelines Regarding Question Paper Setting:

- 1. Section I-Q. No.1 to3and Section II- Q. No.4to 6
- 2. All questions are compulsory.
- 3. Internal optional questions are allowed, weightage of optional question should not be more than 30% of total marks i.e. 21 marks out of 70 marks.

Ling Semester Examination 1 aper 1 attern	End	Semester	Examination	Paper	Pattern
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Question No.	Based on Unit No.	Marks
1.	1	11
2.	2	12
3.	3	12
4.	4	11
5.	5	12
6.	6	12

Third Year B. Tech. (Civil) Semester-V

Open Elective–I (Waste Management) (Offered by Faculty of Civil Engineering to All Faculties)

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
6	OEC-CV506	OE-I	Open Elective-I	5	3

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To study the effects of the various types of waste on human being, animals and environment.
- 2. To study the water &wastewater management and solid waste of urban area.
- 3. Tostudythevarioustechniquesandoptionsforhandlingindustrialwastewater, hazardous waste and air pollution of urban area.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. To evaluate the effects of various wastes on human beings, animals and on Environment.
- 2. Tosolvethewaterandwastewatertreatbyusingconventionalandadvancedtreatment methods.
- 3. To estimate quantity of solid waste, E-waste and biomedical wastes and to suggest their disposal methods.
- 4. To suggest reuse and recycles techniques of solid waste, E-waste and biomedical wastes and to suggest their disposal methods.
- 5. Tocharacteristics and to select treatment options for selected industrial was tewater.
- 6. To discuss the impacts of hazardous waste and air pollution.

Course	Γ	'each	ning S	cheme	Evaluation Scheme					
	L	Т	Р	Credit			Theory(Marks)		Practical(Marks)	
					Scheme	Max.	Min. for	Max.	Min. for	
							passing		passing	
OF I					ISE					
(OEC-CV506)	03			03	CIE	30	12			
					ESE	70	28			

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

Unit 1: Introduction

SECTION I

1.1 Definition of waste, Types and sources of waste, Properties of waste

1.2 Effects on human beings and animals and on their environment

1.3 Introduction to various acts and rules for waste in India

Unit2: Domestic Water and Wastewater Management

6 hrs

$2.1\ Importance of water and was tewater treatment, Water quality standards, Effluent\ standards$

- 2.2 Flow diagram of water and waste water treatment
- 2.3 Advanced waste water treatments-RO
- 2.4 Nitrification and De-nitrification process, SBR techniques

Unit3: Industrial Wastewater Management

- 3.1 Volume and strength reduction, Equalization, Neutralization
- 3.2 Propagation techniques
- 3.3 Flow diagram and treatment methods for pulp and paper, dairy, sugar &textile industries

SECTION II

Unit 4: Solid Waste Management

- 4.1 Municipal Waste: Types, Sources, Collection, Transportation and disposal methods
- 4.2 Biomedica l Waste: Types, Sources ,Collection and disposal methods
- 4.3 *Construction and Demolition Waste* :Problems of collection, Segregation, Transportation & limitations, Reuse and disposal of waste

Unit5: Hazardous Waste Management

- 5.1 Definition of hazardous waste, Classification of waste
- 5.2 Processing techniques
- 5.3 Rules and regulation of disposal of waste

Unit6: E-waste Management

- 6.1 Composition, Segregation
- 6.2 Reuse and recycle
- 6.3 Disposaltechniques, E-wastemanagementrules2016

NOTE: One assignment on each unit.

Text Books:

- 1. "Water and Waste Water Technology"- M. J. Hammer, Prentice-Hall of India Private Ltd.
- 2. "Environmental Engineering Peavey" H. S. Roweand D. R. Tchobanoglous, McGraw Hill Book Company
- 3. "Water and Wastewater Technology" -G.S. Birdie and J.S. Birdie
- 4. "Waste Water Engineering Treatment & Disposal"-Mertcalf & Eddy, TataMcGraw Hill
- 5. "Solid Waste Management"-Dr. A.D. Bhide

Reference Books:

- 1. "Manual on Water Supply and Treatment", Government of India Publication, 1993
- 2. "Manual on Sewerage & Sewage Treatment", Ministry of Urban Development, Govt. of India.
- 3. "Manual on Municipal Solid Waste Management", Ministry of Urban Development, Govt. of India.
- 4. "Solid Waste Management"-Gorge Tchobanoglous

Guidelines Regarding Question Paper Setting:

- 1. Section I-Q. No.1 to3and Section II- Q. No.4to 6
- 2. All questions are compulsory.
- 3. Internal optional questions are allowed, weightage of optional question should not be more than 30% of total marks i.e. 21 marks out of 70 marks.

6 hrs

6 hrs

6 hrs

End Semester Examination Paper Pattern

Question No.	Based on Unit No.	Marks
1.	1	11
2.	2	12
3.	3	12
4.	4	12
5.	5	11
6.	6	12

SEMESTERVI

Sr.No	CodeNo.	CodeNo. Subject					
			S				
1	PCC-CV601	Theory of Structures	4				
2	HM-CV602	Engineering Management	5				
3	PCC-CV603	Environmental Engineering-II	4				
4	PCC-CV604	Geotechnical Engineering-II	5				
5	OEC-CV605	Open Elective-II	4				
6	PCC-CV606	Structural Design and Drawing-I	2				
7	MC-CV607	SEMINAR	1				
8	*SI-CV707	Field Training	_				
			25				

Sr.No	Sem	CodeNo.	Subject	Credit s
1	VI	PCC-CV601	Theory of Structures	5

PSOs:

- 1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems
- 2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

COs:

At the end of the course the students should be able to:

- 1. Understand the concept of determinacy and indeterminacy.
- 2. Apply various techniques of structural mechanics to solve indeterminate structures.
- 3. Analyze indeterminate structures by using various approaches.
- 4. Know the limitations of the methods of solution and their outcomes.

Syllabus:

Course	Т	each	ing S	cheme	Evaluation Scheme				
	L	Т	Р	Credit	Credit Scheme	Theory	y(Marks)	Practical(Marks)	
						Max.	Min.for passing	Max.	Min.for passing
					ISE			25	10
C-CV601)	03	01		04	CIE	30	12		
					ESE	70	28		

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTIONI

Unit1: Introduction and Consistent Deformation Method	6hrs
1.1 Concept of determinacy and indeterminacy, Degrees of freedom and structural	l redundancy,
Methods of analysis.(No numerical).	•
1.2 Consistent deformation method: propped cantilever with uniform section, fixed	beam.
Unit2: Clapeyron's Theorem	6 hrs
Clapeyron's theorem of three moments, application to	
2.1 Continuous beams	
2.2 Sinking of supports	
2.3 Beams with different M.I.	
Unit3: Energy Theorems	6 hrs
Castiglione's theorem and unit load method (Degree of S.I. ≤ 2), application to	
3.1 Statically indeterminate beam	

3.2 Truss (lack of fit and temperature variation effect)

SECTIONII

Unit4: Slope Deflection Method

Slope deflection equation, Modified slope deflection equation (Degree of K.I. \leq 2), application to

- 4.1 Beams, sinking of supports
- 4.2 Portal frames without sway

Unit5:Moment Distribution Method

Moment distribution method (Degree of S.I. ≤ 2), application to

- 5.1 Beam
- 5.2 Sinking of supports
- 5.3 Portal frames without and with sway.

Unit6:Matrix Methods

6.1 Flexibility Method: Flexibility coefficients, development of flexibility matrix, compatibility equations, application to propped cantilever, fixed beam, continuous beam (Degree of S.I. \leq 2) 6.2 Stiffness Method: Stiffness coefficients, development of stiffness matrix, equilibrium equations, applications to beams and portals (Degree of K.I. \leq 2)

Term Work:

One assignment per unit with minimum four numerical in each assignment

Text Books:

- 1. Structural Analysis-Bhavikatti, Vikas Publishing HousePvt, ltd.
- 2. Analysis of Structures -Vazirani and Ratwani, Vol.I& II, Khanna Publishers
- 3. Mechanics of Structures S. B. Junnarkar, H.J. Shah, Vol-I & II, Charotar Publishers.
- 4. Structural Analysis: Matrix approach Pandit and Gupta.
- 5. Structural Analysis- L.S. Negiand R.S. Jangid, Tata Mc-Graw Hills Publishing House, New Delhi

Reference Books:

- 1. Basic Structural Analysis C.S. Reddy, Tata McGraw Hill Publishing House, New Delhi.
- 2. Structural Analysis -Devdas Menon, Narosa Publishing House.
- 3. Basic Structural Analysis K.U. Muthu, Azmi Ibrahim, M.Vijyan, Maganti Janadharn. I.K.International Publishing HousePvt.Ltd.
- 4. Matrix analysis of structures Gere & Weaver.
- 5. Indeterminate structural analysis -C.K. Wang

6 hrs

6hrs

Sr.No	Sem	CodeNo.	Subject	Credit s
2.	VI	HM CV602	Engineering Management	5

PSOs:

- 1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems
- 2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

COs:

At the end of the course the students should be able to:

- 1. Understand importance of management in construction.
- 2. Use the Project planning and management tool sin Construction.
- 3. Evaluate and draw project network for estimating time and cost.
- 4. Know the techniques of Material Management.
- 5. Explore and understand the concepts of Economics in construction.
- 6. Know the advance concepts in management.

Syllabus:

Course	T	each	ing S	cheme	Evaluation Scheme					
	L			Credit		Theory(Marks) Pra		Practic	tical(Marks)	
		Т	Р		Scheme Max.	Max	Min.for	Max	Min.for	
						passing	max.	passing		
EM					ISE			25	10	
HM-CV602	04		02	05	CIE	30	12			
					ESE	70	28	25	10	

SECTION I

Unit 1: Management Introduction 6 hrs

- 1.1 Importance ,Contribution by Henry Fayol and F.W.Taylor
- 1.2 Functions of management w.r.t its influence in construction management
- 1.3 Introduction to Decision Making and Decision Tree.

Unit 2: Project Management and Network Analysis 10 hrs

- 2.1 Phases of Project Management, Bar Chart, Gantt Chart.
- 2.2 Work Breakdown Structure.
- 2.3 CPM Network: Time Estimate, Floats, Critical Path. Network Compression and Updating

Unit 3: PERT 8 hrs

- 3.1 Introduction, Time estimates, floats, Project Duration. Precedence Network(intro).
- 3.2 Study of Project Management Software.

SECTION II

Unit 4: Resource Management 8 hrs

- 4.1 Objectives, Functions, Inventory Control, ABC Analysis, EOQ analysis. HML, VED, SDE.
- 4.2 Resource Allocation, Smoothing and leveling (Concept).

Unit 5: Engineering Economics 10 hrs

5.1 Types of interests, Time value of Money, Equivalence.

5.2 Economic Comparison Methods: Present Worth Method, EUAC Method, Capitalized cost Method.

5.3 Investment Criteria: Net Present Value, Rate of Return, Benefit Cost Ratio, Pay Back Period Method, Break Even Analysis (Concept).

Unit 6: Advances in Management 6 hrs

- 6.1 Work Study and Method Study (Concept), ISO 9000
- 6.2 Site Layout, Safety in Construction: Personal Protective Equipment.

Term Work:

- 1. One assignment per unit with minimum four questions in each assignment
- 2. Planning and scheduling of any construction project by using Project management software.

Text Books:

- 1. Project planning and Control with PERT and CPM^I B.C.Punmia, Laxmi Publication.
- 2. PERT &CPM: Principles and Application Srinath L.S, Affiliated East west press
- 3. Construction Engineering and Management Dr. S. Seetharaman, Umesh Publications
- 4. Financial Management Prasanna Chandra, TATA McGraw Hill.
- 5. Industrial Engineering and Production Management MartandTelsang, S.Chand Publication.
 - 6. Work Study O. P. Khanna, DhanapatRai Publication.

Reference Books:

- 1. Engineering Management Stoner, Pearson Publication.
- 2. Construction Project Management K.K.Chitkara, TATA McGraw Hill.
- 3. Project Cost Control in Construction Roy Pilcher, Blackwell Scientific Publications.
- 4. Principles of Construction Management Roy Pilcher, TATA McGraw Hill.
- 5. Engineering Economics LaylandBlanck and Torquin, TATA McGraw Hill.
- 6. Engineering Economics Paneerselvam, PHI Publications.
- 7. Industrial Engineering and Management O.P. Khanna, DhanapatRai Publication.

8. Operations Research and Engineering Management- S.D. Sharma, KEDARNATH RAMNATH

Sr. No	Sem	CodeNo.	Subject	Credit s
3.	VI	PCC- CV603	Environmental Engineering-II	4

PSOs:

- 1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems
- 2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

COs:

After successful completion of this course students will be able to:

- 1. Explain sources, characteristics and methods of wastewater collection.
- 2. Design the primary and secondary wastewater treatment units and describe low cost wastewater treatment units.
- 3. Understand various methods of wastewater disposal
- 4. Explain the necessity and importance of solid waste management.
- 5. Describe air pollution, its effect and controlling techniques.

