UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY (U.I.E.T)
UNIVERSITY OF JAMMU
DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS
FOR
B.TECH. CIVIL ENGINEERING
(3rd to 8th SEMESTER)
Batch 2018 Onwards

B.Tech Civil Engineering Third Semester Exam To Be Held in the year 2019,2020,2021,2022

SCHEME OF EXAMINATIONS (Semester -III) Civil Engineering

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major	Minor	Practical	Total	
1	BS - 302	Mathematics - III	2:1:0	3	3	100	50	-	150	3
2	ES-301C	Energy Science And Engineering	2:0:0	2	2	75	25	-	100	3
3	ES-302	Introduction to Solid Mechanics	2:1:0	3	3	100	50	-	150	3
4	CE-301	Introduction to Fluid Mechanics	2:1:0	3	3	100	50	-	150	3
5	CE-302	Surveying	2:1:0	3	3	100	50	-	150	3
6	CE-303	Elements of Civil Engineering	3:0:0	3	3	100	50	-	150	3
7	CE-304	Surveying Lab	0:0:2	2	1	-	-	50	50	3
8	CE-305	Fluid Mechanics Lab	0:0:2	2	1	-	-	50	50	3
9	MOOC-01	Massive Open Online Courses(MOOCs)	0:0:2	2	1	-	50	-	50	-
		Total	**13:4:6**	**23**	**20**	**575**	**325**	**100**	**1000**	

B.Tech Civil Engineering Third Semester Exam (BS-302) To Be Held in the year 2019,2020,2021,2022

Semester	III						
Category	Basic Science Course						
Course code	BS – 302						
Course title	**Mathematics –III**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT I

Laplace Transform

Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms, LT of unit step function, Impulse function, Periodic function, Initial value theorem, Final value theorem, Convolution theorem, Application of LT to solve linear differential equations and convolution type integral equations.

UNIT II

Fourier Transform

Integral transforms and Fourier Integrals Fourier integral theorem, Fourier sine and cosine Integrals, and their inverses.

UNIT III

Special Functions

Special functions Legendre polynomials, Rodgrigue's formula, Recurrence formulae, generating function, orthogonality of legendre polynomials, Bessel function of Ist kind recurrence formulae, generating function, Orthogonality of Bessel function.

UNIT IV

Boolean Algebras

Boolean Algebras, Lattices, Finite Boolean algebra, C.N.F and D.N.F, Application of Boolean algebra to switching theory.

BOOKS RECOMMENDED:

01. Higher Engineering Mathematics B.S. Grewal, Khanna Publications, New Delhi
02. Boolean Lattices V.K. Khanna
03. Engineering Mathematics-III Dr. Bhopinder Singh, Malhotra Brothers, Jammu,2019

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Third Semester Exam (ES-301C) To Be Held in the year 2019,2020,2021,2022

Semester	III						
Category	Engineering Science Course						
Course code	ES-301C						
Course title	**Energy science And Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	0	0	75	25	100	2

Unit-I

Energy Resources

Energy and Development, Units and Measurements, Conventional and Non-Conventional Sources of Energy, Fossil and Mineral Energy Resources, Details of Coal, Peat, Oil, Natural Gas and Nuclear Resources, Recovery of Fossil Fuels, Classification and Characterization of Fossil fuels, Basic of Solar, Wind, Bio, Hydro, Tidal, Ocean Thermal and other Renewable Energy Sources, Impact of Energy on Environment.

Unit-II

Energy Conversion Systems

Direct and indirect way of Energy Conversion, Principles of heat and mass transfer, Thermodynamics, Fluid static and dynamics, Electricity generation, distribution and use, Basic of Solar Thermal Conversion, Basic of Wind Energy Conversion, Wind electric generator,Basics of hydropower, Tidal and Wave power, Basics of Hydrogen fuel.

Unit-III

Power System Engineering

Types of power plants, thermal power stations, various components of thermal power stations, power plant cycles, fuel handling, combustion, waste disposal methodologies, economizers, hydroelectric power plant, operation and maintenance methodologies, elements of nuclear power stations, reactor design, fuel, moderator, coolant control and safety, waste disposal.

Unit-IV

Energy and Environmental Impact

Energy, Environment & Climate, Impact of Emission on Environment & Climate, Sources of emission, Types of Emissions from various sectors like industry ,power, human activities, agricultural activities,Kyoto Protocol.

B.Tech Civil Engineering Third Semester Exam (ES-301C) To Be Held in the year 2019,2020,2021,2022

Text/Reference Books:

1.O.P. Gupta, Energy Technology, Khanna Book Publishing House
2.A. Chakrabarti, Energy Engineering and Management, PHI
3.O.PJahkar, Energy Conservation in Buildings, Khanna Publications

NOTE: There shall be total eight questions, two from each unit. Each question will carry 15 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Third Semester Exam (ES-302) To Be Held in the year 2019,2020,2021,2022

Semester	III						
Category	Engineering Science Course						
Course code	ES-302						
Course title	**Introduction to Solid Mechanics**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

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Stresses and Strains:Concept of stress and strain; Type of stresses and strains; Stress-strain diagrams for ductile, brittle materials; Generalized Hooke's law; Lateral strain, Poisson's ratio and Volumetric strain; Elastic moduli and relationship between them; Bars of varying section, composite bars, thermal stresses.

