Civil Engg-Societal & Global Impact

Sem-IV

General Course Information:

Course Code: HSMC-CVE202-T Course Credits: 2 Mode: Lecture (L) Type: HSMC Contact Hours: 2 hours Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course outcomes

Srl.	Course Outcome At the end of the course, students will be able to:	RBT* Level
CO1	Recall aspects of the built environment and factors impacting the quality of life	L1(Remembering)
CO2	Understand the impact that Civil Engineering projects have on the society at large and on the global arena; and use resources efficiently and effectively.	L2 (Understanding)
CO3	Apply professional and responsible judgement and take a leadership role	L3(Applying)
CO4	Examine the potential of Civil Engineering for employment creation and its contribution to the GDP	L4(Analysis)
CO5	Value the sustainability of the environment, including its aesthetics	L5(Evaluating)
CO6	Formulate energy requirement with the extent of infrastructure and analyze how they are met, comparing the past present and future.	L6(Creating)

Course Contents

Unit I

Introduction to Course and Overview; Understanding the past to look into the future: Preindustrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections, Ecosystems in Society and in Nature; the steady erosion in Sustainability; Global warming, its impact and possible causes; Evaluating future requirements for various resources; GIS and applications for monitoring systems; Human Development Index and Ecological Footprint of India Vs other countries and analysis;Understanding the importance of Civil Engineering in shaping and impacting the world; The ancient and modern Marvels and Wonders in the field of Civil Engineering; Future Vision for Civil Engineering

Unit II

Infrastructure - Habitats, Megacities, Smart Cities, futuristic visions; Transportation (Roads, Railways & Metros, Airports, Seaports, River ways, Sea canals, Tunnels (below ground, under water); Futuristic systems (ex, Hyper Loop)); Energy generation (Hydro, Solar (Photovoltaic, Solar Chimney), Wind, Wave, Tidal, Geothermal, Thermal energy); Water provisioning; Telecommunication needs (towers, above-ground and underground cabling);

Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability;

Unit III

Environment-Traditional & futuristic methods; Solid waste management, Water purification, Wastewater treatment & Recycling, Hazardous waste treatment; Flood control (Dams, Canals, River interlinking), Multi-purpose water projects, Atmospheric pollution; Global warming phenomena and Pollution Mitigation measures, Stationarity and non-stationarity; Environmental Metrics & Monitoring; Other Sustainability measures; Innovations and methodologies for ensuring Sustainability.

Built environment–Facilities management, Climate control; Energy efficient built environments and LEED ratings, Recycling, Temperature/ Sound control in built environment, Security systems; Intelligent/ Smart Buildings; Aesthetics of built environment, Role of Urban Arts Commissions; Conservation, Repairs & Rehabilitation of Structures & Heritage structures; Innovations and methodologies for ensuring Sustainability

Unit IV

Civil Engineering Projects – Environmental Impact Analysis procedures; Waste (materials, manpower, equipment) avoidance/ Efficiency increase; Advanced construction techniques for better sustainability; Techniques for reduction of Green House Gas emissions in various aspects of Civil Engineering Projects; New Project Management paradigms & Systems (Ex. Lean Construction), contribution of Civil Engineering to GDP, Contribution to employment(projects, facilities management), Quality of products, Health & Safety aspects for stakeholders; Innovations and methodologies for ensuring Sustainability during Project development;

REFERENCE BOOKS

1. Žiga Turk (2014), Global Challenges and the Role of Civil Engineering, Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society. Geotechnical, Geological and Earthquake Engineering, Vol. 32. Springer, Dordrecht

2. Brito, Ciampi, Vasconcelos, Amarol, Barros (2013) Engineering impacting Social, Economical and Working Environment, 120th ASEE Annual Conference and Exposition

3. NAE Grand Challenges for Engineering (2006), Engineering for the Developing World, The Bridge, Vol 34, No.2, Summer 2004.