Syllabus:

	Teaching Scheme				Evaluation Scheme					
Course	_					Theory	Theory(Marks) Pr		ractical(Marks)	
course	L	Т	P	Credit	Scheme	Scheme	Min.for	Mov	Min.for	
						Iviax.	passing	Iviax.	passing	
					ISE			25	1	
EE-II	04		02	05					0	
PCC-CV603					CIE	30	12			
					ESE	70	28	25	1	
									0	

SECTION I

Unit 1: Waste Water Treatment 8 hrs

- 1.1 Components of wastewater flows, wastewater sources and flow rate, Variations in flow rates and strength, wastewater constituents, Characteristic of Municipal waste water, Problems on B.O.D. calculations, Quantity of storm water.
- 1.2 Sewerage system, Types, Layout, Types of sewers, Collection system, Appurtenances, Design of sanitary and storm water sewers, Maintenance of sewerage systems, Sewage and Sludge pumping.

Unit 2: Primary and Secondary Treatment 8 hrs

- 2.1 Screening, comminuting, Grit removal, Oil and Grease trap Primary settling tank.
- 2.1 Sectoring, commutaning, one removal, on and Grease dup Frinary setting data.
 2.2 Secondary Treatment-Activated sludge process, Process, design and operating parameters of ASP, modification of ASP, Operational problems, Concept of trickling filter.
 Unit 3: Sludge Treatment and Disposal 8 hrs
 3.1 Concept of anaerobic digestion, types of reactors.

- 3.2 Low cost wastewater treatment methods-Principles of waste stabilization pond. Design and operation of oxidation pond, Operation of aerobic & anaerobic Lagoons, Oxidation ditch, Septic tank.

SECTION II

Unit 4: Stream Pollution 8 hrs

- 4.1 Self Purification, DO sag curve, streeterPhelp's Equation, Stream classification4.2 Disposal of waste water methods, effluents standards for stream and land disposal as per MPCB and **CPCB** standards

Unit 5: Solid Waste Management 8 hrs

- 5.1 Solid wastes Definition, Types, Sources, Characteristics, Functional outlines-storage, Collection, Processing techniques
- 5.2 Methods of treatment of solid waste-Composting, Incineration, Pyrolysis and Sanitary land filling.

Unit 6: Air Pollution Noise Pollution and EIA 8 hrs

- 6.1 Air Pollution: Definition, Sources and classification of pollutants, Effects. Control of industrial air pollution- Settling Chamber, Bag filter, Cyclone separator, Scrubbers, Electrostatic precipitators. Air quality standards
- 6.2 Noise Pollution: Noise characteristics and measurements, Levels of noise and standards, control.
- 6.3 Environmental Impact Assessment: Concept, outline and details of EIA, report preparation.

Term Work:

- A. Characterization of municipal waste water (Any five of the following):
- 1. pH
- 2. Alkalinity

- 3. Solids
- 4. Chlorides
- 5. DO
- 6. BOD
- 7. COD
- 8. Sulphates
- 9. Oil & grease
- 10. Volatile acids
- B. Design/analysis problems on sewerage system and treatment system
- C. Visit to sewage treatment plant & visit report.

Text Books:

- 1. Environmental Engineering H. S. Peavey, D.R. Rowe and Thobanoglous, McGraw Hill Book Company
- 2. Water Supply and Pollution Control^{||} Viessman W. and Hammer M.J., Harper Collins College Publishers.
- 3. Waste Water Engineering Treatment & Disposal Mertcalf Eddy, Tata McGraw Hill
- 4. Sewage Disposal and Air Pollution Engineering Garg S.K., Khanna Publishers
- 5. Waste Water Supply Engineering B. C. Punmia, Laxmi Publication
- 6. Solid Waste Management in Developing Countries Bhide A.D. and Sundersen B.B., Indian National Scientific Documentation Centre, New Delhi
- 7. Air Pollution Rao M.N. and Rao H.V.N., Tata Mcgraw Hill

Reference Books:

- 1. Manual on Sewerage & Sewage Treatment Ministry of Urban Development Govt. of India Msy-2000. 35 PDOP-4-59-85-97, Ministry of Urban development
- 2. Water and Waste Water Technology Hammer M.J, Prentice-Hall of India Private ltd.
- 3. Manual on Municipal Solid Waste Management Ministry of Urban Development Govt. of India.

Sr. No	Sem	Code No.	Subject	Credit s
4.	VI	PCC-CV604	Geotechnical Engineering-II	5

PSOs:

1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems

2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Use engineering science principles to develop foundation engineering knowledge.
- 2. Apply foundation engineering knowledge in the civil engineering projects.
- 3. Calculate bearing capacity theoretically as well as practically.
- 4. Calculate settlement and design shallow and deep foundation
- 5. Apply basics concepts of slope stability on field.
- 6. Apply modern foundation techniques.

Syllabus:

	T	each	ing S	cheme	Evaluation Scheme				
Course	_			Credit	Scheme	Theory(Marks)		Practical(Marks)	
Course	L	Т	Р			Max.	Min. for	Max.	Min. for
							passing		passing
CTE II					ISE			25	10

PCC-CV604	04	 02	05	CIE	30	10	
				ESE	70	30	

SECTION I

Unit1: Soil& Rock Exploration

- 1.1 Necessity, Planning, No& depth of bore holes, Exploration Methods-auger boring(hand and continuous flight augers), and wash boring ,rotary drilling, percussion drilling.
- 1.2 Soil sampling-disturbed and undisturbed ,Rock drilling and sampling, types of sampler.
- 1.3 Mechanical properties of rock, behavior of rocks in uniaxial compression, tensile strength of rocks
- 1.4 Types of rock failure Core barrels, Core boxes, core recovery, Rock Quality Designation

Unit2: Bearing Capacity Evaluation

- 2.1 Definitions, Modesoffailure, Terzaghi's bearing capacity theory, Meyerhof's bearing capacity, I.S. Code method of bearing capacity evaluation &computation (IS6403)
- 2.2 Effect of various factors on bearing capacity (Size & Shape, Depth, WT)
- 2.3 Bearing capacity evaluation from Plate load test, S.P.T.(By I.S. Code method), static cone penetration test and Menards pressure meter tests with detailed procedure.

Unit3: Shallow Foundation and Foundation Settlement

- 3.1 Types and their selection, minimum depth of footing, Assumptions & limitations of rigid design analysis. Design of Isolated, combined, strap footing (Rigid analysis), Raft foundation (elastic analysis), floating foundations (R.C.C. Design is not expected)
- 3.2 Immediate settlement-computations from I.S.8009-1976(Part I) approach, consolidation
- 3.3 Settlement computations, Concept of total settlement, differential settlement and angular distortion.

SECTION II

Unit4: Pile Foundation

- 4.1 Classification and the uses, single pile capacity evaluation by static and dynamic methods for cohesive and cohesion less soil, pile load test. Negative skin friction
- 4.2 Group action piles, spacing of pile sin group, Group efficiency.
- 4.3 Under reamed piles-equipment, construction and precautions.

Unit5: Well Foundations, Coffer Dam and Ground Improvement Techniques 8hrs

- 5.1 Element of wells, types, methods of construction, tilt and shift, remedial measures.
- 5.2 Pneumatic caissons: sinking method-Sandis land method, Caisson disease. Types and material used for sheet piling
- 5.3 Common types of coffer dams, Braced cofferdam.
- 5.4 Stone columns, Vibro-flotation, Preloading technique, Civil engineering application of geosynthetics, geotextile & geomembrane

Unit6: Analysis of Slope Stability

- 6.1 Slope classification, slope failure, modes of failure. In finite slope in cohesive and cohesion less soil
- 6.2 Taylor's stability number, Swedish slip method, method of slice sand concept of Friction circle method. Land slide

Term Work:

- 1. Minimum one assignment on each unit with theory and minimum four numerical,(wherever applicable)
- 2. Any software based project **OR** Foundation site visit with report

Text Books:

1. Soil Mechanics in Engineering Practice -Karl Terzaghi, RalphB. Peck and Gholamreza Mesri, Wiley India Pvt. Ltd

8 hrs

8hrs

8 hrs

8hrs

- 2. Basic and Applied Soil Mechanics Gopal Ranjan and AS Rao, G.K. Publications Pvt. Ltd.
- 3. Soil Mechanics and Foundation Engineering I-V.N.S. Murthy, B.S. Publications(3rdEdition)
- 4. Soil Mechanics and Foundation Engineering B. C. Punmia, Laxmi Publishing Co., New Delhi.
- 5. Geotechnical Engineering I-Dr. B. J. Kasmalkar, Pune Vidyarthi Griha Prakashan.

Reference Books:

- 1. Engineering Properties of Soils And Their Measurements I-Joseph E Bowles, McGraw Hill Publications
- 2. Soil Mechanics -Lambe and Whitman, S. Chand Publications (S I Version).
- 3. Geotechnical Engineering Principle and Practice^{||}-Donald P Coduto, Mc Millan Press (PHI).
- 4. Geotechnical Engineering I-P Purushothma Raj, McGraw Hill Publication(4thEdition)
- 5. Foundation Design Manual I-Dr. N.V. Nayak. Dhanpat Rai and Sons

Sr. No	Sem	CodeNo.	Subject	Credit s
5.	VI	OEC- CV605	Open Elective-II	4

PSOs:

1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems

2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Understand methods of soil and water conservation.
- 2. Develop an integrated model for sustainable natural conservation.
- 3. Explain the ground water exploration techniques and its artificial recharge.
- 4. Analyze the needs for protection of banks and preservation of soil.

Syllabus:

	Teaching Scheme				Evaluation Scheme				
Course	_	Т	Р	~	Scheme	Theory(Marks)		Practical(Marks)	
course	L			Credit		Max	Min.for	Max	Min.for
						WIUA.	passing	WIUA.	passing
OF II					ISE				
OE-II	03			03	CIE	30	12		
(OEC-					ESE	70	28		
CV605)									

SECTION I

Unit1: Introduction

1.1 Concept of soil erosion and water conservation

1.2 PrinciplesofSoilErosion-causes,types,agents,factorsaffecting,mechanicsofsoilerosion.

Unit2:SoilConservation Methods

2.1 Introduction, Erosion due to water,

2.2 Terraces for Water Erosion Control-Terrace sand their Design, Bench Terracing, Types of Bench Terraces, Alignment of Bench Terraces,

4 hrs

n

- 2.3 Bunding Methods-Measures for Water Erosion Control, Bunds(Contour Bunds, Graded Bunds), Construction of Bunds
- 2.4 Gully Erosion-Classification of Gullies, Principles of Gully Control, Gully Control Measures;
- 2.5 Maintenance of Bench Terraces, bunding and gully.

Unit3:Stream Bank Erosion and Protection

- 3.1 Introduction; Susceptible Areato Stream Bank Erosion, Process of Stream Bank Erosion; Bank Scour; Mass Failure
- 3.2 Impacts of Stream Bank Erosion; Causes of Stream Bank Erosion; Control Measures for Stream Bank Erosion
- 3.3 Objectives and methods of River Training works.

SECTIONII

Unit4:Water Harvesting Structures

- 4.1 Importance of Water Harvesting; Types of Water Harvesting;
- 4.2 Water Harvesting Technique; Run offvs. Flood Water Harvesting,
- 4.3 Performance of WHS-Check dams, Nala bund, M I tank, Percolation tank

Unit5:Modeling of Watershed Process

5.1 Watershed Model and Modeling; Benefits of Watershed Modeling; Watershed Models;

5.2 Case Study- Watershed; Modelling for Soil and Water Conservation.

Unit6:Ground water Conservation

- 6.1 Introduction, Sources of groundwater, Porosity and Permeability, Types of aquifers, Zones of groundwater,
- 6.2 Ground water regulations, Ground water conservation techniques ,Artificial recharge systems, Causes, effects and solutions of ground water depletion.

NOTE: One assignment on each unit.

Text Books:

- 1. -Soil and Water Conservation Engineering I-Dr.R. Suresh; Standard Publications
- 2. -Hydrology and Soil Conservation Engineering including Watershed Management Ghanshyam Das; PHI
- 3. -Watershed Management -GVS Murthy; NewAgeinternational Publication.