Principal Stresses: Concept of principal stresses, principal strains and principal planes; Mohr circle in computation of stresses and strains; Rectangular block subjected to normal stress along and across two planes.

UNIT-II

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Shear Force and Bending Moment Diagrams: Introduction to the concept of shear force, bending moment and the sign convention; Shear force and bending moment diagrams for cantilever, simply supported and overhang beams subjected to point loads, uniformly distributed loads, uniformly varying loads, moments or their combination, point of contra flexure.

UNIT-III

Slope and deflection- Relationship between moment, slope and deflection, Macaulay's method. Use of these methods to calculate slope and deflection for determinant beams.

Columns and Struts:Stability of Columns; buckling load of axially loaded columns with various end conditions; Euler's and Rankine's formula.

UNIT-IV

Bending and Shear Stresses: Assumptions - theory of simple bending; Derivation of bending equation; Centroid and section modulus of various cross sectional shapes including rectangular, circular, I, channel, angle etc.; Determination of bending stresses, bending stress distribution across various beam sections; Determination of shear stress, shear stress distribution across various beam sections.

B.Tech Civil Engineering Third Semester Exam (ES-302) To Be Held in the year 2019,2020,2021,2022

Text/Reference Books

1. 'Elements of Strength of Materials', Timoshenko, S. and Young, D. H., DVNC, New York, USA.
2. 'Solid Mechanics', Kazmi, S. M. A., TMH, New Delhi.
3. 'Mechanics of Materials', Hibbeler, R. C., Pearson Prentice Hall.
4. 'An Introduction to the Mechanics of Solids', Crandall, S. H., N. C. Dahl, and T. J. Lardner, McGraw Hill.
5. 'Mechanics of Materials', Ferdinand P. Beer, E. Russel Jhonston Jr. and John T. D. Ewolf, TMH.
6. 'Strength of Materials', James M. Gere and Barry J. Goodno, Cengage Learning India Pvt. Ltd., New Delhi.
7. 'Strength of Materials', R. Subramanian, Oxford University Pres

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Third Semester Exam (CE-301) To Be Held in the year 2019,2020,2021,2022

Semester	III						
Category	Professional Core courses						
Course code	CE-301						
Exam Duration	**3 Hours**						
Course title	**Introduction to Fluid Mechanics**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

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; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

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

UNIT-II

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- III

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

Forces on Immersed Bodies : Deformation drag, form drag, drag lift.

B.Tech Civil Engineering Third Semester Exam (CE-301)To Be Held in the year 2019,2020,2021,2022

UNIT-IV

Dimensional Analysis and Hydraulic Similitude:
Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling, similar and distorted models.

Text/Reference Books:
1. Fluid Mechanics & Hydraulic Machines : Dr. R.K. Bansal
2. Hydraulic and Fluid Mechanic by P.N. Modi& S.M. Seth
3. Engineering Fluid Mechanics by R.J. Garde& A.G. Mirajgaoker
4. Fluid Mechanics by Douglas JF, Gasiorek JM, Swaffield JP; Pitman
5. Fluid Mechanics: Streetes VL & Wylie EB;
6. Fluid Mechanics by Potter, Cengage Learning

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Third Semester Exam (CE-302) To Be Held in the year 2019,2020,2021,2022

Semester	III						
Category	Professional Core courses						
Course code	CE-302						
Course title	**Surveying**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Introduction and principles of surveying and measurement of distance.

Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting from the Field Books and Degree of Accuracy, Tape corrections

UNIT-II

Prismatic Compass, Compass and Chain Surveying, Compass Traversing - Instruments used and procedure followed,. Closed Traverse, Correction and Plotting Errors.

Plane Table Surveying, Field Equipment, Methods of Plane Tabling, Two Point and Three Point Problems, Precautions and Accuracy in Plane Tabling.

UNIT-III

Theodolite survey: Introduction and adjustment of theodolite

Levelling definition of terms, Instruments used and field book recording, Methods of Levelling height of Instrument method and Rise and Fall method, Testing of temporary and permanent adjustments in levels, Sensitivity of Bubble Tube.

UNIT-IV

Computation of areas and volumes by different methods. Method of contouring, plotting of contours.

Introduction to Total Station and its application

B.Tech Civil Engineering Third Semester Exam (CE-302) To Be Held in the year 2019,2020,2021,2022

Text/Refernces Books

1. Duggal, S.K., Surveying Vol I & II, Tata McGraw Hill
2. Punmia, B.C., Jain, Ashok Kumar and Jain, Arun Kumar, Surveying Vol. I, II & III, Laxmi Publications
3. Agor, R., Surveying, Khanna Publishers
4. Bhavikatti, S.S. Surveying & Levelling Volume I & II

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Third Semester Exam (CE-303) To Be Held in the year 2019,2020,2021,2022

Semester	III						
Category	Professional Core courses						
Course code	CE-303						
Course title	**Elements of Civil Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Building Stones: - Origin, Classification and Engineering Properties. Essential requirements and selection of good building stones for various works in Civil Engineering. Dressed stones and their role in Export market.

