DEPARTMENT OF CIVIL ENGINEERING

R21- Course Structure for B.Tech CIVIL w.e.f AY:2021-22

SEMESTER I

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21MA1001	BS	Algebra and Calculus	3	1	0	4	4	40	60	100
21CH1002	BS	Chemistry for Civil Engineering	3	0	0	3	3	40	60	100
21ES1001	ES	Problem Solving and Programming	3	0	0	3	3	40	60	100
21EN1001	HS	English	2	0	0	2	2	40	60	100
21CH1502	BS	Chemistry for Civil Engineering Lab	0	0	3	3	1.5	40	60	100
21ES1503	ES	Engineering Graphics	0	1	4	5	3	40	60	100
21ES1501	ES	Problem Solving and Programming Lab	0	0	3	3	1.5	40	60	100
21EN1501	HS	English Language Lab	0	0	3	3	1.5	40	60	100
21MC8001	MC	Mandatory course I : Induction Program	Induction Program							
		Counseling/Mentoring	0	0	1	1	0	--	--	--
		Sports/Hobby Clubs/Activities	0	0	2	2	0	--	--	--
		Activity Point Programme	During the Semester					20 Points		
		Total	**11**	**2**	**16**	**29**	**19.5**	**320**	**480**	**800**

SEMESTER II

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21PH1002	BS	Physics for Civil Engineering	3	0	0	3	3	40	60	100
21MA1003	BS	Vector Calculus Complex Variables and Transforms	3	1	0	4	4	40	60	100
21ES1007	ES	Building Material Science	2	0	0	2	2	40	60	100
21ES1008	ES	Engineering Mechanics	3	1	0	4	4	40	60	100
21PH1502	BS	Physics for Civil Engineering lab	0	0	3	3	1.5	40	60	100
21ES1510	ES	Engineering workshop	0	0	3	3	1.5	40	60	100
21ES1511	ES	IT workshop	0	0	3	3	1.5	40	60	100
21ES1512	ES	Building Material Science lab	0	0	2	2	1	40	60	100
21EN1502	HS	Communication skills lab	0	0	2	2	1	40	60	100
21MC8002-13	MC	Mandatory course II	2	0	0	2	0	--	--	--
		Counseling/Mentoring	0	0	1	1	0	--	--	--
		Sports/Hobby Clubs/Activities	0	0	2	2	0	--	--	--
		Activity Point Programme	During the Semester					20 Points		
		Total	**13**	**2**	**16**	**31**	**19.5**	**360**	**540**	**900**

SEMESTER III

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21MA1006	BS	Probability Statistics and Numerical Methods	3	0	0	3	3	40	60	100
21ES1009	ES	Mechanics of Fluids	3	0	0	3	3	40	60	100
21CE2001	PC	Building Construction and Planning	3	0	0	3	3	40	60	100
21CE2002	PC	Mechanics of Solids	3	0	0	3	3	40	60	100
21CE2003	PC	Surveying - I	3	0	0	3	3	40	60	100
21EN1001-08	HS	Universal Human Values	3	0	0	3	3	40	60	100
21CE2501	PC	Building drawing	0	0	3	3	1.5	40	60	100
21CE2502	PC	Mechanics of Solids lab	0	0	3	3	1.5	40	60	100
21CE2503	PC	Surveying- I Lab	0	0	3	3	1.5	40	60	100
21CD6001	SC	Career competency Development - I	0	0	2	2	1	40	60	100
21CC6001	SC	Value added course/Certificate course- I	0	0	0	0	1	40	60	100
		Counseling/Mentoring	0	0	1	1	0	--	--	--
		Sports/ Hobby Clubs/ Activities	0	0	2	2	0	--	--	--
		Activity Point Programme	During the Semester					20 Points		
		Total	**18**	**0**	**14**	**32**	**24.5**	**440**	**660**	**1100**

SEMESTER IV

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21CE2004	PC	Concrete Technology	3	0	0	3	3	40	60	100
21CE2005	PC	Hydraulics & Hydraulic Machinery	3	0	0	3	3	40	60	100
21CE2006	PC	Structural Analysis	3	0	0	3	3	40	60	100
21CE2007	PC	Surveying - II	3	0	0	3	3	40	60	100
	OE	Open elective I	3	0	0	3	3	40	60	100
21CE2504	PC	Hydraulics& Hydraulic Machinery lab	0	0	3	3	1.5	40	60	100
21CE2505	PC	Structural Analysis practice	0	0	3	3	1.5	40	60	100
21CE2506	PC	Surveying –II Lab	0	0	3	3	1.5	40	60	100
21CD6002	SC	Career competency Development II	0	0	2	2	1	40	60	100
21IC6001	SC	Industry Oriented Course I	0	0	0	0	1	100	00	100
21MC8002-13	MC	Mandatory course III	2	0	0	2	0	--	--	--
		Counseling/Mentoring	0	0	1	1	0	--	--	--
		Sports/Hobby Clubs/Activities	0	0	2	2	0	--	--	--
		Activity PointProgramme	During the Semester					20 Points		
		Total	**17**	**0**	**14**	**31**	**21.5**	**460**	**540**	**1000**

SEMESTER V

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21CE2008	PC	Design of Reinforced Concrete Structures	3	0	0	3	3	40	60	100
21CE2009	PC	Soil Mechanics	3	0	0	3	3	40	60	100
21CE2010	PC	Highway Engineering	2	0	0	2	2	40	60	100
	OE	Open elective II	3	0	0	3	3	40	60	100
21CE4001-5	PE	Professional Elective I	3	0	0	3	3	40	60	100
21CE2507	PC	Computer Aided Drafting of Buildings	0	0	3	3	1.5	40	60	100
21CE2508	PC	Concrete Tech and Highway Engineering lab	0	0	3	3	1.5	40	60	100
21CE2509	PC	Design of Reinforced Concrete Structures Practice	0	0	2	2	1	40	60	100
21CD6003	SC	Career competency Development III	0	0	2	2	1	40	60	100
21CC6002	SC	Value added course/Certificate Course II	0	0	0	0	1	40	60	100
21CE7501	PR	Internship I/on job training/ Com SerProject	0	0	0	0	1.5	00	100	100
		Counseling/ Mentoring	0	0	1	1	0	--	--	--
		Sports/Hobby Clubs/Activities	0	0	2	2	0	--	--	--
		Activity Point Programme	During the Semester					20 Points		
		Total	**14**	**0**	**13**	**27**	**21.5**	**400**	**700**	**1100**

SEMESTER VI

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21CE2011	PC	Water Resources Engineering	2	0	0	2	2	40	60	100
21CE2012	PC	Environmental Engineering	2	0	0	2	2	40	60	100
21CE2013	PC	Foundation Engineering	3	0	0	3	3	40	60	100
	OE	Open Elective III	3	0	0	3	3	40	60	100
21CE4006-10	PE	Professional Elective II	3	0	0	3	3	40	60	100
21CE4011 -15	PE	Professional elective III	3	0	0	3	3	40	60	100
21CE2510	PC	Soil Mechanics Lab	0	0	3	3	1.5	40	60	100
21CE2511	PC	Environmental Engineering Lab	0	0	2	2	1	40	60	100
21CE2512	PC	CAD Lab	0	0	2	2	1	40	60	100
21CD6004	SC	Career competency Development IV	0	0	2	2	1	40	60	100
21IC6002	SC	Industry Oriented Course II	0	0	0	0	1	100	00	100
21MC8002-13	MC	Mandatory course IV	2	0	0	2	0	00	00	00
		Counseling/ Mentoring	0	0	1	1	0	--	--	--
		Sports/Hobby Clubs/Activities	0	0	2	2	0	--	--	--
		Activity Point Programme	During the Semester					20Points		
		Total	**18**	**0**	**12**	**30**	**21.5**	**500**	**600**	**1100**

SEMESTER VII

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21HS5001-05	HS	Humanities and Social Science Elective	2	0	0	2	2	40	60	100
21CE2014	PC	Design of steel structures	3	0	0	3	3	40	60	100
21CE2015	PC	Estimation and quantity surveying	3	0	0	3	3	40	60	100
-	OE	Open Elective IV	3	0	0	3	3	40	60	100
21CE4016-20	PE	Professional elective IV	3	0	0	3	3	40	60	100
21CE4021-25	PE	Professional elective V	3	0	0	3	3	40	60	100
21CE2513	PC	Design of steel Structures Practice	0	0	2	2	1	40	60	100
21CE2514	PC	Estimation and quantity surveying Practice	0	0	3	3	1.5	40	60	100
21CD6005	SC	Career competency Development V	0	0	2	2	1	40	60	100
21CC6501	SC	Skill development Training	0	0	2	2	1	40	60	100
21CE7502	PR	Internship II/on job training/Com Ser Project	0	0	0	0	1.5	00	100	100
		Counseling/ Mentoring	0	0	1	1	0	--	--	--
		Sports/Hobby Clubs/Activities	0	0	2	2	0	--	--	--
		Activity Point Programme	During the Semester					20 Points		
		Total	**17**	**0**	**12**	**29**	**23**	**400**	**700**	**1100**

SEMESTER VIII

Course Code	Category	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
21CE7503	PR	Project work, seminar and internship	0	0	0	0	12	60	140	200
		Total	**0**	**0**	**0**	**0**	**12**	**60**	**140**	**200**

DEPARTMENT OF CIVIL ENGINEERING

List of R- 21 II YEAR - III SEM SUBJECTS

S.No	Subjects from department of CIVIL	Sem/Branch	Category
CIVIL Branch Subjects			
1	Mechanics of Fluids	III Sem CIVIL	PC
2	Building Construction and Planning	III Sem CIVIL	PC
3	Mechanics of Solids	III Sem CIVIL	PC
4	Surveying-I	III Sem CIVIL	PC
5	Building drawing	III Sem CIVIL	PC
6	Mechanics of Solids lab	III Sem CIVIL	PC
7	Surveying-I lab	III Sem CIVIL	PC

DEPARTMENT OF CIVIL ENGINEERING

MECHANICS OF FLUIDS

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

MODULE -1 PROPERTIES OF FLUIDS AND PRESSUREMEASUREMENT 9H

Properties of fluids: introduction: Dimensions and units – properties of fluids-mass density, specific weight, specific volume, specific gravity, viscosity-units, dynamic and kinematic viscosity, newton's law of viscosity, Newtonian and non-Newtonian fluids, variation of viscosity with temperature; surface tension-surface tension on liquid droplet, hollow bubble and liquid jet; capillarity-capillary rise and capillary fall.