Reference Books:

- $1. \ Principles of Soil Conservation and Management {\callenge} Hamberto Blanco and Rattan Lal, Springer$
- 2. ManualofSoilandWaterConservationPractices -GurmalSingh,C.Venkatraman,G. Sastry,B. P. Singh
- 3. Soil Erosion Research Methods I-R.Lal, Lib.Of Congree Catloingin Publication Data.
- 4. Soil and Water Conservation in Semiarid Areal-Norman W.Handsom; United Book Prints
- 5. Ground water Hydrology I-D.K.Todd, Wiley Publication

Sr. No	Sem	CodeNo.	Subject	Credit s
5.	VI	PCC- CV606	Structural Design and Drawing-I	2

PSOs:

1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems

2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

Course Outcomes:

5 hrs

5hrs

5 hrs

After successful completion of this course students will be able to:

- 1. Analyze and design different types of bolted &welded connections
- 2. Demonstrate the knowledge of common sections subjected tension and compression members &its design,
- 3. Analyze and design of steel column, flexural members and its elements.
- 4. Aware of application of software in structural analysis and design. Prepare the working drawing as per requirement of project execution

Syllabus:

	Teaching Scheme				Evaluation Scheme				
Course		Т	Р	Credit	Scheme	Theory(Marks)		Practical(Marks)	
course	L					Max.	Min.for	Max	Min.for
							passing	Ivian.	passing
					ISE			50	20
SDD-I			04	02	CIE				
(PCC-					ESE			50	20
CV000)									

Term Work:

Detailed structural design and drawing of the following steel structure along with necessary drawings by limit state method analysis. (Max group size should not exceed four students)

- 1. Design of industrial building including roof truss, purlin, bracings, gantry girder, column, column base and connections. Preparing of all working drawings.
- 2. Analysis and Design of building frame manually and by using any FEM based software. Preparing of all working drawings.

Text Books:

- 1. Limit State Design of Steel Structures Duggal S.K., Tata McGraw-Hill Education private Ltd., New Delhi, 2nd Edition 2014
- 2. Design of Steel Structures: By Limit State Method as Per IS: 800 2007 Bhavikatti
- S. S., I K International Publishing House.
- 3. Limit State Design in Structural Steell Shiyekar M. R, 2nd Edition, PHI Publisher
- 4. Design of Steel Structures Dayaratnam, Wheeler Publications, New Delhi.
- 5. Design of Steel Structures B. C. Punmia, A. K. Jain and Arun Kumar Jain, Laxmi Publication

Reference Books:

- 1. LRFD Steel Design William T. Segui, PWS Publishing
- 2. Design of Steel Structures Edwin H. Gaylord, Charles N. Gaylord James, Stallmeyer, Mc-Graw Hill
- 3. Design of Steel Structures Mac. Ginely T.
- 4. Design of Steel Structures Kazimi S. M. and Jindal R. S., Prentice Hall India.
- 5. Design of Steel Structures Breslar, Lin Scalzi, John Willey, New York.
- 6. Steel Structure Controlling BehaviourThrough Design, Englekirk, WILEY.

I.S. Codes:

- 1. IS: 800 2007
- 2. IS: 875 (part I, II and III)
- 3. SP6 (1) & SP 6 (6),
- 4. IS: 816
- 5. IS: 808.

Sr.No	Sem	CodeNo.	Subject	Credit s
7	VI	MC- CV607	SEMINAR	1

PSOs:

1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems

2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

COs

Term Work:

- 1. Selectionoftopicfromcurriculum/fieldincivilengineering/interdisciplinaryareasoncurrentissue
- 2. Minimum three presentations at follows,
 - a. Synopsis presentation
 - b. Literature review presentation
 - c. Final presentation
- 3. Preparation of final report in hard and soft format.

Text Books:

Relevant text books for selected topic of seminar.

Reference Books:

Relevant reference books, journal publications, conferences publications, magazines, open web site sources for selected topic of seminar.

Sr. No	Sem	Code No.	Subject	Credit s
8	VI	*SI- CV707	Field Training	_

PSOs:

1. Utilize principles, methods, software & code of practices to excel in the area of planning, analysis& Design related to Civil Engineering systems

2. Perform economical analysis & cost estimates related to design, Construction, Operations & maintenance of systems associated with civil engineering.

*Guidelines about Field Training(SI-CV707):-

- 1. Onsite/office field training for 2 weeks during winter and 3 weeks during summer vacation of T. Y. B.Tech.
- 2. College has to provide field book containing 35 pages about daily report of field training to students.
- 3. Exchange field book should contain the signature of site supervisor /office engineer.
- 4. College has to allot site/office to students and students should strictly do the field training at allotted site/office.
- 5. After successful completion of field training students should bring satisfactory report from allotted firm.
- 6. Thee valuation of field training should be done in semester VII under course Field Training having course code SI-CV707.
- 7. If possible external practicing examiner should be called for evaluation of termwork of Field Training

FINALYEAR (B. Tech.) CBCS

In

CIVIL ENGINEERING

	SEMESTER-VII										
Sr. No	Code No.		Course(Subject Title)	Semester	Credits						
1	PCC-CV701	DCS-I	Design of Concrete Structures-I	7	5						
2	PCC-CV702	EQ	Earthquake Engineering	7	4						
3	PCC-CV703	QSV	Quantity Survey and Valuation	7	4						
4	PCC-CV704	TR-I	Transportation Engineering-I	7	4						
5	PCE-CV705	EL-I	Professional Elective-I	7	4						
6	HM-CV706	LACE	Legal Aspect in Civil Engineering	7	3						
7	SI-CV707	FT	Field Training	7	-						
8	PW-CV708	PP-I	Project Phase-I	7	1						
			TOTAL		25						

SEMESTER-VIII									
Sr. No	Code No.		Course(Subject Title) Semester						
1	PCC-CV801	DCS-II	Design of Concrete Structures-II	8	5				
2	PCC-CV802	WRE-II	Water Resource Engineering-II	8	4				
3	PCC-CV803	TR-II	Transportation Engineering-II	8	4				
4	PCE-CV804	EL-II	Professional Elective-II	8	4				
5	PCE-CV805	EL-III	Professional Elective-III	8	4				
6	PCC-CV806	SDD-II	Structural Design and Drawing-II	8	2				
7	PW-CV708	PP-II	PP-II Project Phase-II 8						
			TOTAL		25				

FINAL YEAR B.Tech Civil Semester VII DESIGN OF CONCRETE STRUCTURES-I

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
1	PCC-CV701	DCS-I	Design of Concrete Structures-I	7	5

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objective:

- 1. To understand the concept of RCC structural design
- 2. To conceive the elementary deign of different structural elements.
- 3. ToimpartknowledgeofstrengthdeterminationofdifferentkindsofR.C.elements using I.S. Code.

Course Outcome: After successful completion of this course student will be able to

- 1. Understand the basic data (Basic Mechanics, Mathematics, and structural analysis) required for design of concrete structures.
- 2. Understand the design process of concrete structure
- 3. Understandtheapplicationoflimitstatemethodforstructuralelementsuchas footing, column, beam slab, staircase etc.
- 4. Design the individual members and hence building.

	Teaching Scheme				Evaluation Scheme				
Course		Т	Р	Total credit	Scheme	e Theory(Marks)		Practical(Marks)	
Design of Concrete	4		2	~		Max	Min for Passing	Max	Min for Passing
Structures-I	4	-	2	5	ISE			25	10
(PCC-CV701)					CIE	30	12		
					ESE	70	28		

ISE- In Semester Evaluation CIE-Continuous Internal Evaluation ESE-End Semester Evaluation

SECTION-I

<u>Unit: 1(06)</u>

Introduction to R.C.C., Stress-Strain behavior of concrete, Steel and R.C.C, Different design philosophies, Various Limits States, Characteristic Strength and Characteristic Load, Load Factor, Partial Safety Factors.

<u>Unit: 2(10)</u>

Limit State of Collapse (Flexure) - Analysis and design of singly reinforced beam. Analysis and design of doubly reinforced beam, Analysis and design of symmetrical T and L beams.

<u>Unit: 3(08)</u>

Limit state of collapse (shear and bond): Shear failure, Types of Shear reinforcement, Design of Shear reinforcement, Bond-types, Factors affecting bond Resistance, Check for development length. (No Numerical on bond)

SECTION-II

<u>Unit: 4(08)</u>

• Design of slabs: Cantilever Slab, Simply Supported One way slab, Simply Supported Two wayslabwithdifferentsupportconditionsasperIS:456-2000

• Design of Simply Supported single flight and doglegged staircase.

<u>Unit: 5(08)</u>

Design of Columns - General aspects, Effective length of column, Loads on column, Slenderness ratio for column, Maximum and Minimum eccentricity, Codal provisions, Design of short axially loaded columns, Design of columns subjected combined axial load and uniaxial bending using SP-16.

<u>Unit: 6</u>(08)

Designofisolatedrectangularcolumnfootingwithconstantdepthsubjectedto axial load and moment.

Term work: At least one assignment on each unit consisting of our questions.

Text books:

- IS456-2000,SP-16&RelevantSpecialpublications of BIS
- LimitstatetheoryandDesign-KarveandShah,Structurespublications,Pune
- ReinforcedConcreteDesign-Limitstate-A.K.JainNemChandbrothers,Roorkee
- Fundamentals of Reinforced Concrete –Sinha and Roy, S. Chand and company Ltd. Ram Nagar, New Delhi
- Reinforced Concrete Design-B. C. Punmia Laxmi publications New Delhi
- Reinforced Concrete Design-M. L. Gambhir-Mcmillan India Ltd. New Delhi

Reference Books

1. Limit State Design of Reinforced Concrete P. C. Varghese, Prentice Hall, New Delhi

Guidelines regarding question paper setting:

- 1. Section -I-Q.No-1to Q.No-3 and Section -II Q.No-4 toQ.No-6
- 2. All questions are Compulsory.

3. Internal option question are allowed, weight age of optional question should not be more than 30% of total marks i.e.21 marks out of 70 marks

Question No.	Based on Unit No.	Marks
1	1	12
2	2	12
3	3	11
4	4	12
5	5	12
6	6	11

END SEMESTER EXAMINATION PAPER PATTERN

FINAL YEAR B.Tech Civil Semester VII EARTHQUAKE ENGINEERING

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
2	PCC-CV702	EQ	Earthquake Engineering	7	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course objectives:

- 1. To understand interior of earth and behavior of earth during earthquake.
- 2. To understand the concepts of mathematical modeling.
- 3. To understand dynamic behavior of structure.
- 4. To understand earthquake resistant philosophy of structure.
- 5. To understand modern techniques of earthquake resistant method.

Course Outcomes: After successful completion of course student will be able to

- 1. Prepare mathematical modeling of Single Degree of Freedom System.
- 2. Design earthquake resistant structure by applying various codal provisions related to seismic design
- 3. Know the concept of modern earthquake resistant techniques

	T	eachi	ng So	cheme	me Evaluation Scheme				
Course	L	Т	Р	Total credit	Scheme	Theory(Marks)		Practical(Marks)	
						Max	Min for Passing	Max	Min for Passing
Earthquake Engineering(PCC-	3	1	-	4	ISE			25	10
CV702)					CIE	30	12		
					ESE	70	28		

ISE- In Semester Evaluation CIE-Continuous Internal Evaluation ESE-End Semester Evaluation

SECTION-I

<u>Unit:1(05)</u>

Elements of seismology – terminology, structure of earth, causes of an earthquake, plate tectonic theory, continental drift theory, elastic rebound theory, seismic waves, magnitude and intensity, methods of measurement, energy released, seismograph, strong motion earthquakes, accelogram, prominent earthquakes of India

Unit:2(07)

Fundamentals of theory of vibration, free and forced vibrations (harmonic loading) of single degree of freedom systems. Undammed and viscously damped vibrations, equations of motion and solution, General dynamic loading Duhamel Integral, earthquake response of SDOF system

Unit:3(06)

Response theory: Earthquake tripartite spectrum response spectrum, spectrum, construction of design response spectrum, effect of foundation soil

And structural damping on design spectrum, evaluation of lateral loads due to earthquake on multistory buildings as per IS1893-2016 Part I

SECTION-II

Unit: 4

Part A:

Conceptual Design: Planning aspects, Load path, Stiffness and strength distribution, different structural system, liquefaction and settlement.

Part B:

Earthquake Resistance Design Principles: Design philosophy, Behavior of RC building, ductility and ductile detailing of beam and columns using IS13920.

Unit: 5

Masonry Structures: Behavior of unreinforced masonry and reinforced masonry, RC bands, vertical reinforcement, openings, Provisions of I.S.4326, Repairs and strengthening of masonry and RC members.

Unit: 6

IntroductiontoEarthquakeresistantmoderntechniques-BaseIsolation-Elastomeric, Sliding, Combined.

Seismic Dampers - Friction Dampers, TMD, Visco elastic dampers.

Term work:

1) One assignment on each unit.

2) Calculation of seismic forces by using any FEM software or RESIST Software.