4. Allen M. (2008) Cleansing the city. Ohio University Press. Athens Ohio.

5. Ashley R., Stovin V., Moore S., Hurley L., Lewis L., Saul A. (2010). London Tideway Tunnels Programme – Thames Tunnel Project Needs Report – Potential source control and SUDS applications: Land use and retrofit options

6. http://www.thamestunnelconsultation.co.uk/consultation-documents.aspx

7. Ashley R M., Nowell R., Gersonius B., Walker L. (2011). Surface Water Management and Urban Green Infrastructure. Review of Current Knowledge. Foundation for Water Research FR/R0014

8. Barry M. (2003) Corporate social responsibility – unworkable paradox or sustainable Paradigm Proc ICE Engineering Sustainability 156. Sept Issue ES3 paper 13550. p 129-130

9. Blackmore J M., Plant R A J. (2008). Risk and resilience to enhance sustainability with application to urban water systems. J. Water Resources Planning and Management. ASCE. Vol. 134, No. 3, May.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	2	1	1	3	2	2	2	2	1	1	2	2	1
CO2	-	1	2	1	-	3	1	1	-	-	-	-	1	-	2
CO3	-	-	1	1	-	1	1	2	3	2	3	2	1	1	1
CO4	-	1	1	2	-	3	1	1	-	1	1	1	1	1	1
CO5	-	1	1	-	-	1	3	2	-	1	-	1	-	-	-
CO6	2	2	1	2	1	1	1	-	-	1	1	1	2	1	1

Introduction to Fluid Mechanics

Sem-IV

General Course Information:

Course Code: PCC-CVE202-T Course Credits: 3 Mode: Lecture (L) Type: PCC Contact Hours: 3 hours(L) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	Course Outcome At the end of the course, students will be able to:	RBT* Level
CO1	Outline principles of hydrostatics and explain the concept of buoyancy and state of equilibrium	L1(Remembering)
CO2	Understand the properties of fluids and their behaviour under static and dynamic conditions and measure fluid pressure in a manometer	L2 (Understanding)
CO3	Use fluid measuring devices like venture meter, orifice meter, notches and mouthpiece	L3 (Applying)
CO4	Distinguish various types of flows and solve the problem on continuity equation, stream function and velocity potential function	L4(Analysing)
CO5	Evaluate Bernoulli's equation and use it to solve the problems of fluids	L5(Evaluating)
CO6	Formulate one-, two- and three-dimensional continuity equations in Cartesian coordinates	L6(Creating)

Course Content

Unit I

Basic Concepts and Definitions – Distinction between a fluid and a solid; Density,Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension,capillarity, Bulk modulus of elasticity, compressibility.

Unit II

Fluid Statics - Fluid Pressure: Pressure at a point, Pascals law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, UTube Differential Manometer, Micromanometers. pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

Unit III

Fluid Kinematics-Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow;

one, two and three dimensional flows; Stream line,path line, streak line and stream tube; stream function, velocity potential function. One-, two- and three -dimensional continuity equations in Cartesian coordinates

Unit IV

Fluid Dynamics- Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : venturimeter, orifice meter and pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Dimensional Analysis and Dynamic Similitude - Definitionsof Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number; Buckingham's π-Theorem.

REFERENCE BOOKS

1. Fluid Mechanics and Hydraulic Machines , Mahesh Kumar, Pearson Education, 2019
2. Fluid Mechanics and Hydraulic Machine by R. K. Bansal
3. Fluid mechanics and Fluid Power Engg. by D.S. Kumar
4. Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
5. Hydraulics and Fluid Mechanics, P N Modi and S M Seth, Standard Book House
6. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
7. Fluid Mechanics with Engineering Applications, R.L. Daugherty, J.B. Franzini and E.J.

C**ourse Articulation Matrix**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	-	-	-	-	1	1	2	1	1	1	1
CO2	2	1	1	2	2	-	-	-	-	-	1	-	2	1	1
CO3	2	2	1	1	-	-	-	-	1	1	1	1	1	1	1
CO4	1	1	2	2	3	-	-	-	2	2	2	1	1	2	2
CO5	2	3	2	2	1	-	-	-	1	2	1	1	1	-	1
CO6	2	2	1	2	1	-	-	-	2	-	1	2	2	2	1

Structural Analysis-1

Sem-IV

General Course Information:

Course Code: PCC-CVE204-T Course Credits: 3 Mode: Lecture Type: PCC Contact Hours: 3 hours (L) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	**Course Outcome** At the end of the course, students will be able to:	**RBT* Level**
CO1	Calculate deflection of statically determinate structures under various loading and support conditions	L2 (Understanding)
CO2	Apply basic concepts of structural mechanics for the analysis of beams and frames	L3(Applying)
CO3	Examine the basic concepts of structural mechanics for the analysis of truss, arches and cables, beams and columns	L4(Analysing)
CO4	Selection of beam columns and strut subjected to various types of loads	L5(Evaluating)

Course Content

Unit-I

Analysis of stresses and strains: Analysis of simple states of stresses and strains, elastic constraints, bending stresses, theory of simple bending, flexure formula, combined stresses in beams, shear stresses, Mohr's circle, Principle stresses and strains, torsion in shafts and closed thin walled sections, stresses and strains in cylindrical shells and spheres under internal pressure.

Theory of Columns: Slenderness ratio, end connections, short columns, Euler's critical buckling loads, eccentrically loaded short columns, cylinder columns subjected to axial and eccentric loading.

Unit-II

Bending moment and shear force in determinate beams and frames: Definitions and sign conventions, axial force, shear force and bending moment diagrams.

Three hinged arches: Horizontal thrust, shear force and bending moment diagrams.

Unit-III

Deflections in beams: Introduction, slope and deflections in beams by differential equations, moment area method and conjugate beam method, unit load method, Principle of virtual work, Maxwell's Law of Reciprocal Deflections.

Unit-IV

Analysis of statically determinate trusses: Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections. Analysis of space trusses using tension coefficient method.

REFERENCE BOOKS

1. C.S. Reddy, Basic Structural Analysis, Publisher: Tata McGraw Hill, 2001.

2. C.K. Wang, Intermediate Structural Analysis, McGraw Hill, 1984.

3. B.G. Neal, Structural theorems and their application, Pergaman Press., 1972.

4. Bhavikatti, Structural Analysis Volume – I, Vikas Publishers, 3rd edition, 2008.

5. Timoshenko and Young, Theory of Structures, Publisher: Tata McGraw Hill, 2009.

6. Norries and Wilbur, Elementary Structural Analysis, Publisher: McGraw Hill, 1990.

7. Laursen H I, Structural Analysis, Publisher: McGraw Hill, 1988.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	2	-	-	-	2	2	1	1	1	2	2
CO2	3	2	2	2	2	-	-	-	1	1	1	1	3	1	1
CO3	3	3	2	2	1	1	1	1	-	2	2	2	3	1	2
CO4	2	3	2	2	2	1	-	-	1	1	1	1	2	1	2

Engineering Building and Drawing
Sem-IV

General Course Information:

Course Code: PCC-CVE206-T Course Credits: 3 Mode: Lecture (L) Type: HSMC Contact Hours: 3 hours (L) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	**Course Outcome** At the end of the course, students will be able to:	**RBT* Level**
CO1	State the kind of material construction	L1(Remembering)
CO2	Recognize different problems regarding material in a building	L2(Understanding)
CO3	Supervise building constructions	L4(Analyzing)
CO4	Plan and draw constructional details of differing building components	L6(Creating)

*Revised Bloom's Taxonomy

Course Contents

Unit-I

Masonry Construction: Introduction, various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, structural brick work-cavity and hollow walls, reinforced brick work, Defects in brick masonry, composite stone and brick masonry, glass block masonry.

Unit-II

Damp-Proofing and Water-Proofing: Defects and causes of dampness, prevention of dampness, materials used, damp-proofing treatment in buildings, water proofing treatment of roofs including pitched roofs.

Roofs and Floors: Types of roofs, various terms used, roof trusses-king post truss, queen post truss etc.Floor structures, ground, basement and upper floors, various types of floorings.

Doors and Windows: Locations, sizes, types of doors and windows, fixures and fastners for doors and windows.

Acoustics, Sound Insulation and Fire Protection: Classification, measurement and transmission of sound, sound absorber, classification of absorbers, sound insulation of buildings, wall construction and accoustical design of auditorium, fire-resisting properties of materials, fire resistant construction and fire protection requirements for buildings.