Pressure Measurement: Fluid Pressure at a Point; Pascal's law, Hydrostatic law, Atmospheric, Absolute, gauge, atmospheric and vacuum pressures; Hydrostatic paradox; Pressure measurement – manometers- Simple, differential and Micro Manometers; vapor pressure and cavitation.

MODULE -2 HYDROSTATIC FORCES AND BUOYANCY 9H

Hydrostatic forces on surfaces: Total Pressure and Centre of Pressure- on Horizontal Plane Surface; Vertical Plane Surface; Inclined Plane Surface and Curved Surfaces. **Buoyancy:** Buoyancy; Buoyant Force and Centre of Buoyancy, Stability of submerged bodies and floating bodies; Metacenter and metacentric height, analytical method for metacentric height.

MODULE-3 KINEMATICS AND DYNAMICS OF FLUID FLOW 13H

Kinematics of Fluid Flow: Introduction**,** Methods of describing fluid motion; Classification of fluid flow; Steady, unsteady, uniform and non-uniform flows; Laminar and turbulent flows; three-, two- and one- dimensional flows; Irrotational and rotational flows. Streamline; Pathline; Streakline.Rate of flow, continuity equation, continuity equation in three-dimension.

Dynamics of Fluid flow: Forces acting on a Fluid in Motion; Equations of motion; Euler's equation of motion; Bernoulli's equation; assumptions. Practical applications of Bernoulli's equation: Venturimeter, Rate of flow through venturimeter, inclined venturimeter; Orifice meter, Rate of flow through Orifice Meter; Measurement of velocity by Pitot tube, Pitot-static tube.

MODULE-4 ORIFICES, MOUTHPIECES, NOTCHES AND WEIRS 8H

Orifices and Mouthpieces: Orifice-Classification of Orifices; Flow through an orifice, Hydraulic co- efficient, Determination of coefficients for an Orifice, Flow through large rectangular Orifice; Flow through submerged Orifice – fully sub-merged and partially sub- merged. Mouth piece-Classification of Mouthpieces, Flow through external and internal cylindrical Mouthpiece.

Notches and Weirs: Introduction, Classification of Notches and Weirs, Flow through rectangular, triangular and trapezoidal notches and weirs; End contractions; Velocity of approach; Cipolletti weir; Discharge over Broad crested weir, narrow crested weir and submerged weir.

MODULE-5 FLOW THROUGH PIPES 9H

Flow through pipes: Energy losses in pipelines; loss of energy due to friction-Darcy Weisbach equation; Minor energy losses in pipelines; Hydraulic Grade Line and Total Energy Line; Siphon; Pipes in series, concept of equivalent length; pipes in parallel& branched pipes.

Laminar & Turbulent flow in pipes: Reynolds's experiment; Characteristics of laminar flow; Steady laminar flow through a circular pipe (Hazen poiseuille equation). Characteristics of turbulent flow, Prandtl's mixing length theory, Hydro dynamically smooth and rough boundaries.

Text Book(s):

1. A text of Fluid mechanics and hydraulic machines by Dr.R.k.Bansal – Laxmi Publications (P)Ltd., New Delhi.
2. Hydraulics and Fluid Mechanics by P. M. Modi and S. M. Seth, Standard Book House.

Reference Book(s):

1. Fluid Mechanics by Mohhanty A K, 'Second Edition, Prentice Hall of India Private Limited, New Delhi.
2. Theory and Applications of Fluid Mechanics, by K.Subrahmanya, Tata McGraw Hill.

BUILDING CONSTRUCTION AND PLANNING

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

MODULE -1 COMPONENTS OF BUILDING-I 10H

Foundations: components of a building, Concept of foundations; Factors affecting selection of foundations; requirements of a good foundation; Types of foundations-shallow foundations, deep foundations; causes of failures of foundations.

Masonry: Introduction, terms used in masonry; brick masonry-terms used in brick masonry, bonds in brick masonry, supervision of brick work, defects in brick work. Partition walls.

Floors: components of ground floor, selection of flooring material, materials used for flooring, types of flooring.

MODULE -2 COMPONENTS OF BUILDING-II 10H

Arches: Introduction, technical terms, stability of an arch, types of arches; Lintels: Introduction, classification of lintels. Stairs: Technical terms, requirement of a good stair, dimension of a step, types of stairs; Elevators, Escalators. Doors and windows: Introduction, location of doors and windows; Doors- size of doors, door frames, types of doors; windows-Introduction, types of windows; ventilators

Roofs: Introduction, types of roofs; Pitched Roof-Basic elements of pitched roof, types of pitched roofs, trusses, roof covering materials, light weight roofing; flat roofs-advantages, types; curved roofs.

MODULE -3FINISHINGS, TREATMENT AND SUPPORTING STRUCRURES 10H

Pointing: Introduction, preparation of surface, method of pointing, types of painting's; Plastering: Introduction, terminology, no of coats of plastering, methods of cement plastering, types of plastering finishes, defects in plastering. Damp Proofing: Introduction, causes, effects, materials used for damp proofing, methods of damp proofing, DPC treatment in buildings; Water Leakages: Reasons, preventive measures, water proofing of flat roofs. Scaffolding: Introduction, component parts and types; Form work: introduction, requirements of good form work, cost of form work, material used for preparing form work.

MODULE -4 PLANNING AND REGULATIONS OF BUILDINGS 9H

Planning of Buildings: Types of buildings, types of residential buildings, site selection for residential building; Space requirement for a building-point to be considered, determining areas For different units of buildings.

Building Byelaws and Regulations: Introduction, Terminology, Objectives of building byelaws, Minimum plot sizes, Open space requirements, Plinth area, floor area, carpet area, Floor area ratio(FAR), Floor space Index (FSI), Principles underlying building byelaws.

MODULE -5 PLANNING OF BUILDINGS 9H

Planning of Residential Buildings: Minimum standards for various parts of buildings, requirements of different rooms and their grouping, characteristics of various types of residential buildings.
Planning of Public Building: Planning of Educational institutions, Hospitals, Office buildings,Industrial buildings, Hotels and Motels, Hostels

Text Book(s):

1. Construction management by Sanga Reddy and Meyyappan — Kumaran Publications.
2. Construction Management and Accounts by Sharma -Satyaprakashan, Tech India Publications.

Reference Book(s):

1.**Construction Contracts by Jimmie Hinze, McGraw hill education, 2013.**
2.Contracts and Legal environment by Joseph T. Bockreth, McGraw hill education, 2013.
3.Construction Project Management -Theory and Practice by Kumar NeerajJha Pearson publications, 2ndedition, 2012.

MECHANICS OF SOLIDS

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

MODULE – 1 SIMPLE STRESS AND STRAINS 9H

Simple Stress and Strains: Types of external loads – internal stresses –normal and shear stresses – strain – Hooke's law – working stress –stress strain diagrams – Poisson's ratio – relationship between elastic constants – Elongation of bars of constant and varying sections – statically indeterminate problems in tension and compression – Temperature effects – strain energy and complementary energy strain energy due to tension, compression and shear.

MODULE – 2 SHEAR FORCE AND BENDING MOMENT 10H

Shear Force and Bending Moment: Different types of beams – various types of loading – Relationship connecting intensity of loading, shearing force and bending moment – shear force and bending moment diagrams for cantilever beams and simply supported beams for different types of loading

MODULE – 3 FLEXURE STRESSES AND SHEAR STRESSES 9H

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I =f/y = E/R – Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and angle sections

MODULE – 4 ANALYSES OF STRESS AND STRAIN ON OBLIQUE SECTIONS,THIN AND THICK CYLINDERS 8H

Analysis of Stress and Strain on Oblique Sections: Stress on inclined planes for axial and biaxial stress fields – principal stresses –Mohr's circle of stress. **Thin and Thick Cylinders**: Stresses in thin cylinders – thick cylinders – Lame's equation – stresses in thick cylinders due to internal and external pressures

MODULE – 5 TORSION, THEORIES OF COLUMNS 12H

Torsion: Torsion of solid and hollow circular shafts – Pure shear –strain energy in pure shear and torsion Theory of Columns: Direct and bending stresses in short columns- Kern of a section. Buckling and stability – Euler's buckling/crippling load for columns with different end conditions – Rankine's formula.