Text Book-

- 1. Earthquake Resistance Design of Structure-S. K. Duggal, Oxford Uni. Press
- 2. Earthquake Engineering-Manish Shrikhande and Pankaj Agarwal, Prentice Hall of India Pvt Ltd, New Delhi
- 3. Structural Dynamics Mario Paz CBS Publication
- 4. Foundation Design Manual–N. V. Nayak, Dhanpatrai and sons, Delhi
- 5. Earthquake resistant design of structures by vinod hosur, wiley precise text book series.
- 6. Earthquake Dynamics of Structures A primer, A K chopra earthquake engineering research institute
- 7. Elements of Earthquake Engineering– Jai Krishna, South Asian Pub. New Delhi
- 8. Earthquake Resistant Design of Masonry and Timber Structures– A. S. Arya

(05)

(04)

(05)

(04)

9. Earthquake Resistant Design of R.C.C. Structures-S. K. Gosh

Reference books:

- 1. Dynamics of Structures-Theory and Applications to Earthquake Engineering by A.K. Chopra– Prentice Hall Publications.
- 2. Earthquake Resistant Structure s–D. J. Dowrick John Wiley Publication
- 3. Dynamics of Structures-R.M. Cloughand Ponian, McGrawHill co. New Delhi
- 4. Mechanical Vibrations-G. R. Grover Roorkee University, Roorkee.
- 5. Analysis and Design of Foundations for Vibrations–P. J. Moove Oxfordand I. B. H. Publication, Delhi
- $6. \ Manual of Earth quake Resistant Nonengineering Construction, University of Roorkee$
- 7. Elements Seismology–Rochter
- 8. IITK-BMTPC Earthquake Tips, National In formation Centre of Earthquake Engineering, IIT Kanpur.
- 9. Government of Maharashtra Earthquake resistant design of house guiding lines and assessment of damages.
- 10. IS1893-2016-Part-I and IS13920, IS 4326.

Guidelines regarding question paper setting:

- 1. Section–I–Q.No-1toQ.No-3 and Section –II–Q.No-4toQ.No-6
- 2. All questions are Compulsory
- 3. Internal option question are allowed, weightage of optional question should not be more than 30% of total marks i.e.21 marks out of 70 marks

Question No.	Based on Unit No.	Marks
1	1	07
2	2	14
3	3	14
4	4	12
5	5	12
6	6	11

ENDSEMESTEREXAMINATIONPAPERPATTERN

FINAL YEAR B.Tech Civil Semester VII QUANTITY SURVEY AND VALUATION

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
3	PCC-CV703	QSV	Quantity Survey and Valuation	7	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To understand the basic skills in estimation of Civil Works.
- 2. To prepare specifications & rate analysis of various items.
- 3. To carry out the estimation for various Civil engineering structures.
- 4. To understand the valuation of Civil Engineering Structures.

Course Outcome: After successful completion of this course students will be able to:

- 1. Explain the importance of estimation in Civil Engineering works.
- 2. Prepare rate analysis of various items.
- 3. To estimate for various construction projects.

Explain importance of valuation in Civil Engineering works

	Teaching Scheme			cheme	Evaluation Scheme				
Course	L	Т	Р	Total credit	Scheme	Theory(Marks)		Practical(Marks)	
Quantity Survey						Max	Min for Passing	Max	Min for Passing
and Valuation	3	-	2	4	ISE			25	10
(PCC-CV703)					CIE	30	12		
					ESE	70	28	25	10

ISE– In Semester Evaluation CIE–Continuous Internal Evaluation ESE–End Semester Evaluation

4. .

Unit : 1

Section I

(06)

- a) General introduction to quantity surveying purpose of estimates, Types of estimates -Detailed estimates & approximate estimates, purpose, various methods used for building and other civil engineering works such as bridge. Water supply, drainage, road project, school building, industrial sheds. Various items to be included in estimates.
- b) Principles in selecting units of measurement for items, various units and modes of measurement for different trades, administrative approval & technical sanction of estimates, I.S.1200, introduction to D.S.R.

- -

c) Prime cost, provisional sum & provisional quantities.

<u>Unit :2</u>

a) Specifications-Definition and basic principle of general and detailed Specifications (writing The detailed specification to various Constructions should be covered in term work)

(06)

b) Analysis of rates, factors affecting the cost of materials, How to fix up the rate of items Task Works, standard schedule of rate, price escalation.

<u>Unit : 3</u>

a) Measurement and abstract sheets and recordings, taking out quantity methods–Long wallshort wall method, Centre line method.

Section II

<u>Unit: 4</u>

- a) Detailed estimate of building, R.C.C. Works, culverts, earthwork for canals, Roads including hill roads and other civil engineering works,
- b) Preparation of schedule for steel as reinforcement.

<u>Unit: 5</u>

a) Valuation- Definition and Principles of valuation, Purposes. Definition of value, price & cost, Attributes of value, Different types of values.

b) Values and his duties, factors affecting the valuation of properties, Tangible and In tangible properties, Landed properties – freehold and leasehold properties, Different types of lease.

c) Valuationfromyieldandfromlife,GrossincomeandNetincome,Outgoings,Capitalized value,

Years purchase - single rate and dual rate, reversion value of land

<u>Unit: 6</u>

a) Methods of valuation-Rental method of valuation, direct comparison with capital value, valuation based on profit, valuation based on cost, Development method of valuation.

b) Rent-Definition, form of rent, different types of rent.

c) Depreciation – methods of depreciation: Straight line method, Constant percentage method ,Sinking fund method and Quantity survey method, Obsolescence

Term Work:

1] Detailed specification for minimum ten civil engineering items.(One each from Roads, Irrigation works, Water Supply & Sanitation & seven from buildings)

- 2] RateAnalysisoftencivilengineeringitems.(Prepareexcelsheetforminimum5itemsof works)
- 3] Detailed estimate of G +1 residential Framed Structure.
- 4]Preparing detailed estimate for anyone of the following:
- a) A stretch of a road about 1 Km. long including earthwork.
- b) A reach of canal about 1Km. long.
- c) A factory shed of steel frame.
- 5] Schedule of reinforcement for the following
- a) Beams
- b) Slab,
- c) Staircase
- d) Column & Column footing
- 6] Valuation reports for building of residential purpose or commercial purpose
- 7] Detailedestimationofbuildinghaving10sq.m.area by using any software.

(06)

(06)

(06)

(06)
Text Books:

- 1. Quantity Surveying-P.L. Bhasin., S. Chand & Co-Ramnagar, Delhi-110055
- 2. Elements of estimating and Costing–S.C. Rangwala. Charotar Publishing House - Opp Amul Dairy Court road Anand.388001 (west rly) India.
- 3. Civil Engineering, Contracts and Estimates B. S. Patil. Universities Press Private Ltd. 3-5-819 Hyderguda, Hyderabad. 500029(A.P), India.
- 4. Estimating and Costing–B.N.Dutta. DhanpatRai &Sons. 1682, NaiSarak, Delhi-110006
- 5. Estimating and Costing–BirdiDhanpat Rai& Sons1682, NaiSarak, Delhi-110006
- 6. Estimating, CostingandSpecificationincivilengineering–ChakrobortyM.21b, BhabanandaRoad, Kolkata-700026
- 7. Valuation of real Properties–S.C.Rangwala Charotar Publishing House, opposite Amul dairy, court Road Anand. 388001.India
- 8. Standard specifications Volumes I&II(P.W.D .Maharashtra) Govt. of Maharashtra

Reference Books:

- Professional Practice (Estimating and Valuation) Roshan Nanavati (1984 Edition) U.B.S. Publishers, Distributers PVT.Ltd.5 Ansari road, New Delhi.
- 2. Standard specifications Volumes I&II(P.W.D. Maharashtra)Govt. of Maharashtra
- 3. C.P.W.D. specifications & schedules of rates.

Guidelines regarding question paper setting:

- 1. Section–I–Q.No-1toQ.No-4, Q. No3Compulsory, Solve any two from Q.No. 1/2/4 and Section –II Q.No-5 to Q.No-8, Solve any two
- 2. Time allotted to solve70 marks Q.Paper03Hours

Question No.	Based on Unit	Marks
1	1	10
2	2	10
3	3 (Compulsory)	15
4	1,2,3	10
5	4	11
6	5	11
7	6	12
8	4,5,6	12

End Semester Examination Paper Pattern

FINAL YEAR B.Tech Civil Semester VII TRANSPORTATIONENGINEERING-I

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
4	PCC-CV704	TR-I	Transportation Engineering-I	7	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To Study of the various principles of highway planning, design of flexible and rigid pavements, traffic engineering, traffic safety analysis
- 2. To familiarizing the students with desirable properties and testing procedures of highway construction materials as per BIS and Indian Roads Congress (IRC) standards.
- 3. To know about tunneling methods in various types of soils.

Course Outcomes: After successful completion of this course students will be able to

- 1. Carry out surveys involved in planning and highway alignment
- 2. Design the geometric elements of highway and expressways
- 3. Carryout traffic studies and implement traffic regulation and control measures and intersection design

Characterize pavement material sand design flexible and rigid pavements as per IRC

	Teaching Scheme			cheme	Evaluation Scheme				
Course	L	Т	Р	Total credit	Scheme Theory(Marks)		Practical(Marks)		
Transportation						Max	Min for Passing	Max	Min for Passing
Engineering– I	3	-	2	4	ISE			25	10
(PCC-CV704)					CIE	30	12		
					ESE	70	28	25	10

ISE- In Semester Evaluation CIE-Continuous Internal Evaluation ESE-End Semester Evaluation

4.

SECTIONI

Unit1: Introduction to Highway Engineering :(06)

1.1 Modes of transportations, their importance and limitations, the importance of highway transportation. Highway Development and Planning: Principles of Highway planning.
1.2 Road development in India, NHAI, NHDP, PMGSY, MSRDC. Classification of roads, road network patterns, Planning Surveys.

1.3 Terrain classification, design speed, vehicular characteristics, highway cross-section elements.

1.4 Sight distance: introduction to sight distance, reaction time, analysis of safe sight distance,

analysis of overtaking sight distance, intersection sight distance.

Unit2: Highway Geometric Design :(06)

2.1 Design of horizontal alignment: horizontal curves, design of super elevation and its provisioadius at horizontal curves, widening of pavements at horizontal curves, analysis of transition curves.

2.2 Design of vertical alignment: different types of gradients, grade compensation on curves, analysis of vertical curves, summit curves, valley curves.

2.3 Intersection: at grade and grade separated intersections, speed change lanes, Canalization, Design of rotary intersection and mini roundabout.

Unit 3: Pavement Materials & Design :(06)

3.1 Pavement materials- Stone aggregates: desirable properties, tests, requirements of aggregates for different types of pavements. Bituminous materials: types, tests on bitumen, desirable properties, selection of grade of bitumen. Bituminous mix design: principle, methods, modified binders.

3.2 Design of pavements-Types of pavements, functions of pavement components, pavement design factors, design wheel load, equivalent single wheel load, repetition of loads, equivalent wheel load factors, strength characteristics of pavement materials, climatic variation; design steps of flexible highway pavement as per IRC 37-2001 and problems based on CBR method, Design of rigid pavement as per IRC 58-2002, Stresses in rigid highway pavements,

3.3 Joints in rigid pavements: transverse joints, longitudinal joints, filler sand sealers.

SECTION II

Unit4: Highway Construction, Maintenance & Rehabilitation (06)

4.1 Highway construction-construction of different Types of roads: water bound macadam, BBM, SDBC, DLC &PQC, use of geo-textiles and geo-grids.

4.2 Highway maintenance & rehabilitation- Pavement failures: flexible pavement failures, rigid pavement failures, maintenance of different types of pavements: assessment and need for maintenance, pavement management system, evaluation of pavements: structural evaluation of pavements, functional evaluation of pavements, strengthening of existing pavements: object of strengthening, types of overlays, design of different types overlays.

Unit5: Traffic Engineering & Highway Drainage (06)

5.1 Traffic Engineering: Fundamentals of traffic flow, Road User and Vehicular characteristics. Traffic Studies: Volume studies, speed studies, parking studies, origin-destination studies and accident studies.

5.2 Traffic management and Safety: Traffic control devices, channelization, traffic signal, junctions, intelligent transportation system, Design of Rotary Intersection and traffic Signal.5.3 Highway drainage- Necessity, surface draining and sub drainage

Unit6: Tunnel Engineering (06)

- .1 Tunnel Engineering: Introduction to tunneling, size and shape of tunnel and suitability
- .2 Tunneling in hard rock, and soft material, shield method, safety measures,
- .3 Ventilation, lighting and drainage of tunneling.