Bricks: Manufacturing of bricks, Classification of bricks , Properties and uses of First Class, Second Class, Third Class and Over burnt bricks , Characteristics of good brick , Size and weight of a standard brick , Composition of brick earth , Test for burnt clay bricks, Fire bricks, its properties, uses and availability.

UNIT-II

Aggregates: Aggregates, classification of aggregates based on petrography, size, shape and textures, deleterious substances in aggregates, bulking of fine aggregates, sieve analysis, grading of aggregates, fineness modulus, Maximum size of aggregate, Flakiness and Elongation index, Crushing, Impact and Abrasion tests.

Cement: Uses of cement Composition of Portland cement ,Setting and hardening of cement , Types of cement, their properties and uses , Ordinary Portland Cement (OPC) , Rapid Hardening Cement ,High Alumina Cement , White Cement , Coloured Cement , Pozzolana Portland Cement , Sulphate Resisting Cement , Storage of Cement

UNIT-III

Mortar: Function of mortar ,, Preparation of cement mortar, lime mortar, lime cement mortar and their , Proportion of mortar for different building works Different types of sand , Bulking of Sand

Timber:- Felling of trees, growth of trees, Various Classifications of trees, Common structural Timbers. Seasoning of Timber, Defects and Decay in Timber and prevention. Processed Timber.

B.Tech Civil Engineering Third Semester Exam (CE-303) To Be Held in the year 2019,2020,2021,2022

UNIT-IV

Foundations: Different types of foundations with reference to advantage of one over the other, Foundations of different types with reference to method of construction. Foundations for special circumstance. Machine foundations.

Special Treatments in Buildings: Fire resistant, water resistant, thermal insulation, acoustical construction and anti-termite treatment in buildings.

Text/Reference Books

1. "Properties Of Concrete" by A.M.Naville
2. "Building Materials" by S K Duggal
3 Building Material by Sushil Kumar
4. Building Material by Parbin Singh

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Third Semester Exam (CE-304)To Be Held in the year 2019,2020,2021,2022

Semester	III				
Category	Professional Core courses				
Course code	CE-304				
Course title	**Surveying Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. To locate objects by chain and cross staff survey
2. To measure distance by ranging and chaining.
3. Measurement of bearing and angles with compass, adjustment of traverse by graphical method.
4. Different methods of levelling, height of instrument, rise & fall methods.
5. Measurement of horizontal and vertical angle by theodolite.
6. Plane table survey, different methods of plotting.
7. Determination of horizontal distance between two inaccessible points with theodolite.
8. Plotting of traverse using the Total Station.

B.Tech Civil Engineering Third Semester Exam (CE-305) To Be Held in the year 2019,2020,2021,2022

Semester	III				
Category	Professional Core courses				
Course code	CE-305				
Course title	**Fluid MechanicsLab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. To study of pressure measuring devices as peizometer, U-tube manometer, and pressure gauges.
2. To verify Bernoulli's Theorem
3. To determine the meta centric height of a of Floating Body under different condition.
4. To determine the coefficient of discharge of a Venturimeter.
5. To determine the coefficient of discharge of a Orifice Meter
6. To determine the coefficient of friction of different diameter pipes.
7. To estimate the minor losses as energy loss in pipe bend, sudden contraction or enlargement in pipe.
8. To determine the coefficient of discharge on rectangular and V-notches.
9. To determine the various element of a hydraulic jump.

B.Tech Civil Engineering Fourth Semester Exam To Be Held in the year 2020,2021,2022,2023

SCHEME OF EXAMINATIONS (Semester -IV) Civil Engineering

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major	Minor	Practical	Total	
1	ES-401C	Mechanical Engineering	2:1:0	3	3	100	50	-	150	3
`2	HSM-401C	Engineering Economics	2:0:0	2	2	75	25	-	1000	3
3	CE-401	Structural Analysis-I	3:1:0	4	4	100	50	-	150	3
4	CE-402	Building Planning and Construction	2:1:0	3	3	100	50	-	150	3
5	CE-403	Engineering Geology	2:0:0	2	2	75	25	-	100	3
6	CE-404	Geotechnical Engineering-I	2:1:0	3	3	100	50	-	150	3
7	CE-405	Engineering Geology Lab	0:0:2	2	1	-	-	50	50	3
8	CE-406	Material Testing and Evaluation Lab	0:0:2	2	1	-	-	50	50	3
9	MOOC-02	Massive Open Online Courses(MOOCs)	0:0:2	2	1	-	50	-	50	-
		Total	**13:4:6**	**23**	**20**	**550**	**300**	**100**	**950**	

Note: All students have to undertake the Survey Camp for 2 weeks after 4th semester which will be evaluated in 5th semester.

B.Tech Civil Engineering Fourth Semester Exam (ES-401C) To Be Held in the year 2020,2021,2022,2023

Semester	IV						
Category	Engineering Science Course						
Course code	ES-401C						
Course title	**Mechanical Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT I

Basic Concepts- Basic concepts - concept of continuum, macroscopic approach, Thermodynamic systems - closed, open and isolated. Property, state, path and process, quasistatic process, work, modes of work. Zeroth law of thermodynamics, concept of temperature and heat, the thermodynamic temperature scale, Concept of ideal and real gases.