Text Book(s):

1. Strength of materials by R.K. Bansal, Laxmi Publications.
2. Strength of Materials by Er.R.K.Rajput, S.Chand Publishing, New Delhi.

Reference Book(s):

1. Strength of Materials by R Subramanian, Oxford University Press.
2. Strength of Materials by Timoshenko, Vol. I & Vol. II, CBS Publishers &Distributers, New Delhi.
3. Strength of Materials by D.S. Bedi, Khanna Publishing House.

SURVEYING-I

Semester	Hours/Week			Total hrs.	Credit	Max. Marks		
	L	T	P		C	CIE	SEE	TOTAL
III	3	0	0	48	3	40	60	100

MODULE – 1 BASIC CONCEPTS & CHAIN SURVEYING 8H

Basic concepts: Surveying– History, primary divisions, Classification, Principles of surveying, Basic Measurements; Instruments and Basic methods; units of measurement, Plan and map, Scales. Errors- Accuracy and Precision, Sources and types of errors. Chain Surveying: Principles of chain survey, Methods of measuring distance, Direct and indirect ranging, Metric chains, Chaining on plane and sloping ground, Basic problems in chaining, chaining past obstacles, Cross–staff survey, Plotting of chain survey, Errors

MODULE-2 COMPASS SURVEY & PLANE TABLE SURVEYING 9H

Compass survey: Introduction, Bearings and angles, Designation of bearings, fore bearing and back bearing, Theory of Magnetic compass (i.e., prismatic compass), Measurement of bearings of lines, Open and closed traverse, calculation of included angles, Magnetic Declination, Local Attraction-Related Problems, Errors in compass survey.

Plane table surveying: Introduction, Accessories, Working operations, Methods of plane tabling, Two point and Three-point problems.

MODULE-3 LEVELLING 9H

levelling: Introduction, basic definitions, methods of levelling, levelling instruments-dumpy level, levelling staff, Sensitivity of a Level tube , Temporary adjustments of dumpy level, theory of simple and differential levelling, Classification of direct levelling methods, Calculation of reduced levels by height of instrument and rise & fall methods, Reciprocal levelling, Profile levelling Difficulties in levelling, errors in levelling.

MODULE-4 THEODOLITE TRAVERSING 10H

Theodolite: Vernier Theodolite, Basic definitions, Fundamental lines and desired relations; Temporary adjustments; Measurement of a horizontal angle, Repetition and Reiteration methods of horizontal angle measurement, Measurement of vertical angle.

Traverse surveying: Introduction, Selection and marking of traverse stations, methods of traversing, traversing by free needle and fast needle method, traversing by direct observation of angles, checks in closed traverse, closing error, methods of balancing the traverse, Omitted measurements.

MODULE-5 CONTOURING & COMPUTATION OF AREAS AND VOLUMES 12H

Contouring: Introduction, contour interval, Characteristics of contours, Methods of locating contours - Direct and indirect methods, Contour gradient, Uses of contour maps. **Areas**: methods of determining areas, areas by sub-division into triangles, areas from offsets to a base line- regular and irregular intervals, Simpson's rule. **Volumes:** embankments and cutting for a level section, two level sections, three level section and multi-level section, prismoid formula, trapezoidal formula, volume from spot levels, volume of earth work from contour plan.

Text Book(s):

1. Surveying Vol. 1 & II by Dr. K. R. Arora, Standard Book House.
2. Surveying Vol. I & II by B.C. Punmia, Laxmi Publications

Reference Book(s):

1. Text book of surveying by C.Venkataramaiah, Universities Press.
2. Surveying Vol. I &II by S.K. Duggal, McGraw Hill Education (India) private limited.
3. Surveying and Levelling by Kanetkar T.P., and Kulkarni, Vols. I and II, United Book Corporation.

BUILDING DRAWING

Semester	Hours/Week			Total hrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	0	0	3	48	1.5	40	60	100

List of Experiments: Minimum 8 of the following.

TASK -1: Drawing of Conventional signs for building materials and symbols for Electrical,sanitary installations and fittings.

TASK -2: Drawing of Various Bonds in Brick Work.

TASK -3: Structural detailing of Beam, isolated footing and column

TASK -4: Drawing of Fully panelled door / Window – Elevation and cross section

TASK -5: Drawing of Dog legged staircase – Plan and Sectional Elevation

TASK -6: Drawing of King post / Queen post trusses

TASK -7: Draw Plan, Elevation & Section of the Residential building – Single Bedroom and Hall (Loadbearing wall structure) for the given line sketch and specifications

TASK -8: Draw Plan, Elevation & Section of the Residential building- double bedroom, living room, Kitchen with (Load bearing wall structure) for the given line sketch and specifications

TASK -9: Draw Plan, Elevation & Section of the office building for the given line sketch and specifications.

TASK -10: Draw Plan, Elevation & Section of the School building for the given line sketch and specifications

ADDITIONAL EXPERIMENTS

TASK -11: Draw Plan, Elevation & Section of the two storied residential building for the given line sketch and specifications

TASK -12: Drawing plan, elevation and section of an industrial building for the given line sketchand specifications

Text Book(s):

1. Building Planning and Drawing by Dr.N. Kumara Swamy and A.Kameswara Rao, Charotar Publishing House.
2. Building Planning Drawing and Scheduling by Gurucharansingh and Jagadish Singh, Standard Publishers Distributors.

Reference Book(s):

1. Building Drawing with an integrated approach to Built environment by M.G.Shah, C.M.KaleandS.Y.Patki, McGraw-Hill Publishing Company Limited, New Delhi.
2. Civil Engineering Drawing Series ‘B’ by R.Trimurty, M/S Premier Publishing House.

MECHANICS OF SOLIDS LAB

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	0	0	3	48	1.5	40	60	100

List of Experiments: Minimum 8 of the following.

TASK -1: Tension test on mild steelbar

TASK -2: Torsion test on mild steel bar

TASK -3: Izod Impact test

TASK -4: Charpy Impact test

TASK -5: Rockwell Hardness test

TASK -6: Brinell hardness test

TASK -7: Determination of stiffness and rigidity modulus on spring

TASK -8: Bending test of wooden / steel beam

TASK -9: Compression test on wood/ brick

TASK -10: Verification of Clark-Maxwell's theorem

ADDITIONAL EXPERIMENTS

TASK -1: Tension test on HYSD bar

TASK -2: Rockwell Hardness test for Aluminum

Text Book(s):

1. Strength of materials by R.K. Bansal, Laxmi Publications.
2. Strength of Materials by Er.R.K.Rajput, S.Chand Publishing, New Delhi.

Reference Book(s):

1. Strength of Materials by R Subramanian, Oxford University Press.
2. Strength of Materials by Timoshenko, Vol. I & Vol. II, CBS Publishers &Distributers, New Delhi.
3. Strength of Materials by D.S. Bedi, Khanna Publishing House.

SURVEYING-I LAB

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
III	0	0	3	48	1.5	40	60	100

List of Experiments: Minimum 9 of the following.

TASK -1: Survey of a given area by using chain survey (closed traverse) and plotting.

TASK -2: Determine of distance between two inaccessible points with compass.

TASK -3: Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.

TASK -4: Radiation method, intersection methods by plane table survey

TASK-5: Two-point and three point problems in plane table survey

TASK -6: Reduction of levels: (i) Height of collimation method, (ii) Rise and fall method

TASK -7: Fly leveling (differential leveling) of a given area by using dumpy level

TASK -8: Measurement of horizontal angles with theodolite by using method of repetition and reiteration.

TASK -9: Measure horizontal distance between two inaccessible points.

TASK -10: Measurement of vertical angles with theodolite.

TASK -11: Contour plan of a given area

ADDITIONAL EXPERIMENTS

TASK -1: Measurement of bearings of sides of traverse with prismatic compass and computation of correct induced angle.

TASK -2: Fixing bench mark with respect to temporary bench mark with dumpy level by fly leveling and check leveling.

Text Book(s):

1. Surveying theory & Practice by S.S. Bhavikatti, Dreamtech press, 2nd edition, wiley distributors.
2. Text book of surveying by C. Venkataramaiah, university press, 2nd edition, 2018.

Reference Book(s):

1. Arora K R “Surveying” Vol 1,2& 3, Standard book house, Delhi, 2004.
2. Surveying Vol. I & II by B.C. Punmia, Laxmi Publication.

DEPARTMENT OF CIVIL ENGINEERING

List of R- 21 II YEAR- IV SEM SUBJECTS

S.No	Subjects from department of CIVIL	Sem/Branch	Category
	CIVIL Branch Subjects		
1	Concrete Technology	IV Sem CIVIL	PC
2	Hydraulics & Hydraulic Machinery	IV Sem CIVIL	PC
3	Structural Analysis	IV Sem CIVIL	PC
4	Surveying-II	IV Sem CIVIL	PC
5	Hydraulics & Hydraulic Machinery lab	IV Sem CIVIL	PC
6	Structural Analysis practice	IV Sem CIVIL	PC
7	Surveying-II lab	IV Sem CIVIL	PC

CONCRETE TECHNOLOGY

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	3	0	0	48	3	40	60	100

MODULE-1 CEMENT AND MANUFACTURE OF CONCRETE (10H)

Cement: Portland cement, chemical composition, hydration, setting and fineness of cement, structure of hydrated cement, mechanical strength of cement gel, water held in hydrated cement paste, heat of hydration; Tests on cements – Fineness of cement using sieve test and air-permeability method, Normal consistency and setting times using Vicat apparatus, soundness test using Le-Chatlier apparatus (detailed procedures to be covered in laboratory); Grades of cement.