Term work: At least two assignments on each unit including design problems

List of experiments

- Aggregate Impact Value
- Los Angles Abrasion Test
- Crushing test of aggregate
- Bitumen Penetration
- Softening Point
- Flash Point and Fire Point Test
- Ductility test
 - Viscosity of bitumen Stripping value

Text Books

- 1. Highway Engineering By S.K.Khanna and C.E.G.Justo, Nemchand Bross. Roorkee.
- 2. Traffic and transport planning, By L.R.Kadiyali, Khanna publisher, New Delhi.
- 3. Principles and practice of highway engineering, by LRK adiyali, N B Lal Khanna Publications, 2005
- 4. Principles Of Transportation Engineering, Partha Chakroborty, PHIL earning, 1st edition
- Principles of Highway Engineering and Traffic Analysis,4th Edition, Fred L.Mannering, Scott S. Washburn, Walter P. Kilareski, John Wiley
- 6. Harbour, Dockand Tunnel engineering by R.Shrinivassan, Charotar Publishing House.

Reference Books

- 1. Transportation Engineering–An Introduction, by Khistry, C.J, PHI Publication.
- 2. An Introduction to Transportation Engineering and Planning, by Morlok, E.R., McGraw Hill, NY,1970
- 3. Introduction to transportation engineering, by Hay W.W., JohnWiley & Sons, NY, 1988.
- 4. Fundamentals of transportation engineering, by Papacostas C.S., PrenticeHall of India, 1987.
- 5. IRC-37-2001- Guidelines for the Design of Flexible Pavements for Highways
- 6. IRC-058-1988-Guidelines for the Design of Plain Jointed Rigid Pavements for Highways
- 7. IS1201 to1220Methods for testingtar and bituminous materials.
- 8. IS1201 to1220Methods for testingtar and bituminous materials
- 9. IS2386:Part1to5:1963Methods of Testfor Aggregates

Guidelines Regarding Question PaperSetting:

- 1. Q.No.4andQ.No.8are compulsory and its hould are based on all units of respective sections.
- 2. Attempt any two questions from Q. No.1, 2,3 and any two questions from Q. No.5, 6, 7.

Question	Based on Unit No.	Marks
No.		
1.	1	10
2.	2	10
3.	3	10
4.	1,2 &3 (Compulsory)	15
5.	4	10
6.	5	10
7.	6	10
8.	4,5 &6 (Compulsory)	15

End Semester Examination Paper Pattern

FINAL YEAR B.Tech Civil Semester VII

PROFESSIONALELECTIVEI: SOLID WASTE MANAGEMENT (PCE-CV705)

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
5	PCE-CV705	EL-I	Professional Elective-I	7	4

	Teaching Scheme			Evaluation Scheme					
Course						Theory (Marks) Practi		Practica	al(Marks)
	L	Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for
							passing		passing
					ISE			25	10
EL-I(PCE- CV705)	03 01	01		04	CIE	30	12		
C v 703)					ESE	70	28	25	10

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

1. To get on broader under standings on various aspects of solid waste management (starting from its generation to processing with options for reuse and recycle, transport, and disposal)

2. To study different processing technologies of municipal solid waste.

3. To know the various aspects including recovery of biological conversion products from solid waste to compost and biogas, incineration and energy recovery

4. To know various disposal methods of solid waste.

Course Outcomes: After successful completion of this course students will be able to,

1. Learn basic concepts of solid waste management, beginning forms our cegeneration to waste disposal in a system of municipality organizational structure.

2. To acquireafairamount of knowledge on waste characterization and its management practices

3. Develop understanding on various technological applications for processing of waste and their disposals in various ways.

4. Acquire knowledge on waste to energy production sintheperspectives of sustainable development.

5. Apply basic concept sin hazardous waste management and integrated waste management for urban areas.

SECTION I

Unit 1: Introduction to Solid Waste Management:

1.1 Introduction, Overview: problems and issues of solid waste management - Need for solid waste management

 $\label{eq:constraint} 1.2 \ Indianscenario, progress in MSW (municipal solid waste) management in India, Rules \& \ regulation \ regarding \ MSWM \ ,$

1.3 Functional elements of Solid Waste Management.

1.4 Classification of solid wastes(source and type based)

1.5 Hazardous waste:-Definition, sources, hazardous characteristics, management, treatment and disposal

1.6 Biomedical waste:-Definition,sources,classification,collection,segregation-Colorcoding, treatment and disposal

Unit 2: Solid Waste Generation, Handling, Storage and Processing

2.1 Waste generation, Solid waste generation rates and expression of unit generation, Methods used to estimate Waste Quantities, factors affecting generation of solid wastes.

2.2 Composition, sampling and characteristics of waste (physical and chemical),

2.3 Solid Waste Handling, Storage and Processing at the Source-Introduction, On-site handling, storage and segregation of wastes at source, On-site processing.

2.4 Collection of municipal solid waste-Methods of collection, Types of Collection system, Analysis of Collection System, Collection routes.

Unit 3: Transfer and Transport of Solid Waste and Waste Processing:

3.1 Transfer station- Introduction, Need, Types, Criteria for Transfer station location, Factors to be considered in planning and design of Transfer Station.

3.2 Transport-CommonWasteCollectionVehicles,factorsconsideredinselectingcollection vehicles

3.3 Waste Processing – Objectives, Unit operations for component separation, and material separation and processing technologies.

3.4 Material Recovery Facilities (MRF) & types, Commonly Recycled Materials and Processes.

SECTION II

Unit4: Land Disposal of Solid Waste

4.1 Sanitary land filling-Introduction, Impacts from Dumps, Essential components of sanitary land filling,

4.2 Methods of land filling, site selection criteria for land filling,

4.3 Planning & designing of sanitary land filling, Sanitary Land filling Construction

4.4 Leachate:-Drainage, Collection and Removal, Leachate Management & treatment,

Landfill gas and its control measures

4.5 Maintenance and precautions of land filling, Closure & end-use.

<u>Unit 5: Biological Treatment of Solid waste- Composting</u> (06)

5.1 Composting-Definition and phases of composting, Theory of composting

5.2 Types of composting, Methods of composting

5.3 Factors affecting composting process, Compost quality

5.4 Vermi Composting, Mechanical composting plant, Recovery of Bio- gas energy.

Unit 6: Incineration

6.1 Introduction, Objectives of Incineration, Need of incineration

6.2 Incineration process, Types of incinerators,

6.3 Site selection criteria, factors affecting incineration,

6.4 Waste to energy, Pyrolysisandits by-products

6.5 Air pollution and its control.

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Term work:

A. At least one assignment on each unit.

B. Visit to any Municipal Solid Waste Processing Plant/Unit &its report.

Text Books

1. Integrated Solid Waste Management: Engineering principles and management issues by George Tchobanoglous, Hilary Theisen, Samuel A Vigil,M/c Graw hill Education . Indian edition.

2. Environmental Engineering by Howard S Peavy, Donald R Rowe and George Tchobanoglous ,Tata Mcgraw Hill Publishing Co ltd.,

Reference Books:

1. Municipal Solid Wastes (Management and Handling) Rules, 2000. Ministry of Environment and Forests Notification, New Delhi, the 25th September, 2000. Amendment -1357(E) - 08-04-20162. Municipal Solid waste management manual, Part II published under Swachh Bharat Mission, Central Public Health and Environmental Engineering Organization (CPHEEO), 2016, Ministry of Urban Development, Government of India.

3. Hand book of Solid waste management, secondedition, George Tchobanoglous, FrankKreith, published by M/c Graw hill Education, 2002, ISBN-13 9780071356237 ISBN -10 0071356231

Guidelines Regarding Question Paper Setting:

1. Q.No.4 and Q. No.8 is compulsory and its hould be based on all units of respective sections. 2. Attempt any two questions from Q. No. 1, 2, 3 and any two questions from Q. No.5, 6, 7.

Question No.	Based onUnit No.	Marks
1	1	10
1.	1	10
2.	2	10
3.	3	10
4.	1,2 &3 (Compulsory)	15
5.	4	10
6.	5	10
7.	6	10
8.	4,5 &6 (Compulsory)	15

End Semester Examination Paper Pattern

FINAL YEAR B.Tech Civil SemesterVII PROFESSIONAL ELECTIVE I: TOWN PLANNING (PCE-CV705)

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
5	PCE-CV705	EL-I	Professional Elective-I	7	4

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives-

1. To understand the concept of balanced town by ensuring that new and existing facilities are complimentary to each other.

2. Provides a basic knowledge on Urbanizations and its trend.

3. Deals with different types of plan, its implementation, regional development and management for sustainable urban growth.

4. Describe different legislations related to urban planning and policy.

Course Outcomes- After successful completion of these course students will be able to,

1. Understand importance of town planning and its past trends.

2. Understand with different types of urban strategies and management for sustainable urban growth.

3. Understand the different types of acts related to town and country planning

	T	Teaching Scheme			Evaluation Scheme				
Course						Theory (Marks)		Practical(Marks)	
	L	Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for
							passing		passing
					ISE			25	10
EL-I(PCE-	03 01	01		04	CIE	30	12		
C v 703)					ESE	70	28	25	10

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

SECTION-I

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Introduction: Objects of town planning, principles of town planning, Origin and growth of towns – development of towns, Modern town planning in India, Socio – Economic aspects of town planning. Selection of site for an ideal town.

<u>Unit: 2</u>

Unit: 1

A) Surveys& Planning: Various types of surveys to be conducted for town planning project. Data's to be collected in different types of town planning survey. Types of planning, -a brief note on urban, rural and regional planning

b) Zoning: Definition - objects and principles of zoning. Advantages of zoning, Special Economic

Zone (SEZ), Maps for zoning.

Unit: 3

A) Housing: Classification of residential building as per HUDCO norms, Housing in villages, Low Cost Housing, Housing policy, different types of housing agencies involved in housing, investment in Housing, Housing Problems in India

B) Slums: Causes, growth, characteristics, effects, slum clearance andre-housing, prevention of slum formation, financial assistance for slum clearance.

SECTION-II

Unit 4: (05) Public buildings & Industries: Classification, location, Design Principles of public building, Effects of Industries on towns and cities, classification of industries, regulation of their location. Recreation measures: Parks-parkways, Playgrounds, Theme parks, boulevards and their spaces tandards.

Unit 5:

A) Master Plan: Meaning – Definition – objects and necessity of masterplan, Data and Drawings required for master planning. Building byelaws, Preparation of a layout plan for a residential area showing LIG, MIG and HIG houses and other amenities (not to scale).

B)Re-planning Existing Towns: General - Objects of re-planning –Analyzing the defects of existing towns-difficulties in Master Planning of existing towns/cities- Urban renewal projects, merging of suburban areas – Decentralization - Satellite Towns – Smart cities- definition and features.

Unit 6:

A) Town and Country Planning Act, Improvement Trust Act, Urban Planning and Development Authorities Act – objectives, contents, procedures for preparation and implementation of Regional Plans, Master Plans and Town Planning Schemes. Various Acts related to urban governance. B)MRTP Act, Provisions of Land Acquisition Act, Urban Land Ceiling Act, Conservation Act.

Text Books:

1.Town and country Planning- G.K. Hiraskar& K. G. Hiraskar, By Dhanpat Rai Publication (p) Ltd.,

- 22 Ansari Road, Dariyaganj New Delhi.
- 2 Town and country Planning- N.K.Gandhi
- 3 Town Planning-S. C .Rangawala, Charotar Publications, Pune
- 4. Town Planning by Abir Bandyopadhyay.

Reference books:

- 1. MRTP Act 1966
- 2. Land Acquisition Act -1894
- 3. Urban Pattern by Gallion, Eisner
- 4. Rural development tPlanning- Designand method: Misra S.N., Satvahan PublicationsNew Delhi
- 5. Economic development in Thirdworld: Todaro Michael, Orient Longman Publication, New- Delhi

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Guidelines Regarding Question Paper Setting:

- 1. Q.No.4and Q.No.8are compulsory and it should be based on all units of respective sections.
- 2. Attempt any two questions from Q. No. 1, 2, 3 and any two questions from Q. No.5, 6, 7.

Question No.	Based on Unit No.	Marks
1.	1	10
2.	2	10
3.	3	10
4.	1,2 &3 (Compulsory)	15
5.	4	10
6.	5	10
7.	6	10
8.	4,5 &6 (Compulsory)	15

End Semester Examination Paper Pattern

FINAL YEAR B.Tech Civil Semester VII Legal Aspects in Civil Engineering

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
6	HM-CV706	LACE	Legal Aspect in Civil Engineering	7	3

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To aware the students about Indian Contract and Arbitration act.
- 2. To provide knowledge about contract administration.
- 3. To provide knowledge about safety acts.

Course Outcome: After successful completion of this course students will be able to:

- 1. Students will learn Indian contract act, Arbitration act and contract administration.
- 2. Students will understand the labour laws.
- 3. Students will understand safety engineering and relevant acts.