Unit-III

Stones: Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

Brick and Tiles: Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Tiles: Terra-cotta, manufacturing of tiles and terra-cotta, types of terra-cotta, uses of terra-cotta.

Limes, Cement and Mortars: Classification of lime, manufacturing, artificial hydraulic lime, pozzolona, testing of lime, storage of lime, cements composition, types of cement, manufacturing of ordinary Portland cement, testing of cement, special types of cement, storage of cement.

Mortars: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.

Unit-IV

Timber: Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fiberboard, masonite and its manufacturing, important Indian timbers.

Ferrous and Non-Ferrous Metals: Definitions, manufacturing of cast iron, manufacturing of steel from pig iron, types of steel, marketable form of steel, manufacturing of aluminium and zinc.

Paints and Varnishes: Basic constituents of paints, types of paints, painting of wood, constituents of varnishes, characteristics and types of varnishes.

Plastic: Definition, classification of plastics, composition and raw materials, manufacturing, characteristics and uses, polymerization, classification, special varieties.

REFERENCE BOOKS:

1 Building Construction, Sushil Kumar, Standard Publishers, New. Delhi
2 Building Construction by B.C.Punmia, Lakshmi Publication Pvt. Ltd, New Delhi
3 Building Material by S.C.RangawalaCharotra Broths. Stall Anand.TulsiSadan, Station Road (W. Railway)
4 Construction Engineering, Y.S. Sane
5 Building Construction, Gurcharan Singh, Standard Pub., N. Delhi.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	1	1	3	3	2	2	2	2	3
CO2	3	2	2	2	2	1	2	1	1	2	2	2	2	1	3
CO3	3	2	3	2	3	1	1	1	3	3	3	2	2	3	1
CO4	3	2	3	3	3	2	2	2	3	2	2	2	1	3	2

Environmental Engg.

Sem-IV

General Course Information:

Course Code: PCC-CVE208-T Course Credits: 3 Mode: Lecture (L) Type: PCC Contact Hours: 3 hours (L) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	**Course Outcome** At the end of the course, students will be able to:	**RBT* Level**
CO1	Identify and describe various elements of water supply, sewerage and air & noise pollution	L1 (Remembering)
CO2	Differentiate between various types of pollutants with their sources, effects on environment and quantifications	L2 (Understanding)
CO3	Analyze the effects of different kinds of pollution and outline their respective measures for treatment	L4(Analyzing)
CO4	Design and compare sewerage systems and storm water drains	L6(Creating)

Course Content

UNIT I

Water: Water Supply systems: Need for planned water supply schemes, Sources of Water, Water demand and Potable, industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.

UNIT II

Sewage: Domestic and Storm water, Quantity of Sewage, Sewage flow variations.

Conveyance of sewage: Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage , Sewer appurtenances, Design of sewerage systems

Storm Water: Quantification and design of Storm water; Sewage and Sludge, Pollution due to improper disposal of sewage, National River cleaning plans, recycling of sewage –quality requirements for various purposes.

UNIT III

Air : Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution – Occupational hazards, Urban air pollution: automobile pollution, Chemistry of combustion, Automobile engines, quality of fuel, operating conditions and interrelationship.Air quality standards, Control measures for Air pollution, construction and limitations

UNIT IV

Noise: Basic concept, measurement, effects and various control methods

Case studies on Pollution(Air, Water, Noise)

REFERENCE BOOKS

1. Environmental Pollution Control Engineering , C. S. Rao
2. Environmental Engineering, Vol. I ,S.K Garg ,.Khanna Publishers, New-Delhi.(1990)
3. Environmental Engineering by H.S.Peavy, D.R.Rowe, G.Tchobanoglous; 1991, Tata-Mcgraw Hill
4. Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan,Thompson / Brooks/Cole; Second Edition 2008
5. Introduction to Environmental Engineering, Vesilind, PWS Publishing Company 2000
6. Water Supply and Sewerage, E.W. Steel
7. CPHEEO Manual on Water Supply & Treatment
8. Manual on Water Supply and Treatment, (latest Ed.), Ministry of Works & Housing,New Delhi.
9. Integrated Solid Waste Management, Tchobanoglous, Theissen & Vigil. McGraw Hill Publication