Manufacture of concrete: Batching, mixing, transporting, placing, compacting, finishing, and curing; Ready Mixed Concrete (RMC): Introduction, advantages of RMC, components of RMC plant, process adopted in RMC plant, handling and placing, code recommendations.

MODULE-2 FRESH CONCRETE AND ADDMIXTURES (10H)

Fresh concrete: Workability, Factors affecting workability, Measurement of workability by different tests, setting time of concrete, Effect of time and temperature on workability, Segregation, bleeding; Water/cement ratio-Abram's law, Gel/Space ratio. **Admixtures**: Introduction, Types of admixtures, plasticizers, action of plasticizers, super plasticizers, effect of super plasticizes on fresh concrete and properties of hardened concrete; Retarders, accelerators; Air-entraining admixtures, factors affecting amount of air-entrainment, effect of air-entrainment on the properties of concrete; pozzolanic admixtures-types, fly ash, effect of fly ash on fresh and hardened concrete, high volume fly ash concrete, silica fume, available forms, effect of silica fume on fresh and hardened concrete.

MODULE-3 HARDENED CONCRETE (10H)

Strength of concrete: Factors affecting strength of concrete, gain of strength with age, Effect of maximum size of aggregate on strength, relation between compressive and tensile strength, bond strength; Testing-compression test, determination of tensile strength, factors influencing the strength results; **Elasticity**- elastic properties of concrete, modulus of elasticity and strength, Factors affecting modulus of elasticity, Dynamic modulus of elasticity, Poisson's ratio; **Creep**-measurement of creep, factors affecting creep, effect of creep; **Shrinkage**- mechanism of shrinkage, classification of shrinkage, Factors affecting shrinkage

MODULE-4 SPECIAL CONCRETES & NON-DESTRUCTIVE TESTING (9H)

Special Concretes: Light weight concrete, no-fines concrete, high density concrete, fibre reinforced concrete, self-compacting concrete, high strength concrete, high performance concrete, cold weather concreting, hot weather concreting, polymer concrete. **Non Destructive Testing**: Importance, Methods-Rebound hammer test, penetration and pull-out test, Ultrasonic pulse velocity test, Principles, applications and limitations; Corrosion meter, Cover meter and core cutter.

MODULE-5 MIX DESIGN (9H)

Durability: Durability and impermeability; cracking, carbonation, alkali-silica reaction, chemical attack, physical aggression; **Concrete Mix Design**: Introduction, object of mix design Factors governing mix design, Methods of expressing proportions, statistically quality control, Introduction to different methods of mix design, Concrete mix design by I.S. method.

Text books:

1. Concrete technology by M.S.Shetty, S.Chand& Company Pvt. Ltd., New Delhi

2. Concrete Technology by, A.R. Santha Kumar, Oxford University Press, New Delhi

3. Concrete Technology by M.L. Gambhir, Tata Mc. Graw Hill Publishers, New Delhi

Reference books:

1. Properties of Concrete by Neville, A.M., Low Priced Edition.

2. Text Book of Concrete Technology by P.D. Kulkarni, R.K.Ghosh and Y.R.Phaul, New Age International.

3. Concrete Technology by A.M. Neville and J.J. Brooks, Pearson Publications.

4. High Performance Concretes and Applications by S.P. Shah, S.H. Ahmad and Edward Arnold, Taylor and Francis Publishers.

HYDRAULICS & HYDRAULIC MACHINERY

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	3	0	0	48	3	40	60	100

MODULE – 1 FLOW IN OPEN CHANNELS 10H

Introduction, Classification of flows, types of channels, velocity distribution, the chezy equation, empirical formulae for the chezy constant; most economical section of channel, most economical Rectangular, Triangular channel sections; most economical trapezoidal channel section, best side slope for most economical trapezoidal channel section; most economical circular channel section for maximum velocity and maximum discharge conditions. Concept of specific energy, Specific energy curves; critical depth, critical velocity, Critical flow, Critical flow in a rectangular channel, Critical slope, discharge curve; Different slope conditions

MODULE -2 NON-UNIFORM FLOW IN OPEN CHANNELS 10H

Gradually Varied Flow: Introduction, Dynamic equation; Dynamic equation for GVF in wide rectangular channel, classification of channel bottom slopes, Surface Profiles; Characteristics of surface profiles, Back water Curves and Draw down curves; Computation of surface profiles by single step method.

Rapidly Varied Flow: Hydraulic jump; Elements and characteristics of hydraulic jump; Hydraulic jump in rectangular channels, height and length of the jump, Energy loss in a hydraulic jump, Types of hydraulic jump; applications of hydraulic jump.

MODULE-3 IMPACT OF JETS & IMPULSE TURBINE 10H

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for Work done and efficiency. Impulse Turbine: Hydraulic Turbines - Introduction, layout of a hydro power plant, head and efficiencies of hydraulic turbines, Classification of hydraulic turbines; Pelton turbine- Introduction, parts, Velocity triangles, work done and efficiency, working proportions, design of Pelton wheel.

MODULE-4 REACTION TURBINES 9H

Radial flow Reaction Turbine: velocity triangles and work done for inward radial flow turbine, degree of reaction, discharge, speed ratio, flow ratio. Francis turbine: main components and working,work done and efficiencies, design proportions.

Axial flow Reaction Turbine: Kaplan turbine- main components and working, working proportions; Draft tube-types of draft tubes, draft tube theory and efficiency of draft tube; Cavitation: causes, effects.

MODULE-5 CENTRIFUGAL PUMPS & DIMENSIONAL ANALYSIS 9H

Centrifugal Pumps: Introduction, component parts and working of a centrifugal pump, work done by the impeller; heads, losses and efficiencies; minimum starting speed, Priming, specific speed, limitation of suction lift, net positive suction head(NPSH); Cavitation effects, Multistage centrifugal pumps.

Dimensional Analysis and Similitude: Introduction, derived quantities, Dimensional homogeneity; Methods of dimensional analysis- Rayleigh's method, Buckingham–Pi theorem; model analysis; similitude - types of similarities; Dimensionless numbers; Model laws.

Text Book(s):

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
2. A text of Fluid mechanics and hydraulic machines by Dr.R.k.Bansal – Laxmi Publications (P)Ltd., New Delhi.

Reference Book(s):

1. Fluid Mechanics & Hydraulic Machines by SS Rattan, Khanna Publishing House.
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid Machinery by Sadhu Singh, Khanna Publishing House, Delhi.
4. Flow in Open channels by K.Subramanya. Tata Mc Graw Hill Publishers.

STRUCTURAL ANALYSIS

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	3	0	0	48	3	40	60	100

MODULE –1 STATICALLY INDETERMINATE BEAMS AND FRAMES 10H

Statically indeterminate Beams and Frames: Determinateness of structures, stability and indeterminacy, External and Internal Redundancy Methods of Analysis-Force Method and Displacement Method. Clapeyron's Theorem of Three Moments, Application of theorem for -General Loading, Fixed Beams, Sinking of supports. (Involving not more than 3 unknowns) Castigliano's Second Theorem, Application of theorem for -General Loading, Fixed Beams, Sinking of supports and frames. (Involving not more than 3 unknowns)

MODULE -2 ANALYSIS OF INDETERMINATE STRUCTURES 10H

Analysis of Indeterminate Structures: Slope Deflection Method, sign conventions, development of slope deflection equations, modification for simple ends, Application to beams and sway and non- sway Frames. (Involving not more than 3 unknowns)

Moment Distribution Method, Carry over moment, distribution factors, fixed end moments, modification of stiffness for simple ends, Application to beams and sway and non-sway frames. (Involving not more than 3 unknowns

MODULE-3 FLEXIBILITY METHOD 9H

Flexibility Method: Fundamental concepts, formulation of flexibility matrix, application to beams and sway and non-sway frames. (Involving not more than 3 unknowns) Application to pin jointed plane trusses. (Involving not more than 3 unknowns).

MODULE-4 STIFFNESS METHOD 9H

Stiffness Method: Fundamental concepts, formulation of stiffness matrix, application to beams using member approach. (Involving not more than 3 unknowns) Application to sway and non-sway frames. (Involving not more than 3 unknowns)

MODULE-5THREE HINGED ARCHES AND INFLUENCE LINE DIAGRAM 10H

Three Hinged Arches: Concept, analysis of parabolic and semi-circular arch with supports at same and different levels. Horizontal thrust, radial shear and normal thrust for parabolic and semi- circular arch.

Influence Line Diagram: Basic concepts, influence line diagram for reactions, shear and bending moment for simply supported and overhanging beams.

Text Book(s):

1. Structural Analysis by S.S. Bhavikatti, Volume 1 and 2, Vikas Publishing House, Pvt. Ltd.

2. Theory of Structures by S. Ramamurtham, Dhanpat Rai Publishing Company (p) Ltd,

Reference Book(s):

1. Theory of Structures- B.C.Punmia, Ashok kumar Jain and Arun Kumar Jain, Laxmi Publications (P) Ltd.
2. Mechanics of Structures Vol. II - S.B. Junnerkar and H.J. Shaha, Charotar Publishing House.
3. Advanced Structural Analysis by A.K. Jain, Nem Chand Bros.