Course		Teaching	g Scher	ne		Evaluation Scheme			
	_		Р	Credit	Scheme	Theory (Marks)		Practical(Marks)	
	L					Max.	Min. for Passing	Max.	Min. for Passing
LACE					ISE			25	10
(HM-	02		02	03	CIE				
CV706)					ESE				

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

Unit I Contract and Tenders:

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Contracts, Types of Contracts, Tender document- invitation of tenders. Tender notice, tender documents, Submission. Scrutiny and acceptance two envelop method. Award of jobs. Various conditions to contracts. Rights and responsibilities of parties of contracts. E- Tendering, Introduction to Non-Conventional Contracts

Unit II Contract administration:

Essentials of legally void and avoidable contracts, contract for engineer and architecture services, contract between owner and contractor. Introduction to RERA

Unit III Arbitration:

Introduction to Indian Arbitration Act, Arbitration Agreement, Power and Duties of Arbitration, Different types of arbitration, Qualification of arbitrator.

Unit IV Safety laws and acts:

Workmen's Compensation Act, Safety and health standards, Employer's liability act, Employer's Insurance act

Term Work:

- 1. One assignment per unit.
- 2. Visit to one Public Bodies & prepare a report regarding tendering process over there.
- 3. In house tendering process which includes demonstration & preparation of reports in batches

Text Books:

- 1. Indian arbitration Act by B.S.Patil
- 2. Contract-I by R.K.Bangia
- 3. Contract-II by R.K.Bangia
- 4. Estimation, Costing, Spectification, and valuation in Civil Engineering by M.Chakraborti.

5. Estimation & Costing in Civil Engineering by B.N.Dutta, UBS Publishers & Distributore Pvt. Ltd.

- 6. Civil Engineering Contracts & Estimates by B.S.Patil
- 7. Legal Aspects of building and Engineering Contracts by B. S.Patil
- 8. Indian contract Act Avatar singh
- 9. Indian Contrac tAct.

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FINAL YEAR B.Tech Civil Semester VII FIELD TRAINING

Sr. No	Code No.		Course(Subject Title)		Credits
7	SI-CV707	FT	Field Training	7	-

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

		Teaching	g Scher	ne		Evaluation Scheme			
Course	_	_	Р	Credit	Scheme	Theory (Marks)		Practical(Marks)	
	L	Τ				Max.	Min. for Passing	Max.	Min. for Passing
					ISE			25	10
FT (SI-CV707)					CIE				
				-	ESE				

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

Based on the field training done by the students in T.Y.B.Tech during the winter and summer vacation, as mentioned in the T. Y. B. Tech. syllabus. The oral is to be conducted preferably in presence of expert from field and final term work marks are to be given based on performance in oral exam and the project report in the field book.

FINALYEAR B.Tech Civil Semester VII PROJECT PHASE – I

Sr. No	Code No.		Course(Subject Title)	Semester	Credits
8	PW-CV708	PP-I	Project Phase-I	7	1

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

		Teaching	g Scher	ne		Evaluation Scheme			
Course	L	_	_	Credit	~ -	Theory (Marks)		Practical(Marks)	
		Т	Р		Scheme	Max.	Min. for Passing	Max.	Min. for Passing
PP-I					ISE			50	20
(PW-			02	01	CIE				
CV708)					ESE				

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

The project work will be a design project, experimental project, field surveying or computer oriented on any of the topics of civil engineering interest. It will allot as a group project consisting of a minimum THREE and maximum FIVE number of students, depending upon the depth of project depth work. The student is required to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem.

Probable Activities of Project Phase -I

- 01. Submission of project to pig with names of group member
- 02. Finalization of topic and allotment of guide by department through Departmental Research Committee (DRC)
- 03. Introduction and literature review presentation
- 04. Methodology and future work presentation
- 05. Submission of synopsis duly signed by students and guide
- 06. Presentation of synopsis in front of DRC

The term work assessment of the project will be done continuously throughout the semester by a DRC consisting of 3-4 faculty members from the department along with Project Guide. The students will present their project work before the committee. The complete project report is not expected at the end this semester. However, ten pages typed report based on the work done will have to be submitted by the

students to the DRC. The project guides will award the marks to the individual students depending on the group average awarded by the committee. 36

One Project Guide shall be allotted Maximum TWO groups for guidance.

For work load calculation minimum load is1 Hr./week, for one group of FOUR to FIVE students.(As per AICTE Guide Lines).

FINAL YEAR B.Tech Civil Semester VIII DESIGN OF CONCRETE STRUCTURES-II

	SEMESTER-VIII									
Sr. No	Code No.		Course(Subject Title)	Semester	Credits					
1	PCC-CV801	DCS-II	Design of Concrete Structures-II	8	5					

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To study the concept of torsion,
- 2. To design two span and three continuous beams,
- 3. To analyze and design water tanks resting on ground by WSM
- 4. To study concept of prestressed concrete, losses in prestress, analysis & design of prestressed concrete sections.

Course Outcomes:

After successful completion of course student will be able to design -

- 1. Sections subjected to torsion
- 2. Continuous beams
- 3. Water tanks resting on ground
- 4. Prestressed concrete sections

	Те	achiı	ng Scl	heme	Evaluation Scheme						
Course	L	Т	Р	Total credit	Scheme	The	eory (Marks)	Pract	ical(Marks)		
DCS-II						Max	Min for Passing	Max	Min for Passing		
(PC	4	-	2	5	ISE			25	10		
C-					CIE	30	12				
801)					ESE	70	28				

ISE–In Semester Evaluation

CIE–Continuous Internal Evaluation

ESE–End Semester Evaluation

SECTION-I

<u>Unit: 1</u>

Limit State of Collapse in Torsion - Behavior of R.C. rectangular sections subjected to torsion, Design of sections subjected to combined bending and torsion, combined shear and torsion.

<u>Unit: 2</u>

Limit State Design of two span continuous beams and three span continuous beams using IS

coefficient or Moment Distribution Method, Introduction to moment redistribution. <u>Unit: 3</u> (09)

Design of water tank - Introduction to working stress method for water tank design, Calculation of design constants, Design criteria, permissible stresses, design of water tank restingon groundusing IS codemethod–circular water tanks with flexible and rigid joint between wall and floor.

SECTION-II

<u>Unit: 4</u>

Basic Concept of Prestressing, Types and Systems of Prestressing. Analysis of rectangular and symmetrical I sections. Different cable profiles.

<u>Unit: 5</u>

Losses in Prestress - elastic deformation, creep, shrinkage, friction, anchorage slip, relaxation in steel for Pre & Post tensioned members.

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<u>Unit: 6</u>

Design of Prestress Concrete-Rectangular and Symmetrical Isections by Working Stress Method for flexure.

TermWork:

Atleast one assignment on each unit.

Use of IS: 456-2000, IS: 1343, IS3370 is allowed for students

Text books :

- 1. Limit State Theory & design-Karve & Shah Structures Pub.Pune
- 2. Reinforced Concrete Design(Limit State)-A.K.Jain
- 3. Fundamentalsof ReinforcedConcrete-- Sinha&Roy
- 4. Limit State Design of Reinforced Concrete-P.C.Varghese, Prenticeall of India, New Delhi
- 5. Reinforced Cement Concrete-B.C.Punmia
- 6. Handbook of Reinforced Concrete SP-34
- 7. Prestressed Concrete-Sinha & Roy S.Chand & Co. New

Reference Books:-

- 1. Prestressed Concrete-T.Y.LinJohn Willey & sons Newyark
- 2. Prestressed Concrete–N KrishnaRaju,TataMcGraw-HillPublication Company ltd., NewDelhi

Guidelines regarding question paper setting:

- 1. Section–I–Q.No-1toQ.No-3 and Section –II–Q.No-4toQ.No-6
- 2. All questions are Compulsory
- 3. Internal option question are allowed, weightage of optional question should no the more than 30% of total marks i.e.21 marks out of 70 marks

FINAL YEAR B.Tech Civil Semester VIII WATER RESOURCES ENGINEERING-II

	SEMESTER-VIII									
Sr. No	Code No.		Course(Subject Title)	Semester	Credits					
2	PCC-CV802	WRE-II	Water Resource Engineering-II	8	4					

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To equip the students with capabilities required for identifying, formulating and management of water resources related issues and problems.
- 2. To impart the students with knowledge required for planning design, and development of different types of dams and reservoirs.
- 3. To impart the students with knowledge required for planning design, and development of canal distribution systems for agriculture purpose
- 4. To make the students understand the importance of hydropower projects and their needs of development.
- 5. To understand the basic concepts and importance of river engineering works.

Course outcomes: After successful completion of this course students will be able to:

- 1. Identify and understand various issues related to water resources systems.
- 2. Understand the role of dams and reservoirs in controlling the floods.
- 3. Plan and design different types of hydraulic structures.
- 4. Plan design and monitor an efficient canal network system.
- 5. Understand the role of rivers in the development of nation.

Course	,	Teachin	g Schem	ie		Evaluation Scheme			
				~	G I	Theory (Marks)		Practical(Marks)	
	L	Т	Р	Credit	Scheme	Max.	Min. for Passing	Max.	Min .for Passing
WRF-II					ISE			25	10
PCC-CV802	03		02	04	CIE	30	12		
					ESE	70	28		

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

SECTIONI

<u>Unit-1</u>

Introduction to dams and reservoirs: Types of dams, selection of site for dams, selection of type of dam.

Reservoirs – Types of reservoirs, site selection, control levels, Area elevation-curve& Elevation-capacity curve, Reservoir capacity determination using mass curves, Silting of reservoirs, Control of losses in reservoirs.

Earthen dam: Types of earthen dams, Components and their functions, methods of Construction o fear then dam, plotting of phreaticline, Modes of failure, seepage control measures-Drainage & filters, stability of slopes for sudden drawdown & steady seepage Only.

<u>Unit-2</u>(07)

Gravity Dams: Forces acting on gravity dams, Modes of failures, Stress analysis, Elementary and practical profile, stability analysis, Structural joints, keys and Water seals in Gravity Dames, Drainage galleries, Foundation treatment.

Arch dams and Buttress dams-Introduction to different Types.

<u>Unit-3</u>(05)

Spillway: Necessity and function, components of spillway, different types, Energy dissipation arrangements, gates for spillway, Elementary design of an ogee spillway **Outlets in Dams:** Outlets through concrete and earth dams, different types, Trash racks.

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SECTIONII

<u>Unit-4</u>

(05)

Diversion Head Works: Component parts& their functions, types of weir and barrages, Causes of failure and remedies, Introduction to Theories seepage-Bligh's creep theory, critical exit gradient, Khosla's theory.

<u>Unit-5</u>(08)

Canals: Types, alignment, typical sections of canals, balancing depth, Kennedy's and Lacey's silt theories, Canal lining - purpose, types, selection, and economics of lining. Types of canal outlets

C.D. Works: Necessity and Types.

Canal Regulatory Works: head regulator, cross regulator, canal fall, canal escape, standing wave flume.

Drainage of Irrigated lands: Necessity and methods,

<u>Unit-6</u>

(07)

River Engineering: Classification and types of rivers, meandering phenomenon, **And River training works:** Classification-Marginal bunds, Guide banks and Groynes. River navigation. Interlinking of rivers

Elements of hydro-power: Hydro-power & importance, typical layout & functions of components parts-Intakes, conveyance system, surge tanks, Power house, Tail race, Types of hydro-power plants.

Term work:

A) Students have to solve any **Eight** out of following Ten assignments

- 1. Determination of height of dam: Demand / supply reservoir calculation and control levels and free board
- 2. Earthen dam: Determination of section(drawing of one plate),one slip circle calculations, Types of failure
- 3. Gravity dam: Forces acting, Modes of failure, Elementary and practical profile with stability calculations (drawing of one plate),
- 4. Types of arch dam and buttress dams–Simple sketches and brief Explanation
- 5. Spillway: Geometrical sections, energy dissipation arrangement and gates,

Outlet through earth dam and gravity dam.

- 6. Typical section of diversion headwork, Different components, B lighs creep theory, khosla's theory.
- 7. Typical sections of canals, kennedy & lacey's theory
- 8. Types of CD work and canal regulatory works

- 9. Different types of river training work, I nter linking of rivers
- 10. A typical layout &component parts of Hydropower plant and its functioning
- B) A Report base done field visit to adam & CD works.