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	2	-	1	3	1	-	-	-	1	2	1	1
CO2	1	2	1	2	-	2	3	1	-	-	-	1	2	-	2
CO3	2	3	2	1	1	1	3	1	1	2	-	1	2	-	-
CO4	3	2	3	1	2	-	2	1	3	2	2	1	1	3	2

Introduction to Fluid Mechanics Lab

Sem-IV

General Course Information:

Course Code: PCC-CVE202-P Course Credits: 1 Mode: Practical (P) Type: PCC Contact Hours: 2 hours (P) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	**Course Outcome** At the end of the course, students will be able to:	**RBT* Level**
CO1	Basic properties of fluids and its application.	L1 (Remembering)
CO2	Understand Various conditions in respect to the flow of fluids and the concept of floating bodies.	L2 (Understanding)
CO3	Analyse Flow measuring techniques and equipments with theories of fluid flow.	L4(Analyzing)
CO4	Formation of hydraulic models and modules and dimension analysis of fluids.	L6(Creating)

LIST OF EXPERIMENTS:

1 To determine meta-centric height of the ship model.

2 To verify the Bernoulli's theorem.

3 To determine coefficient of discharge for an Orifice-meter.

4 To determine coefficient of discharge of a venture-meter.

5 To determine the various hydraulic coefficients of an Orifice (C_d, Cc, Cv).

6 To determine coefficient of discharge for an Orifice under variable head.

7 To calibrate a given notch.

8 To determine coefficient of discharge for a mouth piece.

9 Drawing of a flow-net by Viscous Analogy Model and Sand Box Model.

10 To study development of boundary layer over a flat plate.

11 To study velocity distribution in a rectangular open channel.

12 Velocity measurements by current meter, float, double float (demonstration only).

13 Experiment on Vortex formation (demonstration only).

REFERENCES:

1. Fluid Mechanics and Hydraulic Machine by R. K. Bansal

2. Fluid mechanics and Fluid Power Engg. by D.S. Kumar
3. Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
4. Hydraulics and Fluid Mechanics, P N Modi and S M Seth, Standard Book House
5. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
6. Fluid Mechanics with Engineering Applications, R.L. Daugherty, J.B. Franzini and E.J.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	2	3	1	-	-	-	-	-	-	-	1	1	1	-	2
CO3	2	3	1	-	-	-	-	-	-	-	2	1	3	2	1
CO4	1	2	3	2	1	-	-	-	-	-	2	1	1	2	3

Structural Analysis-I Lab

Sem-IV

General Course Information:

Course Code: PCC-CVE204-P Course Credits: 1 Mode: Practical(P) Type: PCC Contact Hours: 2 hours (L) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	Course Outcome At the end of the course, students will be able to:	RBT* Level
CO1	Basic application of mechanics involved commonly in the structures.	L1 (Remembering)
CO2	Apply the process of agitation on the structures.to get the desired values of the resultant action	L3 (Applying)
CO3	Various techniques to analyse the structures following the slope and deflection approach.	L4(Analyzing)
CO4	Formulate trusses or forces in each member of trusses using simplified approach.	L6(Creating)

LIST OF EXPERIMENTS:

1. Verification of reciprocal theorem of deflection using a simply supported beam.
2. Verification of moment area theorem for slopes and deflections of the beam.
3. Deflections of a truss- horizontal deflection & vertical deflection of various joints of a pin- jointed truss.
4. Elastic displacements (vertical & horizontal) of curved members.
5. Experimental and analytical study of 3 hinged arch and influence line for horizontal thrust.
6. Experimental and analytical study of behavior of struts with various end conditions.
7. To determine elastic properties of a beam.
8. Uniaxial tension test for steel (plain & deformed bars)
9. Uniaxial compression test on concrete & bricks specimens

Text Books:

1. Experimental Methods in Structural Mechanics Kukreja C B andSastry V V

2. C.S. Reddy, Basic Structural Analysis, Publisher: Tata McGraw Hill, 2001.

3. C.K. Wang, Intermediate Structural Analysis, McGraw Hill, 1984.

4. B.G. Neal, Structural theorems and their application, Pergaman Press., 1972.

5. Bhavikatti, Structural Analysis Volume – I, Vikas Publishers, 3rd edition, 2008

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	1	-	-	-	1	2	1	-	1
CO2	3	2	2	1	-	-	-	-	-	-	1	1	2	-	1
CO3	1	2	2	1	1	-	-	-	-	-	1	1	3	1	2
CO4	1	2	3	3	1	-	-	-	-	-	1	1	1	2	3

Engg. Building and Drawing Lab

Sem-IV

General Course Information:

Course Code: PCC-CVE206-P Course Credits: 1 Mode: Drawing(D) Type: PCC Contact Hours: 2 hours (L) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course Outcomes

Srl.	**Course Outcome** At the end of the course, students will be able to:	**RBT* Level**
CO1	State the kind of material construction	L1(Remembering)
CO2	Recognize different problems regarding material in a building	L2(Understanding)
CO3	Supervise building constructions	L4(Analyzing)
CO4	Plan and draw constructional details of differing building components	L6(Creating)

List Of Drawing

1. Different brick masonary bonds
2. Different types of trusses
3. Different types of doors and windows
4. Different types of defects in timber
5. Plan of a building

REFERENCE BOOKS:

1 Building Construction, Sushil Kumar, Standard Publishers, New. Delhi

2 Building Construction by B.C.Punmia, Lakshmi Publication Pvt. Ltd, New Delhi

3 Building Material by S.C.RangawalaCharotra Broths. Stall Anand.TulsiSadan, Station Road (W. Railway)

4 Construction Engineering, Y.S. Sane

5 Building Construction, Gurcharan Singh, Standard Pub., N. Delhi.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	1	1	3	3	2	2	2	2	3
CO2	3	2	2	2	2	1	2	1	1	2	2	2	2	1	3
CO3	3	2	3	2	3	1	1	1	3	3	3	2	2	3	1
CO4	3	2	3	3	3	2	2	2	3	2	2	2	1	3	2

Environmental Engg. Lab

Sem-IV

General Course Information

Course Code: PCC-CVE208-P Course Credits: 1 Mode: PRACTICAL(P) Type: PCC Contact Hours: 2 hours (P) Examination Duration: 03 hours.	**Course Assessment Methods (Internal: 30; External: 70)** Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments and quiz etc. (6 marks) and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Course outcomes

S. No.	**Course outcomes** At the end of the course students will be able to:	RBT* Level
CO1	Identify physical, chemical and biological characteristics of water and wastewater	L2(Understanding)
CO2	Solve optimum dosage of coagulant	L3(Applying)
CO3	Evaluate break - point chlorination	L5(Evaluating)
CO4	Formulate the quality of water and wastewater	L6(creating)

*Revised Bloom's Taxonomy

Detailed Syllabus:

1. Determination of pH.
2. Determination of Conductivity.
3. Determination of Acidity of waste water.
4. Determination of Alkalinity of waste Water.
5. Determination of Chlorides.
6. Determination of Hardness of waste water.
7. Determination of Fluorides in waste water
8. Determination of Available Chlorine in bleaching powder.
9. Conducting Break Point Chlorination Test.
10. Determination of Residual Chlorine.
11. Determination of Dissolved Oxygen.
12. Determination of Chemical Oxygen Demand of waste water
13. Determination of Biochemical Oxygen Demand of waste water
14. Conducting Jar test for determining optimum dosage of coagulant.
15. Determination of Total Solids, Total Dissolved Solids & Settelable Solids.

REFERENCE BOOKS

Standard methods for the examination of water and wastewater. (2012). 21st Edition, Washington: APHA.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	-	-	1	2	-	-	-	1	2	1	1	2
CO2	1	2	3	1	-	1	2	-	-	-	1	2	1	-	2
CO3	1	2	3	1	-	1	2	-	-	-	1	2	1	-	3
CO4	1	2	3	1	-	1	2	-	-	-	1	2	1	2	3