First Law of Thermodynamics- Concepts of Internal Energy, Specific Heat Capacities, Enthalpy. Energy Balance for Closed and Open Systems, Energy Balance for Steady-Flow Systems. Steady-Flow Engineering Devices. Energy Balance for Unsteady- Flow

UNIT II

Second Law of Thermodynamics- Thermal energy reservoirs, heat engines energy conversion, Kelvin's and Clausius statements of second law, the Carnot cycle, the Carnot Theorem, the Carnot heat engine, efficiency, the Carnot refrigerator and heat pump, COP. Clausius inequality, concept of entropy, principle of increase of entropy – availability, perpetual-motion machines, reversible and irreversible processes, isentropic processes, reversible steady-flow work, Energy - a measure of work potential, including work potential of energy, reversible work and irreversibility, second-law efficiency, energy balance: closed systems and control volumes energybalance.

UNIT III

Properties of Pure Substance- Properties of pure substances. Thermodynamic properties of pure substances in solid, liquid and vapour phases. Phase rule, P-V, P-T, T-V, T-S, H-S diagrams, PVT surfaces. Thermodynamic properties of steam. Calculations of work done and heat transfer in non-flow and flow process.

Power Cycles- Vapour and combined power cycles, including the Carnot vapor cycle, Rankine cycle: the ideal cycle for vapor power, the ideal reheat. Gas power cycles, the Carnot cycle and its

value in engineering, air standard assumptions, gasoline engine Otto cycle,diesel engine cycle, gas-turbine Brayton cycle

UNIT IV

Ideal and Real Gases and Thermodynamic Relations- Gas mixtures – properties ideal and real gases. Equation of state, Avogadro's Law, Vander Waal's equation of state, Compressibility factor, T-D relations, Joule – Thomson coefficient.

Psychrometry and psychrometric charts, property calculations of air vapour mixtures. Psychrometric process – Sensible heat exchange processes. Latent heat exchange processes. Adiabatic mixing, evaporative cooling. Use of standard thermodynamic tables, Mollier diagram, Psychometric chart and Refrigerant property tables. Refrigeration cycles, including refrigerators and heat pumps, the ideal reversed Carnot vapour-compression refrigeration cycle, actual vapor-compression refrigeration cycles, gas refrigeration cycles, and absorption refrigeration systems.

Text/Reference Books:

1. Nag.P.K., "Engineering Thermodynamics", Tata McGraw-Hill, NewDelhi.
2. Cengel, Thermodynamics – AnEngineeringApproach *Tata McGraw Hill,New* Delhi.
3. Sonntag, R. E., Borgnakke, C., &Wylen, G. J. V. Fundamentals of thermodynamics: Wiley.
4. Moran, M. J., Shapiro, H. N., Boettner, D. D., & Bailey, M. Fundamentals of Engineering

1. Thermodynamics: John Wiley & Sons.

5. Jones, J. B., & Dugan, R. E. Engineering thermodynamics: PrenticeHall.
6. Potter, M. C., & Somerton, C. W. Schaum's Outline of Thermodynamics for Engineers,McGraw-HiL

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fourth Semester Exam (HSM-401C) To Be Held in the year 2020,2021,2022,2023

Semester	IV						
Category	Humanities and Social Sciences Including Management courses						
Course code	HSM-401C						
Course title	**Engineering Economics**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	0	0	75	25	100	2

UNIT I

Introduction to Economics

Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics Theory of Demand & Supply; meaning, determinants, law of demand, law of supply, equilibrium between demand & supply Elasticity; elasticity of demand, price elasticity, income elasticity, cross elasticity.

UNIT II

Theory of Production

production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical

UNIT III

Markets

meaning, types of markets & their characteristics (Perfect Competition, Monopoly, Monopolistic Completion, Oligopoly) National Income; meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP,NDP, Personal income, disposal income.

Index Number

Meaning, construction and difficulties in measurement of index number and its uses; meaning and phases of trade/business cycle.

UNIT IV

Money

meaning, functions, types, Monetary policy- meaning, objectives, tools, fiscal policy- meaning, objectives, tools Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR

Basic Economic Problems

Poverty-meaning, absolute & relative poverty, causes, measures to reduce Unemployment: meaning, types, causes, remedies Inflation; meaning, types, causes, measures to control.

B.Tech Civil Engineering Fourth Semester Exam (HSM-401C) To Be Held in the year 2020,2021,2022,2023

References/Text Books

1. K.K.Dewett Modern Economic Theory
2. H.L. Ahuja Advanced Economics Theory
3. P.N. Chopra Business Economics/Advanced Economics Theory
4. R. Paneerselvam Engineering Economics

NOTE: There shall be total eight questions, two from each unit. Each question will carry 15 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fourth Semester Exam (CE-401)To Be Held in the year ,2020,2021,2022,2023

Semester	IV						
Category	Professional Core courses						
Course code	CE-401						
Course title	**Structural Analysis-I**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	1	0	100	50	150	4

UNIT I

Statically Indeterminate Structures:
Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one redundant members using Castigliano's 2nd theorem.