Text Books:

- 1. "Irrigation Engineering"-S.K.Garg-Khanna Publishers, Delhi.
- 2. "Water Resources & Irrigation Engineering"–Dr.K.R.Arora, Standard Publisher.
- 3. "Irrigation, Water Resources and Water Power Engineering"–Dr P.N.Modi,Standard Book House.
- 4. "Irrigation and Water Power Engineering–Dr.Punmia and Dr.Pande–Laxmi Publications, Delhi
- 5. "Irrigation Engineering" Dahigaonkar, Asian Book Pv tLtd.
- 6. "Irrigation Engineering"–S. R.Sahastrabudhe, Katson Publishers.
- 7. "Irrigation Theoryand practice"- Michael, Vikas Publications House.
- 8. "Irrigation Engg.", -G.L.Asawa, Wiley Eastern
- 9. "Theoryand design of irrigation structures" Varshneyand Gupta, vol. I, II and III, New Chand and Brothers.
- 10. "Irrigation Engineering" Raghunath, WileyEastern Ltd, NewDelhi.

Reference Books:

- 1. U.S.B.R., Oxfordand IBH Publication—Design of smalldams.
- 2. Justinn, Creagerand Hinds, -- Engg. For Dams. Vol.I, II, and III
- 3. Varshney,-Design of hydraulic structures.
- 4. Leliavs ky,-Design of hydraulic structures
- 5. Satyanarayan Murty,-Water resources Engg, New age international private Ltd.
- 6. Satyanarayanand R.Murthy-"Design of M.I. And Canal Structure", Wiley Eastern Ltd, New Delhi.
- 7. Bharat Singh, 'Irrigation', New ChandandBros., Roorkee.
- 8. River Behaviour and Management and Training,-CBI P publication
- 9. "Water management"-Jaspal Sing, M.S.Acharya, Arun Sharma, Himanshu Publications.

Guidelines Regarding Question Paper Setting:

- 1. Q.No.4andQ. No.8 are compulsory, and its hould be based on all units of respective sections.
- 2. Attempt any two questions from Q. No. 1, 2, 3 and any two questions from Q. No. 5, 6, 7

Question No.	Based on Unit	Marks
1	1	10
2	2	10
3	3	10
4	1,2 &3 (Compulsory)	15
5	4	10
6	5	10
7	6	10
8	4,5 &6 (Compulsory)	15

End Semester Examination Paper Pattern

FINAL YEAR B.Tech Civil Semester VIII TRANSPORTATIONENGINEERING-II

	SEMESTER-VIII									
Sr. No	Code No.		Course(Subject Title)	Semester	Credits					
3	PCC-CV803	TR-II	Transportation Engineering-II	8	4					

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives

- 1. To study of various components so far ail way track and geometric design of curves along railway tracks.
- 2. To impart knowledge of functioning of railway points, crossing sand junctions.
- 3. To learn about the aircraft characteristics, airport planning and air traffic control.
- 4. To introduce the students to dock sand harbor engineering.
- 5. To introduce the students to various types of bridges, bridge components, and design aspects of bridges.

Course Outcomes:

After successful completion of this course students will be able to:

- 1. Perform geometric design for the railway tracks.
- 2. Plan the layout of different types of air terminals.
- 3. Carry out the surveys for layout of railways, airports and harbors.
- 4. Design various bridge components

	Teaching Scheme				Evaluation Scheme					
Course		Т	Р	Credit	Scheme	Theory	Theory (Marks)		Practical(Marks)	
Course	L					Max.	Min. for	Max.	Min. for	
							passing		passing	
ΤΡ ΙΙ					ISE			25	10	
(PCC-CV803)	03		02	04	CIE	30	12			
(100-00000)					ESE	70	28			

ISE: In Semester Evaluation

CIE: Continuous Internal Evaluation

ESE: End Semester Examination

SECTION I

Unit 1: Airport Engineering

1.1 Airport Engineering- Aircraft characteristics and their influence on airport planning. Airport planning: topographical and geographical features, air traffic characteristics, and development of new airports, factors affecting airport site selection. Airport obstruction: Zoning laws, classification of obstruction, imaginary surfaces, approach zones, turning zones.

1.2 Airport layout: runway orientation, wind rose diagrams, and basic runway length. Correction of runway length, airport classification, geometric design, airport capacity, run way configuration, taxiway design, geometric standards

Unit2: Airport layout details

1.1 Exit taxiways, holding aprons, location of terminal buildings, aircraft hangers and parking. Airport marking and lighting: marking and lighting of runways, taxiways and approach areas.

1.2 Terminal area, planning of terminal building, Apron: size of the gate position, number of gate position, aircraft parking system; Hanger: general planning considerations, blast considerations. Air traffic control: Air traffic control aids, Enroute aids, landing aids.

1.3 Airport Drainage: requirement of airport drainage, design data, surface drainage design, subsurface drainage design.

Unit 03: Dock and Harbors Engineering

3.1 Hydrographic Survey, Sea and tide, Wind Waves & cyclone, Siltation and erosion, Ship feature, Traffic forecasting, Harbour layout, channel basin and berth, Breakwater, Jetties Dolphins & mooring, Berth for crude oil, Locks,

3.2 Dry-dock and slip well, Carbohydrate equipment, Apparent, Transit shade, Ware Houses, Navigation Aids.

SECTION II

Unit: 4 Railway Engineering

4.1 Introduction, Permanent Way: Components, coning of wheels

4.2 Geometric design: Alignment, gradient, horizontal curves, super elevation, design problems on above.

4.3 Points & 4Crossing: Terms used, standard points and crossings, design of simple turnout various types of track junctions.

4.4 Station sand yards: purpose, location, site selection, types and general layouts of terminus, Junction.

Unit: 5 Railway Engineering

5.1 Signaling and interlocking—Introduction,

5.2 Construction and maintenance of railway track: methods, material required per KM of track, tools and plant used for plate laying,

5.3 Maintenance of Track, Modern trends in railways, Safety in railways

Unit: 6 Bridge Engineering

6.1 Classification of bridges, selection of site, Bridge Hydrology: determination of design discharge, linear water way, economical span, location of piers and abutments, afflux, scour depth, design problems on above topics.

6.2 Standard specification for bridges: - IRC loads, Railway bridge loading, forces acting on super structure. Design considerations, aesthetics of bridge design.

6.3 Types of bridge foundations, Bridge piers, Abutments, Wing walls, Bearings, Construction and

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maintenance of bridges-Introduction; Recent trends in bridges.

Term Work

Assignment on each unit and field visit report on airport/railway/bridge shall be submitted by the students.

Text Books

- 1. Airport Engineering by G.V. Rao.Rao,TataMcGraw Hill
- 2. Airport Planning & Design, by Khannaand Arora, NemchandBros, Roorkee
- 2. Harbour, Dockand Tunnel Engineering by R.Shrinivasan, Charotar Publishing House.
- 3. A Textbook of Railway Engineering by Saxena and Aror, DhanapatRai & Sons Publication.
- 4. Railway Engineering by Rangwala, by Charotar Publication.
- 6. Bridge Engineering by Ponnuswamy S,,TataMcGrawHill

Reference Books

- 1. Railway Engineering- by Aggarwal M.M.
- 2. Railway and track Engineering- by Mundrey J.S.
- 3. Indian Railway permanent way manual 1986.
- 4. Planning and Construction of Docksand Harbors–Quinn.
- 5. Docks and Harbour Engineering Oza, Charotar Publication House.
- 6. Airport Planning & Design by Khanna & Arrora.
- 7. Concrete Bridge Practice by RainaVK,TataMcGrawHill
- 8. IRC:5-2015-Standard Specifications and Code of Practice for Road Bridges,SectionI– General Features of Design
- 9. IRC:6-2017-Standard Specifications and Code of Practice for Road Bridges, SectionII– Loads and Load Combinations

Guidelines Regarding Question Paper Setting:

- 1. Q.No.4 and Q.No.8 are compulsory and it should be based on all units of respective sections.
- 2. Attempt any two questions from Q. No.1, 2,3and any two questions from Q. No.5, 6, 7.

Question No.	Based on Unit No.	Marks
1.	1	10
2.	2	10
3.	3	10
4.	1,2 &3 (Compulsory)	15
5.	4	10
6.	5	10
7.	6	10
8.	4,5 &6 (Compulsory)	15

End Semester Examination Paper Pattern

FINAL YEAR B.Tech Civil Semester VIII PROFESSIONALELECTIVEII: STRUCTURAL DESIGN OF FOUNDATION & RETAINING STRUCTURES (PCE-CV804)

	SEMESTER-VIII								
Sr. No	Code No.		Course(Subject Title)	Semester	Credits				
4	PCE-CV804	EL-II	Professional Elective-II	8	4				

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

- 1. To learn various foundation systems and their applications
- 2. To evaluate the load carrying capacity & stability of specify foundation system.
- 3. To learn analysis & design of different foundations with reinforcement details.
- 4. To enhance the knowledge about reinforcement curtailments with economy.
- 5. To study the structural construction in water bodies as retaining structures.
- 6. To study the various force sating on modern foundation techniques.

Course Outcomes:

After successful completion of this course students will be able .to:

- 1. Understand the different types of foundations & their necessities
- 2. Select the suitable foundation system based on soil and loading conditions.
- 3. Analyse the different types of loading acting on foundation system.
- 4. Design the foundation for lighter & heavy structures.
- 5. Learn the reinforcement curtailments in foundation systems.

Design the vertical walls to retain water or soil on one side of wall

		Teaching	g Schem	e	Evaluation Scheme				
Course						The (Ma	Theory (Marks)		ctical arks
Course	L	Т	Р	Credit	Scheme Max Marks f		Min for passing	Max Marks	Min for passing
El - II					ISE				
PCE-	3	1		4	CIE	30	12		
CV804					ESE	70	28		

ISE: In Semester Evaluation **CIE:** Continuous Internal Evaluation **ESE:** End Semester Examination

SECTION-I

Unit 1:	Shallow Foundations –Combined footing	6 hrs.
1.1	Introduction to combined footings, necessity & types of combined footings	
1.2	Dimension analysis of rectangular & Trapezoidal combined footings	
1.3	Design of slab type combined footing with reinforcement details	
1.4	Design of slab-beam type combined footing with reinforcement details	
Unit 2:	Shallow Foundations – Raft Foundation	6 hrs.
2.1	Introduction to raft or mat foundation, necessity & types of raft	
2.2	Design of raft as slab with reinforcement details (without primary & secondary beams)	
2.3	Design of raft as slab including primary peripheral beam swith proper	
2.4	Design of raft as slab including both primary & secondary be amwith Proper reinforcement details	
Unit 3:	Deep Foundations –Pile Foundation	6 hrs.
3.1	Introduction to pile foundation, necessity, classifications of pile foundation.	
3.2	Design of single pile with reinforcement details	
3.3	Introduction to group of piles, pilecap & efficiency of group of pile	

3.4 Design of pile cap for a group of 2,3,4 and 6 piles with reinforcement details

SECTION-II

Unit 4:	Deep Foundations –Well Foundation6 hrs.	
4.1	Introduction to well foundation, necessity & types of wellfoundations	
4.2	Elements of wellfoundation, shapes of wellfoundation, installation etc.	
4.3	Forcesactingon well foundation &lateral stability analysis	
4.4	Problems associated with sinking of well & remedial measures	
4.5	Tilt, shift & techniques to overcome, health problems of workers etc.	
Unit 5:	Retaining Structures6 hrs.	
5.1	Introduction ,functions &types of retaining wall	
5.2	Stability analysis of cantilever type retaining wall	
5.3	Reinforcement curtailment in cantilever type wall, use of shear key etc.	
5.4	Design of cantilever type retaining wall for various types of backfill conditions with reinforcement details	
Unit 6:	Break waterStructures 6 brs.	
6.1	Introduction, Necessity, functions and types of breakwater	
6.2	Parameters for construction of breakwater	
6.2 6.3	Parameters for construction of breakwater Methods of constructions of reakwaters	60
6.2 6.3 6.4 Practio 1. One 2. Stud	Parameters for construction of breakwater Methods of constructions of reakwaters Stability analysis and design of breakwater ceWork: assignment on each unit containing atleast three problems to practice ents should visitat least one foundation site during academic term	60
6.2 6.3 6.4 Practio 1. One 2. Stud Refere	Parameters for construction of breakwater Methods of constructions of reakwaters Stability analysis and design of breakwater ceWork: assignment on each unit containing atleast three problems to practice ents should visitat least one foundation site during academic term ncebooks:	60
6.2 6.3 6.4 Practio 1. One 2. Stud Refere 1.	Parameters for construction of breakwater Methods of constructions of reakwaters Stability analysis and design of breakwater ceWork: assignment on each unit containing atleast three problems to practice ents should visitat least one foundation site during academic term ncebooks: <i>"Foundation Engineering Handbook- I"</i> , Van Nostrand Reinhold Company, 1975 by	60
6.2 6.3 6.4 Practio 1. One 2. Stud Refere 1. 2.	Parameters for construction of breakwater Methods of constructions of reakwaters Stability analysis and design of breakwater ceWork: assignment on each unit containing atleast three problems to practice ents should visitat least one foundation site during academic term ncebooks: <i>"Foundation Engineering Handbook- I"</i> , Van Nostrand Reinhold Company, 1975 by Winterkorn H.F. and Fang H. Y <i>"Pile Foundation Analysis and Design"</i> , Poulos, H.G. and Davis, E.H. (1980), JohnWiley and Sons, New York.	60
 6.2 6.3 6.4 Praction 1. One 2. Study Reference 1. 2. 3. 	Parameters for construction of breakwater Methods of constructions of reakwaters Stability analysis and design of breakwater ceWork: assignment on each unit containing atleast three problems to practice ents should visitat least one foundation site during academic term ncebooks: <i>"Foundation Engineering Handbook- I</i> ", Van Nostrand Reinhold Company, 1975 by Winterkorn H.F. and Fang H. Y <i>"Pile Foundation Analysis and Design</i> ", Poulos, H.G. and Davis, E.H. (1980), JohnWiley and Sons, New York. <i>"FoundationAnalysis& Design</i> ",by JosephBowles,McGraw-HillEducation;5th edition March 2001	60