SURVEYING -II

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	3	0	0	48	3	40	60	100

MODULE – 1 TACHEOMETRIC SURVEYING 8H

Tacheometric surveying: Definition, Advantages of tachometric surveying, Basic systems of tacheometric measurement, Principle of stadia measurements, Determination of constants K and C, Inclined sight with staff vertical, Inclined sight with staff normal to the line of sight, Movable hair method, Tangential method, Subtense bar, Errors in tachometry.

MODULE-2 TRIANGULATION & SETTING OUT WORKS 9H

Triangulation: Principles of triangulation, Uses of triangulation survey, Classification of triangulation, operations of triangulation survey, Signals and towers, Satellite station, Base line & Extension of the base line.

Setting out works: Introduction, Control stations; Horizontal control Reference grid, Vertical control, Positioning of a structure; offset pegs, setting out a foundation- reference pillars, batter boards, setting out with a theodolite; Graded stakes; setting out a sewer; Setting out a culvert.

MODULE-3 CURVES 9H

Curves: Simple curves–Definitions and Notations, designation of a curve, Elements of simple curves, location of tangent points, selection of peg interval, Methods of setting simple curves (based on equipment) – Rankines method, Two theodolite method. Compound curves – Elements of compound curve, setting out compound curve. Reverse curves – Elements of reverse curve, relationship between various elements.

MODULE-4 MODERN FIELD SURVEY SYSTEMS 10H

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station – Parts of a Total Station – Accessories – Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems Segments, GPS measurements, errors and biases, Surveying with GPS, Co- ordinate transformation, accuracy considerations.

MODULE-5 CONCEPTS OF REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS 12H

Remote Sensing: Concept of remote sensing, Principles of remote sensing, Components of remote sensing, Elements in remote sensing, Platforms for remote sensing, Types of remote sensing, Remote sensing systems, the principal steps used to analyses remotely sensed data, Data reception, transmission and processing.

Geographic Information Systems (GIS): Definition, Objectives of GIS, Components of GIS, GIS architecture, Data – Raster and vector data processing methods, Data input, Data storage and retrieval, Data manipulation and analysis, Data output, Applications of GIS in Civil Engineering.

Text Book(s):

1.Surveying, Vol- II and III by Arora, K.R., Standard Book House.

2.Advanced Surveying: Total Station, GIS and Remote Sensing by Madhu, N, Sathikumar, R andSatheesh Gopi, Pearson India.

Reference Book(s):

1. Geomatics Engineering by Manoj, K. Arora and Badjatia, Nem Chand & Bros.

2. Surveying and Levelling, Vol. I and II by Bhavikatti, S.S., I.K. International.

3. Remote sensing and Geographical information system by Anji Reddy, M., B.S. Publications.

HYDRAULICS & HYDRAULIC MACHINERY LAB

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	0	0	3	48	1.5	40	60	100

List of Experiments: Minimum 8 of the following.

Task- 1: Verification of Bernoulli's theorem.

Task- 2: Calibration of Venturimeter.

Task- 3: Determination of coefficient of discharge, Coefficient of contraction for an Orifice meter.

Task- 4: Determination of Coefficient of discharge for an orifice by a constant head method.

Task- 5: Determination of coefficient of discharge for Rectangular Notch.

Task- 6: Determination of coefficient of discharge for Triangular Notch.

Task- 7: Determination of Coefficient of discharge for an external mouth piece by variable head method

Task- 8: Determine the Coefficient of friction of a pipe.

Task- 9: Impact of jet on vanes.

Task- 10: Efficiency test on centrifugal pump.

Additional Experiments:

Task-1: Performance test on Pelton wheel turbine.

Task-2: Draw performance curves of centrifugal pump.

Task-3: Study of Hydraulic jump

Text Book(s):

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
2. Flow in Open channels by K.Subramanya. Tata Mc Graw Hill Publishers.

Reference Book(s):

1. Fluid Mechanics & Hydraulic Machines by SS Rattan, Khanna Publishing House.
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid Machinery by Sadhu Singh, Khanna Publishing House, Delhi.

STRUCTURAL ANALYSIS PRACTICE

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	0	0	3	48	1.5	40	60	100

List of Experiments:

Task -1: Statically indeterminate Beams and Frames

Task -2: Analysis of Indeterminate Structures

Task -3: Flexibility Method

Task -4: Stiffness Method

Task -5: Three Hinged Arches and Influence Line Diagram

Task -6: Approximate Methods of Analysis

Text Book(s):

1. Structural Analysis by S.S. Bhavikatti, Volume 1 and 2, Vikas Publishing House, Pvt. Ltd.

2. Theory of Structures by S. Ramamurtham, Dhanpat Rai Publishing Company (p) Ltd,

Reference Book(s):

1. Theory of Structures- B.C.Punmia, Ashok kumar Jain and Arun Kumar Jain, Laxmi Publications (P) Ltd.
2. Mechanics of Structures Vol. II - S.B. Junnerkar and H.J. Shaha, Charotar Publishing House.
3. Advanced Structural Analysis by A.K. Jain, Nem Chand Bros.

SURVEYING-II LAB

Semester	Hours/Week			Totalhrs.	Credit	MaxMarks		
	L	T	P		C	CIE	SEE	TOTAL
IV	0	0	3	48	1.5	40	60	100

List of Experiments: Minimum 8 of the following.

Task -1: Determination of tachometric constants.

Task -2: Height and distances using principles of tachometric surveying.

Task -3: Use of triangulation method to find the given area.

Task -4: To set out a simple circular curve by Rankine's method.

Task -5: To set out a compound circular curve by deflection angle method or Rankine's method.

Task -6: To study the various electronic surveying instruments like EDM, Total Station etc.

Task -7: Determine of area using total station.

Task -8: Traversing using total station.

Task -9: Distance, gradient, difference in height between two inaccessible points using total station.

Task -10: To study the Global Positioning System (GPS).

Additional experiments

Task -1: Contour plan of given area using total station.

Task -2: To give layout of given plan of building.

Task -3: Determination of remote height using total station.

Text Book(s):

1.Surveying, Vol- II and III by Arora, K.R., Standard Book House.

2.Advanced Surveying: Total Station, GIS and Remote Sensing by Madhu, N, Sathikumar, R andSatheesh Gopi, Pearson India.

Reference Book(s):

1. Geomatics Engineering by Manoj, K. Arora and Badjatia, Nem Chand & Bros.
2. Surveying and Levelling, Vol. I and II by Bhavikatti, S.S., I.K. International.
3. Remote sensing and Geographical information system by Anji Reddy, M., B.S. Publications.

DEPARTMENT OF CIVIL ENGINEERING

LIST OF R21 III YEAR – V SEMESTER SUBJECTS

S. No	Subjects from department of CIVIL	Semester /Branch	Category
CIVIL Branch Subjects			
1	Design of Reinforced Concrete Structures	V **Semester** /CIVIL	PC
2	Soil Mechanics	V **Semester** /CIVIL	PC
3	Highway Engineering	V **Semester** /CIVIL	PC
4	Computer Aided Drafting of Buildings	V **Semester** /CIVIL	PC
5	Concrete Tech and Highway Engineering lab	V **Semester** /CIVIL	PC
6	Design of Reinforced Concrete Structures Practice	V **Semester** /CIVIL	PC

DESIGN OF REINFORCED CONCRETE STRUCTURES (21CE2008)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
V	3	0	3	48	3	40	60	100

MODULE – 1 INTRODUCTION 10H

Concepts of RCC Design:

Introduction to Working stress method - Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS: 456 – 2000.

Design of Beams: Limit state analysis and design of singly reinforced, doubly reinforced.

Design of Flanged Beams: Limit state analysis and Design of T and L beam sections.

MODULE -2 BEAMS 10H

Shear, Torsion and Bond :

Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

MODULE-3 SLABS 10H

Design of One way and Two way Slabs: Simply Supported Slabs on all Four Sides, Moment in Two way Slabs with Corners held down. Choosing Slab Thickness. I.S. Code Provisions. Detailing of Reinforcement.

MODULE-4 COLUMNS 9H

Design of Columns: Short and Long Columns, Minimum Eccentricity, Short Column under Axial Compression, Column with Helical and Tie Reinforcement.

MODULE-5 FOOTINGS AND STAIRCASE 9H

Design of Footings - isolated (square, rectangular) and Combined footings.

Design of Stair case – Dog legged and Open well.

Total hours: 48 hours

Text Book(s):

1. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
2. Limit State Design of Reinforced Concrete by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
3. Design of Reinforced Concrete Structures by K.Subramanian , Oxford University press India.

Reference Book(s):

1. Design of RCC Structures by M.L.Gambhir P.H.I. Publications, New Delhi.
2. Limit State Design of RCC Structures – P.C.Varghese, Printice Hall of India, New Delhi
3. Reinforced Concrete Design by Pillai & Menon, TMH Publishers.
4. Analysis of Skeletal Structures by Seetharamulu Kaveti, TMH publications.

SOIL MECHANICS (21CE2009)

Semester	Hours/Week			Total hrs.	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
V	3	0	0	48	3	40	60	100

MODULE – 1 SOIL CLASSIFICATION 10H

Introduction of Soil – Soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship – Relative density. Index Properties of Soils Grain size analysis – Sieve and Hydro meter methods -consistency limits and indices – I.S. Classification of soils and unified soil classification.

MODULE-2 PERMEABILITY & EFFECTIVE STRESS 9H

Permeability – capillary rise – flow of water through soils – Darcy's law Permeability– Factors affecting permeability – laboratory determination of coefficient of Permeability – Permeability of layered soils --Effective Stress: Total, neutral and effective stress –principle of effective stress - quick sand condition. Seepage through soils – 2-D flow and Laplace's Equation –Flow nets: Characteristics and Uses.