UNIT-II

Slope deflection and Moment Distribution Methods:
Analysis of continuous beams & portal frames, Portal frames

UNIT-III

Column Analogy Method:
Elastic centre, Properties of analogous column, Applications to beam & frames.
Analysis of Two and Three hinged Arches:
Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Rib shortening, Axial thrust and Radial Shear force diagrams.

UNIT-IV

Unsymmetrical Bending
Introduction Centroidal principal axes of sections, Bending stresses in beam subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.
Cable and suspension Bridges:
Introduction, uniformly loaded cables, Temperature stresses, three hinged stiffening Girder and two hinged stiffening Girder.

B.Tech Civil Engineering Fourth Semester Exam (CE-401) To Be Held in the year 2020,2021,2022,2023

Text/Reference Books

(1) Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New York.
(2) Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
(3) Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
(4) Theory of Structures, Vol. I, S.P. Gupta &G.S.Pandit, Tata McGraw Hill, New Delhi.
(5) Structural Analysis-II, Bhavikatti S.S.,VikasPub.House, N.Delhi.
(6) Theory of Structures, S.Ramamrutham, DPR publishing Company
(7) Theory of Structures, B.C.Punmia, Luxmi Publication

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fourth Semester Exam (CE-402) To Be Held in the year ,2020,2021,2022,2023

Semester	IV						
Category	Professional Core courses						
Course code	CE-402						
Course title	**Building Planning And Construction**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT I

Planning Aspects & Regulations: Functional Planning of buildings: General aspects to consider for planning, bye-laws and regulations, Selection of site for building construction, Principles of planning, Orientation of building and its different elements, Components of building.

UNIT II

Masonry: Definitions of terms used in masonry, Materials used, Stone masonry, Brick masonry, Different bonds used for brick masonry, Composite masonry.
Floors and Roofs: Components of a floor, materials used for floor construction, Different types of flooring, Ground floor and upper floors, Types of roofs, Basic roofing elements and Roof coverings.

UNIT III

Doors and Windows: Location of roofs and windows, Definition of technical terms, Size of doors and windows, Door frames, Types of doors and windows, Ventilators, Fixtures and fastenings.
Damp proofing, Fire protection and Thermal insulation: Causes and effect of dampness on buildings, Materials and methods used for damp proofing; Fire hazards, Grading of buildings according to fire resistance, Fire resisting properties of common building materials, Fire resistant construction; General methods of thermal insulation and thermal insulating materials.

UNIT IV

Building Services: Integration of services in buildings - water supply & plumbing layout for a residential building - elevators & escalators - planning & installation – basic components of the electrical system for a residence - typical electrical layout diagram. Lay out of external services - water supply- sewage disposal-electrical cabling.

B.Tech Civil Engineering Fourth Semester Exam (CE-402) To Be Held in the year 2020,2021,2022,2023

Text/Reference Books:

1. Varghese P. C. **—Building Construction"**, PHI Learning Pvt. Ltd.
2. Punmia B. C., Jain A. J. and Jain A. J. **—Building Construction"**, Laxmi Publication.
3. Arora S. P. and Bindra S. P. **—The text book of Building Construction"**, DhanpatRai Publications
4. Joseph De chiara& John Callendar – **"Time saver standards for building types",** III Edition - McGraw Hill.
5. National Building Code, **—Bureau of Indian Standars**‖, New Delhi, 2005.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fourth Semester Exam (CE-403) To Be Held in the year ,2020,2021,2022,2023

Semester	IV						
Category	Professional Core courses						
Course code	CE-403						
Course title	**Engineering Geology**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	0	0	75	25	100	2

UNIT-I

Introduction:
Definition, object, scope and sub division of geology. The interior of the earth, crust, mantle and core. Importance of geology in Civil Engineering projects. Different branches of geology.

Physical Geology:
Origin of earth, external and internal geological forces causing changes, erosion of the surface of the earth. Geological work of ice, water and wind. Soil profile and its importance. Earth movement, earthquakes and volcanoes.

UNIT-II

Mineralogy and Petrology:
Definition of mineral and rocks. Classification of minerals, physical and chemical properties of minerals. Classification of rocks.

Structural Geology:
Elementary idea about outcrop, dip and strike, bedding plane, fold, fault, joint and unconformity.

UNIT-III

Geological conditions and stability of foundation sites and abutments:
Geological condition and their influence on the selection, location, type and design of dams, reservoirs, tunnels, highways, bridges. Geological definitions and aspects of landslides and Hill-slope stability.

B.Tech Civil Engineering Fourth Semester Exam (CE-403) To Be Held in the year ,2020,2021,2022,2023

UNIT-IV

Improvement of foundation rocks:
Precaution and treatment against faults, Joints and ground water (electrical and seismic methods). Retaining walls and other treatments.
Geology and environment of earth:
Engineering geology and its case study, water table, geology as a subject, flood plane deposits, deltas, waterfalls, lakes etc.Earth environment, global warming and effect.