5. "Basics of retaining wall design", by hugh brooks, HBA Publications, Incorporated(23

May 2018)

- 6. *"Earth Pressure and Earth-Retaining Structures",* by Clayton Chris R.I, Woods Rick. I, Bond Andrew J, Publisher: Taylor & Francis Inc.
- 7. *"DesignApplicationsofRaftFoundations"*, byJ.A.Hemsley, Publishedon2000by Thomas Telford

Text Books:

- 1. *"Foundation Engineering"*, by P. C. Varghese, Prentice Hall IndiaLearning PrivateLimited
- 2. *"Raft Foundation Designand Analysis with a Practical Approach"*, by Sharat Chandra Gupta, New age Publisher 1997
- 3. *"Pile foundation Design & Construction"*, by Satyendra Mittal, CBS Publishers & Distributers Pvt. Ltd.
- 4. *"Soil Mechanics and Foundations"* by B.C.Punamia & Ashok Kumar Jain,Laxmi Publications
- 5. *"Soil Mechanics and Foundation Engineering"*, by PurushotamaRaj,Publishedby Pearson Education India, Ltd.
- 6. *"FoundationEngineering"*, byB. J.Kasmalkar,Pune Vidyarthi GrihaPrakashan
- 7. *"AdvanceFoundationEngineering"*, by V.N.S.Murthy, CBS Publishers & Distributers Pvt. Ltd.
- 8. *"Foundation Design Manual for Practicing Engineer"*, by Narayan Nayak, Dhanapat Rai Publications Pvt. Ltd.

Guidelines regarding question paper setting:

- 1. Section -I-Q.No-1to Q.No-3 and Section -II Q.No-4 toQ.No-6
- 2. All questions are Compulsory.
- 3. Internal option question are allowed, weightage of optional questions hould not be more than 30% of total marks i.e.21 marks out of 70 marks

Question No.	Based on Unit No.	Marks
1	1	12
2	2	12
3	3	11
4	4	12
5	5	12
6	6	11

ENDSEMESTEREXAMINATIONPAPERPATTERN

FINAL YEAR B.Tech CIVIL SEMESTER VIII PROFESSIONAL ELECTIVE III: ADVANCED CONSTRUCTION TECHNIQUES (PCE-CV805)

	SEMESTER-VIII								
Sr. No	Code No.		Course(Subject Title)	Semester	Credits				
5	PCE-CV805	EL-III	Professional Elective-III	8	4				

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

	Г	leach	ing So	cheme	Evaluation Scheme					
Course					Theory(Marks) Practic			Practic	cal(Marks)	
	L	Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for	
							passing		passing	
					ISE					
EL-III(PCE-CV805)	03	03 01		04	CIE	30	12			
					ESE	70	28			

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

SECTION-I

(06) 1.1 COMPOSITE CONSTRUCTION: Composite v/s non composite action; composite steel- concrete construction. 1.2 FORMWORK:-Material for formwork, special types of formwork, designs of formwork.

Unit: 2

2.1 NEW MATERIAL of construction such as geosynthetics, Epoxyresins, Adhesives, MDF, FRC, FRP, Polymer- based composites.

<u>Unit: 3</u>

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1.1 GROUND IMPROVEMENT by Vibro Compaction, Soilcrete, Soil fracturing (SoilFrac), Soil Nailing, Vaccume Consolidation, Gabbions and Cribs.

SECTION-II

<u>Unit: 4</u>

1.1 COFFERDAMS: Types, requirements, Selection criteria, Design features, Leakage points and leakage prevention in coffer dams. **Caissons:** Materials used, Sinking loading of caissons

<u>Unit: 5</u>

- **5.1 REHABILITATION OF BRIDGES:** Necessity and methods of strengthening, preservation of bridges.
- **5.2 RETAINING STRUCTURES** like diaphragm walls, advanced methods of their construction.

<u>Unit: 6</u>

- **6.1 CONSTRUCTION OF CONCRETE PAVEMENT** by techniques like vaccum processing, revibrated concrete, Roller–compacted concrete.
- **6.2 USE OF TECHNIQUES** like, Sanitary Landfills, vaccum dewatering, Foundation dewatering, foundation strengthening.

Referencebooks:

- 1. Handbook of Composite construction Engg---G.M.Sabanis
- 2.Formwork design and construction ------Wynn
- 3. Water power Engineering—

Dandekarsharma

- 4. Bridge Engineering-----Raina
- 5. Bridge engineering Punnuswamy
- 6. Concrete Technology ------ M.S.ShettyS.Chandpublication
- 7. NPTL Course on Advanced Construction Technology.

Guideline Regarding Question Paper Setting:

- 1. Q.No.4 and Q.No.8 are compulsory and it should be based on all units of respective sections.
- Attempt any two questions from Q.No.1,2,3and any two questions from Q.No.5, 6,
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Question No.	Based on Unit No.	Marks
1.	1	10
2.	2	10
3.	3	10
4.	1,2 &3 (Compulsory)	15
5.	4	10
6.	5	10
7.	6	10
8.	4,5 &6 (Compulsory)	15

End Semester Examination Paper Pattern

FINALYEARB.TECHCIVILSEMESTERVIII PROFESSIONALELECTIVE III: CONSTRUCTION PRACTICES (PCE-CV805)

]	ſeach	ing So	cheme	Evaluation Scheme				
Course						Theory(Marks)		Practical(Marks)	
	L	Т	Р	Credit	Scheme	Max.	Min. for	Max.	Min. for
							passing		passing
					ISE				
EL-III(PCE-CV805)	03	01		04	CIE	30	12		
					ESE	70	28		

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives-

- 1. To study various earthmoving equipment's.
- 2. To understand RMC and Hot Mix process.
- 3. To study prefabrication technique.
- 4. To study various construction techniques like Slipform, Grouting, Blasting.

Course Outcomes

After successful completion of the course, the students will be able to.-

- 1. Know the earth moving equipments & excavation in hard rock.
- 2. Understand new construction methods & techniques.
- 3. Know the concreting equipments, plants & concreting methods.
- 4. Understand plants & equipments used for steel construction & road construction.
- 5. Understand construction of heavy structure & construction management.

SECTION-I

Unit No.1

- a) Earth moving equipments- Tractors, bulldozers, scrappers, power shovel, hoes, dragline, clamshell, trenchers, compactors
- b) Cycle time and production rates (simple numerical problems), typesand performance, operating efficiencies, lifting capacities.

a) Excavation in hard rock- Rippers, jack hammers, drills, compressors and pneumatic equipments.

- b) Blasting explosives, detonators, fuses,
- c) Drainage in excavation-necessity and methods of dewatering

Unit No.3

Unit No.2

- a) RMC plant, layout and production capacity
- b) Grouting, shortcreting, underwater concreting
- c) Slip formwork

SECTION-II

Unit No.4

- a) Prefabricated construction comparison with monolithic construction
- b) Steel construction-planning and field operation, erection equipments
- c) Floating and dredging equipments

Unit No.5

- a) Asphalt mixing and batching plant hot mix plant, sensor pavers for rigid roads, crushing plants.
- b) Belt conveyors, cableways-need and construction methods.
- c) Diaphragm walls- purpose and construction methods.

Unit No.6

- a) New projects-conceptual planning, site access and services, advantages of mechanization in construction
- b) Introduction to trenchless technology and need
- c) Safety measures in construction, prevention of accidents, and introduction to disaster management.

Reference books:-

- 1. Construction Planning equipment & methods -R. L. Puerifoy, McGrawHill Book
- 2. Construction equipment Mahesh Verma.
- 3. Handbook of Heavy Construction Stubb.
- 4. Heavy Construction Planning, Equipment, Methods- Jagman Singh
- 5. Erection of steelstructures ThomasBaron
- 6. Reinforced concrete bridges-Taylor

Guidelines Regarding Question Paper Setting:

- 1. Section I- Q.No.1 to3 and SectionII-Q.No. 4to6
- 2. All questions are compulsory.
- 3. Internal optional questions are allowed, weightage of optional question should not be more than 30% of total marks i.e. 21 marks out of 70marks.

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Question	Based on Unit No.	Marks		
No.				
1	1	12		
2	2	12		
3	3	11		
4	4	12		
5	5	12		
6	6	11		

End Semester Examination Paper Pattern

FINAL YEAR B.Tech CIVIL SEMESTER VIII STRUCTURAL DESIGN AND DRAWING-II

SEMESTER-VIII								
Sr. No	Code No.		Course(Subject Title)	Semester	Credits			
6	PCC-CV806	SDD-II	Structural Design and Drawing-II	8	2			

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course Objectives:

1. To apply holistic approach of planning, analysis, segmentation & design of RCC building.

- 2. To understand the knowledge of how to use the codal provision in I.S.456-2000,
- S.P.16 for design

3. To understand the reinforcement detailing of various structures as per codal provision S.P.34

4. To getanex posure to the method of analysis & design using software.

Course Outcomes:

After successful completion of course student will be able to

- 1.Translate the ideas into workable plans
- 2. Classify the components
- 3. Design the units &hence the structure as awhole
- 4. Draft the details for execution
- 5. To read and understand the supplied drawing for execution on site.

	Teaching Scheme			Evaluation Scheme						
Course	L	Т	Р	Total credit	Scheme	Theory (Marks) Pra		Practica	ctical(Marks)	
						Max	Min for Passing	Max	Min for Passing	
SDD-I	_	_	4	2	ISE			50	20	
(PCC- CV806)				CIE	-	-				
					ESE	-	-	25	10	

ESE–End Semester Evaluation

Term work shall consist of detailed design & drawing of the following R.C.C.

Structures by Limit State Method.

1. Residential two storied building. (Minimum60 sqmt. per floor). Drawing sprepared shall indicate ductility details as per the provision in IS:13920. (This Project should be in a group of 4-6 students)

2. Any ONE from the following:(Individual Student should perform this project)

a)Retaining wall (cantilever or counter fort type)

b) Design of footing (Raft foundation /pile foundation)

3. Analysis and design of RCC framed structure using software.

Note: At least one site visit to be conducted to show the onsite detailing.

FINAL YEAR B.Tech CIVIL SEMESTER VIII PROJECT PHASE-II

SEMESTER-VIII								
Sr. No	Code No.	Semester	Credits					
7	PW-CV708	PP-II	Project Phase-II	8	2			

Program Specific Outcomes (PSO's)

1. Utilize principles methods software &codes of practices in excel in the area of planning, analysis & design related to Civil Engineering Systems.

2. Perform economic analysis & cost estimates related to design, constructions & maintenance of systems associated with civil engineering.

Course	Teaching Scheme					Evaluation Scheme			
	L	Т	Р	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min.for Passing	Max.	Min.for Passing
PP-II					ISE			50	20
(PW- CV807)			02	01	CIE				
					ESE			100	40

ISE: In Semester Evaluation CIE: Continuous Internal Evaluation ESE: End Semester Examination

The project work started in the seventh semester will continue in this semester. The students will complete the project work in this semester and present it before the assessing committee.

The term work assessment committee as constituted in the seventh semester will assess the various projects for the relative grading and group average. The guides will award the marks for the individual student's depending on the group average. Each group will submit the copies of the completed project report signed by the guide to the department. The head of the department will certify the copies and return them to the students. One copy will be kept in the departmental library.

For work load calculation minimum load is 2 Hr./week, for one group of to FIVE students. (As per AICTE Guide Lines)

Probable Activities of Project Phase -II

- 1. Progress presentation I
- 2. Progress presentation II
- 3. Final presentations in front of DRC along with submission of spiral bound copy
- 4. Checking of project format on spiral bound by DRC
- 5. Submission of final bound copy along with published paper.