MODULE-3 STRESS DISTRIBUTION IN SOILS & COMPACTION 10H

Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart. Compaction Mechanism– factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – Compaction quality control.

MODULE-4 CONSOLIDATION OF SOIL 10H

Consolidation – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log ,p curves – normally consolidated soil, over consolidated soil and under consolidated soil – pre consolidation pressure and its determination- Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time.

MODULE-5 SHEAR STRENGTH 9H

Shear strength– Mohr's– Coulomb Failure theories – Types of laboratory strength tests – strength tests based on drainage conditions – Shear strength of sands - dilatancy– Critical Void Ratio – Liquefaction- shear strength of clays.

Total hours: 48 hours

Text Book(s):

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.12th Edition, 2012
2. Soil Mechanics and foundation engineering by Purushotham Raj, Pearson Publishers, 2nd edition,2013.

Reference Book(s):

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt.Ltd, 7thEdition, 2013.
2. Principles of Geotechnical Engineering by Baraja M.Das & Khaled Sobhan, Cengage, 8th Edition.

HIGHWAY ENGINEERING (21CE2010)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
V	2	0	0	32	2	40	60	100

MODULE – 1 HIGHWAY PLANNING AND ALIGNMENT 7H

Significance of highway planning – Modal limitations towards sustainability – History of road development in India – Factors influencing highway alignment – Soil suitability analysis – Road ecology – Engineering surveys for alignment, objectives, conventional and modern methods – Classification of highways – Locations and functions – Typical cross sections of Urban and Rural roads.

MODULE -2 HIGHWAY GEOMETRICS 6H

Highway classification (Rural and Urban roads), Road Geometrics – Highway cross section elements – Camber – Sight Distance, Horizontal Alignment Design, Super Elevation, Extra widening, Transition curves, set back distance, Design of Vertical curves.

MODULE-3 HIGHWAY MATERIALS AND CONSTRUCTION 7H

Material requirement for pavements – Soil classification for Highway – Soil tests – CBR and Plate Load Test, Aggregate – materials testing and specification, Bitumen – material testing and specification – Concrete Mix Design, construction of bituminous and rigid pavements, Highway Maintenance – Material recycling.

MODULE-4 PAVEMENTDESIGN 6H

Pavement Analysis – Factors affecting pavement thickness – Soil – Wheel load – Temperature – Environmental factors; Flexible Pavement Design – Axle Load surveys – CBR method of Design, Rigid Pavement Design – IRC method.

MODULE-5 **TRAFFIC ENGINEERING** **6H**

Characteristics of traffic elements – Design of Intersections, Interchanges, Parking Layout & Road signs – Urban traffic management - Traffic regulation and control, Accidents, Causes and Preventions

Total hours: 32 hours

TextBook(s):

1. Khanna, S.K. & Justo, C.E.G., Highway Engineering, NemChand& Bros, Roorkee (U.A).
2. Venkata Ramaiah, C., Transportation Engineering Volume-1, Universities press.

ReferenceBook(s):

1. IRC 37-2018: Guidelines for Design of Flexible pavements.
2. IRC 58-2015: Guidelines for Design of Rigid Pavements.
3. Sharma, S.K., Principles, Practice and Design of Highway Engineering, S. Chand & Co., New Delhi.
4. Rangwala S.C, Highway Engineering, Charotar publishers, Gujarat.
5. Kadiyali, L.R., Traffic Engineering & Transport Planning, Khanna Publishers, New Delhi.
6. Kadiyali, L.R. & Lal, N.B., Principles & Practices of Highway Engineering, Khanna Publishers, New Delhi.

COMPUTER AIDED DRAFTING OF BUILDINGS (21CE2507)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
V	0	0	3	48	1.5	40	60	100

List of experiments: Minimum 8 of the following by using CAD Software

TASK -1: Introduction to Computer aided drafting

TASK -2: Software for CAD – Introduction to different software's

TASK -3: Practice exercises

TASK -4: Detailing of Building Components

TASK -5: Drawing of Line diagram of Residential Building.

TASK -6: Drawing of Plan, Section & Elevation for Residential Buildings.

TASK -7: Drawing Line diagram for Multi Storey Residential Buildings

TASK -8: Drawing of Plan, Section & Elevation for Multi Storey Residential Buildings

TASK – 9 : Drawing of plan, section & Elevation for Hospital Building.

TASK -10: Drawing of Plan, Section & Elevation for Industrial Buildings.

Text Book(s):.

1. Engineering graphics with Auto CAD - R.B. Choudary , Anuradha Publishes
2. Ajeet Singh (2002), "Working with AUTOCAD 2000 with updates on AUTOCAD 200I", Tata- Mc Graw-Hill Company Limited, New Delhi

N. Kumara Swamy, A. Kameswara Rao "Building Planning and Drawing"

Reference Book(s):

1. Balagopal and Prabhu (1987), "Building Drawing and Detailing", Spades publishing KDR building, Calicut, (Corresponding set of) CAD Software Theory and User Manuals.
2. Sikka, V.B. (2013), "A Course in Civil Engineering Drawing", S. K. Kataria & Sons,
3. Sham Tickoo Swapna D (2009), "AUTOCAD for Engineers and Designers", Pearson Education

CONCRETE TECH & HIGHWAY ENGINEERING LAB(21CE2508)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
V	0	0	3	48	1.5	40	60	100

List of Experiments: Minimum 10 of the following.

I. TESTS ON CEMENT

Task 1: Normal Consistency and fineness of cement.

Task 2: Initial setting time and final setting time of cement.

Task 3: Specific gravity and soundness of cement.

II. TESTS ON CONCRETE

Task 4: Workability test on concrete by

A) Slump Cone Test B)Compaction factor and C) Vee-bee.

Task 5: Determination of compressive strength of concrete.

Task 6: Compressive strength of the concrete by relating the rebound index using Rebound Hammer Test.

III. TESTS ON ROAD AGGREGATES

Task 7: Aggregate Crushing value

Task 8: Aggregate Impact Test

Task 9: Abrasion Test.

IV. TESTS ON BITUMINOUS MATERIALS

Task 10: Penetration Test & Viscosity Test.

Task 11: Ductility Test

Task 12: Softening Point Test

Text Books:

1. Concrete Manual by M.L.Gambhir, Dhanpat Rai&co., Fourth edition.

2. Building construction and materials (Lab Manual) by Gambhir, TMH publishers.

3. S.K. Khanna and C.E.G Justo, Highway Materials Testing Laboratory Manual, Nem Chand Bros. Roorkee

4. Lab manual on High way Engineering by Ajay.K.Duggal & Vijay .P.Puri, New Age Publications, New Delhi.

DESIGN OF REINFORCED CONCRETE STRUCTURES PRACTICE (21CE2509)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
V	0	0	2	32	1	40	60	100

List of experiments: Minimum 8 of the following

Task -1 Design & Detailing of Singly Reinforced Beams

Task - 2 Design & Detailing of Doubly Reinforced Beams

Task -3 Design & Detailing Of Cantilever Beams

Task -4 Design & Detailing of One Way Slab

TASK -5 Design & Detailing of Two Way Slab

TASK -6 Design & Detailing of Short Column

TASK-7 Design & Detailing of Long Or Slender Column

TASK -8 Design & Detailing of Footings

TASK -9 Design & Detailing of Stair Case

Text Book(s):

1. Punmia, BC; "Reinforced Concrete Structure Vol I", Delhi Standard Publishers Distributors

2. Mallick, SK; and Gupta, AP; "Reinforced Concrete", New Delhi, Oxford and IBH Publishing Co

3. Ramamurtham, S; "Design and Testing of Reinforced Structures", Delhi Dhanpat Rai and Sons

Reference Book(s) :

1. Gambhir, M.L., "Reinforced Concrete Design", Macmillan India Limited

2. Jai Krishna and Jain, OP; "Plain and Reinforced Concrete", Vol. I, Roorkee, Nem Chand and Bros

DEPARTMENT OF CIVIL ENGINEERING

LIST OF R21 III YEAR – VI SEMESTER SUBJECTS

S.No	Subjects from department of CIVIL	Semester /Branch	Category
CIVIL Branch Subjects			
1	Water Resources Engineering	VI **Semester** /CIVIL	PC
2	Environmental Engineering	VI **Semester** /CIVIL	PC
3	Foundation Engineering	VI **Semester** /CIVIL	PC
4	Soil Mechanics Lab	VI **Semester** /CIVIL	PC
5	Environmental Engineering Lab	VI **Semester** /CIVIL	PC
6	CAD Lab	VI **Semester** /CIVIL	PC

WATER RESOURCES ENGINEERING (21CE2011)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VI	2	0	0	32	2	40	60	100

MODULE – 1 INTRODUCTION TO HYDROLOGY 7H

History of hydrology, applications in engineering, sources of hydrological data; Hydrologic cycle; catchment, stream patterns; basin characteristics, classifications of watersheds; precipitation- types and forms of precipitation; weather systems for precipitation, characteristics of precipitation in India; measurement of precipitation , types of rain gauges, Presentation of Rainfall data, computation of average rainfall over a basin.