Text/Reference Books

1. Engineering and General Geology by Prabin Singh
2. General & Engineering Geology by Dr. D.S.Arora
3. A Text Book of Geology by P.K. Mukherjee
4. Physical and General Geology by S.K.Garg
5. Introduction of Physical Geology by A.Holmes.
6. Engineering Geology by S.K Duggal.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 15 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fourth Semester Exam (CE-404) To Be Held in the year ,2020,2021,2022,2023

Semester	IV						
Category	Professional Core courses						
Course code	CE-404						
Course title	**Geotechnical Engineering-I**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT – I

Introduction: Definition of soil, Soil Formation, Soil Types, Composition, Importance of geotechnical engineering in civil engineering

Soil Properties: Basic Definitions, Three Phase Relationship, Specific Gravity, Water Content, Shape And Size, Void Ratio, Porosity, Determination Of Grain Size Distribution Of Soils, Sieve Analysis, Wet Mechanical Analysis, Hydrometric Method Of Analysis, Grain Size Distribution Curves, Degree Of Saturation, Relative Density, Consistency Of Soil, Unified Soil Classification System, IS Soil Classification System, Field Identification Test.

UNIT – II

Capillarity, Permability &Seepage: Darcy's Law And Its Validity, Seepage Velocity, Discharge Velocity, Constant And Variable Head Permea-Meter, Pumping In And Out Tests, Permeability Of Stratified Soils, Factors Affecting Permeability, Laplace's Equation, Flow Potential Flow Net And Its Properties, Different Methods Of Drawing Flow nets, Seepage Pressure, Quick Sand, Exit Gradient, Piping, Design Of Filter, Principle Of Total And Effective Stresses, Capillarity Conditions In Soil, Effective And Pore Pressures.

UNIT-III

Compaction : Mechanism Of Compaction, Objective Of Compaction, Measurement Of Compaction, Factors Affecting Compaction, Optimum Moisture Content, Standard Proctor Test, Modified Proctor Test, Effect Of Moisture Content And Compactive Effort On Dry Density, Zero Air Void Curve, Compaction Of Cohesionless Soils, Field Compaction, Field Control Of Compaction.

Consolidation: - principle of consolidation, one - dimensional consolidation, standard one-dimensional consolidation tests, normal consolidation and over consolidation ratio, pre-consolidation pressure, secondary compression, computation of ultimate settlement

B.Tech Civil Engineering Fourth Semester Exam (CE-404) To Be Held in the year ,2020,2021,2022,2023

UNIT-IV

Stress Distribution Of Soils -Boussuiesq's formula, Westergaard's formula, Comparison of the Two Point load, line load, Strip load, 2:1 method, Pressure Isobars, Stress Beneath loaded areas.

Shear Strength Of Soils: Basic Concepts, Coulumb's Equation, Box and Triaxial Shear Tests, Mohr's Circle, Mohr's Coulomb's Equation, Classification of Shear Tests on the basis of drainage conditions.

Text/Reference Books

1.	SOIL MECHANICS AND FOUNDATION ENGINEERING	V.N.S MURTHY
2.	SOIL MECHANICS & FOUNDATION ENGG.	ARORA K.R
3.	SOIL MECHANICS AND FOUNDATION ENGG.	PUNMIA B.C

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fourth Semester Exam (CE-405) To Be Held in the year 2020,2021,2022,2023

Semester	IV				
Category	Professional Core courses				
Course code	CE-405				
Course title	**Engineering Geology Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. Study of Physical properties of minerals
2. Identification of rocks forming silicate and ore minerals
3. Recognition of rocks
4. Use of clinometers compass and Burton compass for measurement dip and strike of formations.
5. Geological cross sections.
6. Study of models of geological structures and out crops patterns of different types of rocks and land forms
7. Study of geological maps
   - Showing Horizontal Beds
   - Showing Vertical Beds
   - Showing Inclined Beds
   - Showing Folded Beds
   - Showing Unconformity
   - Showing Faulted Beds

B.Tech Civil Engineering Fourth Semester Exam (CE-406) To Be Held in the year 2020,2021,2022,2023

Semester	IV				
Category	Professional Core courses				
Course code	CE-406				
Course title	**Material Testing and Evaluation Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1.Determination of physical properties of steel including strength and ductility.
2.Study of tensile and compressive stress-strain behaviour of steel.
3.Compression test on brick.
4.Development of shear stress-strain curve for steel in torsion.
5.Determination of hardness of a material by Rockwell and Brinell hardness testing machine.
6.Determination of impact strength of a material by Izod and Charpy tests.
7.Determination of bending strength of a wooden beam specimen.
8. To conduct Torsion test on a given sample. .
9. To veify the moment area theorm for slope and deflection of a given beam.
10.Study of behaviour of columns and struts with different end conditions.

B.Tech Civil Engineering Fifth Semester Exam To Be Held in the year ,2020,2021,2022,2023

SCHEME OF EXAMINATIONS (Semester -V) Civil Engineering

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major	Minor	Practical	Total	
1	HSM-501C	Professional Practice, Law & Ethics	2:0:0	2	2	75	25	0	100	3
2	CE-501	Structural Analysis-II	3:1:0	4	4	100	50	0	150	3
3	CE-502	Transportation Engineering	2:1:0	3	3	100	50	0	150	3
4	CE-503	Design of Steel Structure	2:1:0	3	3	100	50	0	150	3
5	CE-504	Geotechnical Engineering - II	3:1:0	4	4	100	50	0	150	3
6	CE-505	Hydraulic Engineering	2:1:0	3	3	100	50	0	150	3
7	CE-506	Structural Analysis Lab	0:0:2	2	1	-	-	50	50	3
8	CE-507	Geotechnical Engineering Lab	0:0:2	2	1	-	-	50	50	3
9	CE-508	Transportation Engineering Lab	0:0:2	2	1	-	-	50	50	3
10	PRO-501	Survey Camp	-	-	2	-	-	100	100	-
		Total	**14:5:6**	**25**	**24**	**575**	**275**	**250**	**1100**	

Note: All students have to undertake the Survey Camp for 2 weeks after 4th semester which will be evaluated in 5th semester.

B.Tech Civil Engineering Fifth Semester Exam (HSM-501C) To Be Held in the year 2020,2021,2022,2023

Semester	V						
Category	Humanities and Social Sciences Including Management courses						
Course code	HSM-501C						
Course title	**Professional Practice, Law & Ethics**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	0	0	75	25	100	2

UNIT-I

Professional Ethics – Definition of Ethics, Professional Ethics, Business Ethics,Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website ofInstitution of Engineers (India); Profession, Professionalism, Professional Responsibility,Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence,Deficiencies in state-of-the-art; Vigil Mechanism, Whistleblowing, protected disclosures.

UNIT-II

General Principles of Contracts Management: Indian Contract Act, 1972 and*amendments*covering General principles of contracting; Contract Formation & Law; Privacy ofcontract; Various types of contract and their features; Valid & Voidable Contracts; Prime and subcontracts; Joint Ventures & Consortium; Complex contract terminology; Tenders, Request ForProposals, Bids & Proposals; Bid Evaluation; Contract Conditions & Specifications; Critical /"Red Flag" conditions; Contract award & Notice To Proceed; Variations & Changes in Contracts; Differing site conditions; Cost escalation; Delays, Suspensions &Terminations; Time \ extensions &Force Majeure; Delay Analysis; Contract documentation; Contract Notices; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Build- Own-Operate & variations; Public- Private Partnerships; International\ Commercial Terms

UNIT-III

Engagement of Labour and Labour& other construction-related Laws:Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece rate work;

Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017

B.Tech Civil Engineering Fifth Semester Exam (HSM-501C) To Be Held in the year 2020,2021,2022,2023

UNIT-IV

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system:
Arbitration –Meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law –Arbitration and expert determination; Extent of judicial intervention; International commercialarbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision; Enforcement of foreign awards – New York and Geneva Convention Awards; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; LokAdalats.

Text/Reference Books:

1. B.S. Patil, Legal Aspects of Building and Engineering Contracts, 1974.
2. The National Building Code, BIS, 2017
3. RERA Act, 2017
4. Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset
5. NeelimaChandiramani (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications
Mumbai
6. Avtarsingh (2002), Law of Contract, Eastern Book Co.
7. Dutt (1994), Indian Contract Act, Eastern Law House
8. Anson W.R. (1979), Law of Contract, Oxford University Press
9. Kwatra G.K. (2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL
Model Law on Arbitration, Indian Council of Arbitration
10. Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co

NOTE: There shall be total eight questions, two from each unit. Each question will carry 15 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fifth Semester Exam (CE-501) To Be Held in the year 2020,2021,2022,2023

Semester	V						
Category	Professional Core courses						
Course code	CE-501						
Course title	**Structural Analysis-II**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	1	0	100	50	150	4

UNIT-I

Influence lines:
Introduction, influence lines for three hinged and two hinged arches, load position for Max. S.F. and B.M. at a section in thespan.
Influence Line for statically indeterminate Beams:
Muller-Breslau Principle, I.L. for B.M. & S.F. for continuous Beams.

UNIT-II

Rolling Loads:
Introduction, Single concentrated load, uniformly distributed load longer than span, shorter than span, two point loads,several point loads, Max. B.M. and S.F. Absolute, Max. B.M.
Fixed Arches:
Expression for Horizontal Thrust and Bending Moment at a section, Elastic centre

UNIT-III

Kani's Method:
Analysis of continuous beams and simple frames, analysis of frames with different column lengths and end conditions ofthe bottom story.

UNIT-IV

Approximate Analysis of frames:
(i) For vertical loads, (ii) for lateral loads by Portal method & Cantilever method.
Matrix Methods
Introduction, Stiffness Coefficients, Flexibility Coefficients, development of flexibility & stiffness matrices for plane frame,Global axis and local axis, analysis of plane frame, pin jointed and rigid jointed.