MODULE -2 ABSTRACTIONS FROM PRICIPITATIONS 6H

Introduction, Evaporation, factors affecting evaporation, measurement of evaporation, methods to reduce evaporation losses; Transpiration, Factors effecting transpiration; Evapotranspiration, measurement of evapotranspiration; Infiltration, capacity factors affecting infiltration capacity, measurement of infiltration, classification of infiltration capacities, infiltration indices.

MODULE-3 HYDROGRAPHS 6H

Runoff process, Components of stream flow, Factors affecting runoff, Estimation of runoff, Empirical formulae and Infiltration method; Flow-duration curve, Flow-mass curve; Hydrographs, Components of hydrograph, Base flow separations, Unit hydrograph, Derivation of Unit hydrograph, Unit hydrograph of different durations, Use and limitations of UH, Duration of the Unit hydrograph.

MODULE-4 GROUND WATER 6H

Introduction, Aquifer, Aquiclude, Aquifuge, aquifer parameters- porosity, Specific yield, Specific retention; Divisions of sub–surface water; Water table; Types of aquifers; storage coefficient-coefficient of permeability and transmissibility; well hydraulics- Darcy's law; Steady radial flow to a well –Dupuit's theory for confined and unconfined aquifers; Tube well; Open well; Yield of an open well–Constant level pumping test, Recuperation test.

MODULE-5 RESERVOIR PLANNING 7H

Introduction; Investigations for reservoir planning; Selection of site for a reservoir; Zones of storage in a reservoir; Storage capacity and yield; Mass inflow curve and demand curve;
Calculation of reservoir capacity for a specified yield from the mass in flow curve; Determination of safe yield from a reservoir of a given capacity; Reservoir sedimentation; Life of reservoir; Reservoir sediment control.

Total Hours: 32 hours

Text Book(s):

1. Irrigation Engineering and Hydraulic Structures by S. K. Garg; Khanna Publishers, Delhi
2. Irrigation And Water Power Engineering by Punmia, Laxmi Publications Pvt. Ltd., New Delhi.

Reference Book(s):

1. Engineering Hydrology by K.Subramanya, The Tata McGraw Hill Company, Delhi
2. Engineering Hydrology by Jayarami Reddy, Laxmi publications Pvt. Ltd., New Delhi

ENVIRONMENTAL ENGINEERING (21CE2012)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VI	2	0	0	32	2	40	60	100

MODULE – 1 QUALITY AND ANALYSIS OF WATER 7H

Water demand – Types – Factors affecting water demand – Fluctuations in water demand – Design period – Population forecasting methods and their suitability.

QUALITY AND ANALYSIS OF WATER: Characteristics of water – Physical, Chemical and Biological. Analysis of Water – Physical, Chemical and Biological. Impurities in water, Water borne diseases. Drinking water quality standards.

MODULE-2 WATER TREATMENT 6H

Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices.

MODULE-3 WATER DISTRIBUTION 6H

Distribution systems – Requirements, Layout of Water distribution systems - Design procedures-Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house, waste detection and prevention.

MODULE-4 WASTE WATER COLLECTION AND CHARACTERISTIC 6H

Conservancy and water carriage systems – Sewage and storm water estimation – time of concentration – Storm water overflows combined flow – Characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. – C.O.D. equations.

MODULE-5 WASTE WATER & SLUDGE TREATMENT 7H

Layout and general outline of various units in a waste water treatment plant – primary treatment:

design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters – standard and high rate – Construction and design of Oxidation ponds.

Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks and Imhoff Tanks, working principles and design – soak pits.

Total hours: 32 hours

Text Book(s):

1. Water Supply Engineering by S.K. Garg.
2. Water Supply Engineering by B.C.Punmia
3. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi
4. Wastewater Engineering by B.C.Punmia.
5. Sewage Disposal and Air Pollution Engineering by S.K. Garg.

Reference Book(s):

1. Wastewater Engineering, Treatment, Disposal and Reuse by Metcalf and Eddy.
2. Environmental Engineering I Water Supply Engineering by Modi. P. N
3. Water Supply and Sanitary Engineering by G. S. Birdie & J. S. Birdie.
4. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education.

FOUNDATION ENGINEERING (21CE2013)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VI	3	0	0	48	3	40	60	100

MODULE – 1 SOIL EXPLORATION 8H

Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

MODULE -2 STABILITY OF SLOPES 10H

Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

MODULE-3 EARTH PRESSURE THEORIES 10H

Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Rebhann's and Culmann's graphical method **RETAINING WALLS**: Types of retaining walls – stability of retaining walls.

MODULE-4 SHALLOW FOUNDATIONS 10H

Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi's, Meyerhoff's and Skempton`s Methods . **ALLOWABLE BEARING PRESSURE** : Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures – Settlement Analysis.

MODULE-5 PILE FOUNDATION 10H

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Criteria – Sinking of wells – Tilts and shifts.

Text Book(s):

1. C.Venkataramaiah, **"Geotechnical Engineering",** New Age Pubilications.
2. Arora, "**Soil Mechanics and Foundation Engineering**" Standard Publishers and Distributors, Delhi.

   B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain,Soil "**Mechanics and Foundations**" ,Laxmi, publications Pvt. Ltd., New Delhi.

Reference Book(s):

1. Purushtoma Raj, "**Soil Mechanics and Foundation Engineering**", Pearson Pubilications.
2. Das, B.M., "**Principles of Foundation Engineering"**, 6th edition (Indian edition) Thomson Engineering(1999).
3. Varghese,P.C., **"Foundation Engineering"**, Prentice Hall of India., New Delhi.
4. V.N.S.Murthy**, "Foundation Engineering",** CRC Press, New Delhi.

   Bowles, J.E., **"Foundation Analysis and Design",** 4th Edition, McGraw-Hill Publishing company, Newyork.

SOIL MECHANICS LAB (21CE2510)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VI	0	0	3	48	1.5	40	60	100

List of experiments: Minimum 10 of the following.

Task 1: Specific gravity

Task 2: Atterberg's Limits.

Task 3: Field density-Core cutter and Sand replacement methods

Task 4: Grain size analysis by sieving

Task 5: Permeability of soil - Constant and Variable head tests

Task 6: Compaction test

Task 7: Direct Shear test

Task 8: Tri-axial Compression test (UU Test)

Task 9: Unconfined Compression test

Task 10: CBR Test

Task 11: Consolidation test (Demonstration)

Task 12: Free Swell Index

Additional Experiments:

Task 1: Vane Shear Test

Task 2: Hydrometer Analysis Test (Demonstration)

Textbooks:

1. Soil Mechanics and Foundation Engg by K. R. Arora, Standard Publishers and Distributors, Delhi 7th edition 2009.
2. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).

Reference Books:

1. Soil Mechanics and Foundation by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi publications Pvt. Ltd., New Delhi 17th edition 2017.
2. Basic and Applied Soil Mechanics by Gopal Ranjan & A. S. R. Rao, New age International Pvt . Ltd, New Delhi 3rd edition 2016.
3. Principles of Geotechnical Engineering by Braja M. Das Cengage Learning

ENVIRONMENTAL ENGINEERING LABORATORY (21CE2511)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VI	0	0	2	32	1	40	60	100

List of Experiments: Minimum 8 of the following.

Task 1: Determination of pH and turbidity.

Task 2: Determination of conductivity and total dissolved solids.

Task 3: Determination of alkalinity and acidity.

Task 4: Determination of chlorides.

Task 5: Determination of iron.

Task 6: Determination of dissolved oxygen.

Task 7: Determination of nitrates.

Task 8: Determination of optimum dose of coagulant.

Task 9: Determination of chlorine demand.

Task 10: Determination of total phosphorus.

Additional Experiments:

Task 1: Determination of B.O.D.

Task 2: Determination of C.O.D.

Task 3: Presumptive coliform test

Text Book(s):

1. Water supply Engineering, by Santhosh Kumar Garg, Khanna publishers.
2. Chemical analysis of water and soil, by Dr. KVSG Murali Krishna, Reem.
3. Environmental Engineering Laboratory Manual by DR.B.Kotaiah, DR.N.Kumara Swamy, Charotar publishers.

CAD LABORATORY (21CE2512)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VI	0	0	2	32	1	40	60	100

List of experiments: Minimum 8 of the following

Task 1 - Introduction to basics in STAAD Pro

Task - 2 Analysis And Design of Fixed And Continuous Beams

Task -3 Analysis And Design of 2-D Frame

TASK -4 Analysis And Design of 3-D Frame

TASK -5 Analysis And Design of Steel Tubular Truss

TASK-6 Analysis & Design of One Way Slab

TASK -7 Analysis & Design of Two Way Slab

TASK -8 Analysis & Design of Column

TASK -9 Analysis And Design of Retaining Wall

TASK -10 Analysis And Design of Simple Tower

Text Book(s):

1.Computer Aided Design Lab Manual by Dr.M.N.SeshaPrakash And Dr.C.S.Suresh.

DEPARTMENT OF CIVIL ENGINEERING

LIST OF R21 IV YEAR – VII SEMESTER SUBJECTS

S.No	Subjects from department of CIVIL	Semester/Branch	Category
CIVIL Branch Subjects			
1	Design of steel structures	VII **Semester** CIVIL	PC
2	Estimation and quantity surveying	VII **Semester** CIVIL	PC
3	Design of steel Structures Practice	VII **Semester** CIVIL	PC
4	Estimation and quantity surveying Practice	VII **Semester** CIVIL	PC

DESIGN OF STEEL STRUCTURES (21CE2014)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VII	3	0	0	48	3	40	60	100

MODULE -1 INTRODUCTION & DESIGN OF CONNECTIONS 10H

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads–and combinations loading wind loads on roof trusses, Behavior of steel, local buckling. Concept of limit State Design – Different Limit States as per IS 800 -2007 – Design Strengths- deflection limits – serviceability - Bolted connections – Welded connections – Design Strength – Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

MODULE -2 DESIGN OF TENSION & COMPRESSION MEMBERS 10H

Design of members in direct tension and bending -Buckling class – Slenderness ratio / strength design – Laced & Battened columns –Column splice – Column base – Slab base and Gusseted base.

MODULE -3 DESIGN OF BEAMS & ROOF TRUSSES 10H

Plastic moment – Bending and shear strength laterally supported and unsupported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams.

Types of trusses – Design loads – Load combinations as per IS Code, detailing –Design of simple roof trusses elements (purlins, members and joints) – tubular trusses.

MODULE -4 DESIGN OF ECCENTRIC CONNECTIONS 10H

Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types)

MODULE -5 PLATE GIRDER 8H

Design consideration – I S Code recommendations, Design of plate girder, Welded – Curtailment of flange plates stiffeners – splicings and connections.

Total Hours : 48 Hours

Text Book(s):

1. Limit State Design of Steel Structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi.
2. Limit State Design of Steel Structures by Subramanyam.N, Oxford University press, New Delhi
3. Design of Steel Structures by Dr. B. C. Punmia, A.K.Jain, Lakshmi Pubilications.

Reference Book(s):

1. Fundamentals of Structural Steel Design by M.L.Gambhir, TMH publications.
2. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad.
3. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
4. Design of Steel Structures by Edwin Gaylord, Charles Gaylord, James Stallmeyer, Tata Mc.Graw- Hill, New Delhi.

Codes/Tables /IS Code Book(s):

1. IS -800 – 2007 Code Of Practice For Use Of Structural Steel In General Building Construction.
2. IS – 875 – Part III Code Of Practice For Design Of Loads For Building & Structures.
3. IS Hand Book No.1 : Properties of Structural Steel Rolled Sections.

ESTIMATION & QUANTITY SURVEYING (21CE2015)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VII	3	0	0	48	3	40	60	100

MODULE – 1 PROCEDURE AND METHODS OF ESTIMATION 10H

Procedure of Estimating - Introduction, method of estimating, deduction for openings; degree of accuracy; units of measurement; types of estimates – preliminary estimate, plinth area estimate, cube rate estimate, detailed estimate, revised estimate, supplementary and revised estimate, annual repair or maintenance estimate, contingencies; methods of building estimates - different items of work in building; Principles of taking out quantities, detailed measurement form; long wall and short wall method of building estimate.

MODULE-2 ESTIMATES FOR VARIOUS WORKS 10H

Estimating the quantities- for different types of steps, masonry water tank, hexagonal room, GI sheet veranda roof; estimate of RCC works - standard hooks and cranks, estimate of RCC slab, RCC beam, RCC T– beam slab, RCC column with foundation and RCC retaining wall; detailed estimate of highway road.

MODULE-3 SPECIFICATIONS 9H

Specifications: Meaning, purpose, types of specifications, general specification, detailed specifications of different items of buildings and other structures-Earth work for foundation, cement concrete, reinforced cement concrete, brick work, stone masonry, DPC, plastering, pointing, mosaic flooring, form work, Painting and wood works; Methods of measurement of work (IS 1200)-Introduction, general rules, principle of units, measurements for various civil works.

MODULE-4 ANALYSIS OF RATES 10H

Analysis of Rates: Purpose, Task or out – turn work, requirement of labour and materials for different works, Rates of materials and labour, procedure of rate analysis; Rate analysis for- Earth work for foundations and basement of buildings, Cement Mortar (1:4), Cement Concrete (1:2:4), Reinforced Concrete for Lintels, Slabs, Beams and Columns (1:2:4), Brick work Constructed with first class bricks with C.M.(1:6), R.R.stone Masonry with cement mortar (1:6), Plastering With Cement mortar (1:4) 12mm thick, Pointing With cement mortar (1:3) for brick masonry, white wash 2 coats, painting one coat over a coat of priming, 40mm thick panelled door, W.B.M. road with bituminous carpet 20mm thick; Standard Schedule of Rates.

MODULE-5 VALUATION 9H

Valuation: value, cost, price, purpose of valuation, gross income, net income,; Out goings, types of out goings; Scrap value, salvage value, comparison between scrap value and salvage value; market value, factors affecting value of a property, book value, difference between market and book value, assessed value, capitalized value etc.; Annuity, capital cost; Sinking fund, determination of sinking fund; Depreciation, types of depreciation, obsolescence, appreciation, methods of calculating depreciation; Valuation of building, methods of valuation, mortgage, free hold property, leasehold property; Fixation of rent

Total hours: 48hours

Text Book(s):

1. Estimating & Costing in Civil Engineering by B.N. Dutta; UBS Publishers & Distributors.

2. Estimating, Costing, Specifications and valuation in Civil Engineering by M. Chakraborty, Khanna Publications.

3. Valuation of Real properties by S. C. Rangwala, Charotar Publishing House.

Reference Book(s):

1. A Text Book of Estimating and Costing (Civil) by Kohli, D.D and Kohli, R.C., S.Chand& Company Ltd.

2. Estimating & Costing in Civil Engineering by V.V.Vazirani and S.P.Chandola, Khanna publishers.

3. Estimation and costing by G.S.Biridie, DhanpatRai Publications.

4. A Text Book of Estimating, Costing and Valuation by Gurcharan Singh and Jagdish Singh, Standard Publishers Distributors.

5. Elements of Estimating and Costing by K. S. Randwala and K.K. Rangwala, Chavotar Publishing.

DESIGN OF STEEL STRUCTURES PRACTICE (21CE2513)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VII	0	0	2	32	1	40	60	100

List of Experiments : Minimum Eight of the following

Task -1 Design & Detailing Of Welded Connections

Task -2 Design & Detailing Of Bolted Connections

Task - 3 Design & Detailing Of Tension Members

Task -4 Design & Detailing Of Built-Up Compression Member (Laced Column)

Task -5 Design & Detailing Of Built-Up Compression Member (Battened Column)

Task -6 Design & Detailing Of Column Base (Slab Base)

Task -7 Design & Detailing Of Column Base (Gusseted Base)

TASK -8 Design & Detailing Of Roof Trusses

TASK -9 Design & Detailing Of Eccentric Connections

TASK -10 Design & Detailing Of Welded Plate Girder

Text Book(s):

1. Limit State Design of Steel Structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi.

2. Limit State Design of Steel Structures by Subramanyam.N, Oxford University press, New Delhi
3. Design of Steel Structures by Dr. B. C. Punmia, A.K.Jain, Lakshmi Pubilications

Reference Book(s) :

1. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad.
2. Design of Steel Structures by Edwin Gaylord, Charles Gaylord, James Stallmeyer, Tata Mc.Graw-Hill, New Delhi.

ESTIMATION & QUANTITY SURVEYING PRACTICE (21CE2514)

Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
VII	0	0	3	48	1.5	40	60	100

List of Experiments : Minimum Eight of the following

TASK 1: Preparation of Detailed estimate for a single storey residential building using centre line method for Earthwork, foundations, Superstructure, Fittings including sanitary and electrical fittings & Paintings

TASK 2: Preparation of Detailed estimate for a two storey residential building using centre line method for Earthwork, foundations, Superstructure, Fittings including sanitary and electrical fittings & Paintings.

TASK 3: Preparation of Abstract Estimate for a single storey residential building

TASK 4: Preparation of Abstract Estimate for a two storey residential building

TASK 5: Preparation of Detailed estimate with abstract sheet of R.C.C Column with footing and R.C.C beam (work out for: cement, coarse aggregate and sand for cement concrete; % of volume of reinforcement; bar bending schedule)

TASK 6: Preparation of detailed estimate with abstract sheet for 10m long retaining wall. (Work out for: cement, coarse aggregate and sand for cement concrete; % of volume of reinforcement; bar bending schedule, cost of retaining wall per meter length

TASK 7: Preparation of estimate for slab culvert

TASK 8: Preparation of estimate for pipe culvert

TASK 9: Preparation of estimate for well foundation

TASK 10: Preparation of estimate for septic tank

Text Book(s):

1. 1B.N. Dutta [2012], Text book of Estimating and Costing in Civil Engineering, UBS Publishers, New Delhi..

2. M. Chakraborthy, Estimating, Costing, Specifications and valuation in Civil Engineering, Khanna Publications.

3. V.V.Vazirani and S.P.Chandola, Estimating & Costing in Civil Engineering, Khanna publishers, New Delhi.

Reference Book(s):

1. Agarwal, Kumar, Chaudary, Civil Estimating, Costing, and Valuation in Civil Engineering, Dhanpat Rai Publications.

2. G.S.Biridie, Estimation and costing, Dhanpat Rai Publications.

3. Mahajan, Text book of Estimating and costing, UBS Publications.

4. A.P. Dept, Standard Specifications and Standard schedule of rates – Public Work Department .

5. Rangwala, Estimation and costing, UBS Publications

DEPARTMENT OF CIVIL ENGINEERING

LIST OF R21 IV YEAR – VIII SEM SUBJECTS

S.No	Subjects from department of CIVIL	Sem/Branch	Category
1	Project work, seminar and internship	VIII Sem CIVIL	PC