B.Tech Civil Engineering Fifth Semester Exam (CE-501) To Be Held in the year ,2020,2021,2022,2023

Text/ Reference Books

1. Indeterminate structures, R.L.JindalS.Chand& Co.,N.Delhi.
2. Advanced Structural Analysis-A.K.Jain, Nem Chand & Bros.,Roorkee.
3. Structural Analysis-A Unified Approach, D.S. Prakash Rao,, University Press, Hyderabad.
4. Structural Analysis-A unified classical & Matrix Approach, A.Ghali& A.M. Neville, Chapman & Hall London.
5. Theory of Structures- Vol. I&II- S.P. Gupta &G.S.Pandit, Tata McGraw Hill, N.Delhi.
6. Basic Structural Analysis – C.S. Reddy, Tata McGraw Hill, New Delhi.
7. Structural Analysis –III, Amit Raheja. Professional Publication, Ambalacantt.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fifth Semester Exam (CE-502) To Be Held in the year 2020,2021,2022,2023

Semester	V						
Category	Professional Core courses						
Course code	CE-502						
Course title	**Transportation Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Road Development And Planning: Brief history of road development, road crossSection, necessity of transportation planning, classification of roads, road patterns, planning, saturation system, highway planning in India, road development plans.
Highway Materials and Testing: Embankment, Subgrade soil, subbase and base course materials, bituminous materials, testing of soil, stone aggregates and bitumen.

UNIT-II

Highway Geometric Design: Cross section elements, camber, super elevation, sight distances, horizontal and vertical alignment, summit and valley curves
Traffic Engineering: Traffic characteristics, road user & vehicular characteristics, traffic studies, road traffic safety, traffic operations, traffic control devices, intelligent transport systems, pollution due to traffic.

UNIT-III

Design of Highway Pavements: types of pavement, Flexible pavements and theirdesign, review of old methods, CBR method, IRC:37-2001, 2012, equivalent single wheel load factor, General design consideration of Rigid Pavements, difference between Rigid and Flexible Pavements, Westergaard's Method for design of Rigid Pavements, concept for stresses due to load and temperature in rigid pavements, IRC design method (IRC:58-2002).

UNIT-IV

Construction of Roads: Construction of water bound macadam roads, bituminous Pavements, cement concrete pavements, design and construction joints in cement concrete Pavements.
Hill Roads: General considerations, alignment, geometric design and construction, drainage and maintenance problems in hill roads.

B.Tech Civil Engineering Fifth Semester Exam (CE-502) To Be Held in the year ,2020,2021,2022,2023

Text/Reference Books:-

1. Traffic Engineering and Transportation Planning — Kadiyali, L.R.
2. Highway Engineering — Khanna & Justo
3. Highway Engineering — O'flherty
4. An Introduction to Transportation Engineering and Planning — Morlok, E.R

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fifth Semester Exam (CE-503) To Be Held in the year ,2020,2021,2022,2023

Semester	V						
Category	Professional Core courses						
Course code	CE-503						
Course title	**Design of Steel Structure**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Introduction:
Loads, structural steels and their specifications, structural elements, design specifications as per IS: 800, structural layout, strength and stiffness considerations, efficiency of cross-section, safety and serviceability considerations.

Riveted/Bolted Connections:
Riveting and bolting, their types, failure of riveted joint, efficiency of a joint, design of riveted joint, concentric riveted joints, advantages and disadvantages of bolted connections, stresses in bolts.

Welded Connections:
Types of welded joints, design of welded joint subjected to axial loads, welded joints subjected to eccentric loads, simple, semi-rigid and rigid connections.

UNIT-II

Design of Tension Members:
Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

Design of Compression Members:
Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and battened columns including the design of lacing and battens, design of eccentrically loaded compression members.

UNIT-III

Design of Beams:
Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

B.Tech Civil Engineering Fifth Semester Exam (CE-503) To Be Held in the year 2020,2021,2022,2023

Cold Formed Sections:
Introduction and brief description of various types of cold formed sections, local buckling, concepts of effective width andeffective sections.

UNIT-IV

Elementary Plastic Analysis and Design:
Introduction, Scope of plastic analysis, ultimate load carrying capacity of tension members and compression members,flexural members, shape factor, mechanisms, plastic collapse, analysis, plastic analysis applied to steel beams and simpleportal frames and design.

Text/Reference Books

1) Design of steel structures, S.K.Duggal, TMH Pub., New Delhi
2) Design of steel structures, Dr.B.C.Punmia, Luxmi Publication
3) Design of steel structures, Dr. Ram Chandra, Scientific Publisher, Jodhpur
4) Design of steel structures, A.S.Arya&J.L.Ajmani, Nemchand& Bros., Roorkee.
5) Design of steel structures, M.Raghupati, TMH Pub., New Delhi.
6) Design of steel structures, S.M.A.Kazmi&S.K.Jindal, Prentice Hall, New Delhi.
7) IS:800-1984, Indian Standard Code of Practice for General Construction in Steel.
8) IS-801-1975, Indian Standard Code of Practice for Use of Cold formed light gauge steel structural members in generalbuilding construction.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fifth Semester Exam (CE-504) To Be Held in the year 2020,2021,2022,2023

Semester	V						
Category	Professional Core courses						
Course code	CE-504						
Course title	**Geotechnical Engineering-II**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	1	0	100	50	150	4

UNIT – I

Soil Exploration and Soil Sampling: Planning for sub-surface exploration, depth and spacing of exploration, methods of exploration, field testing. Geo-physical Exploration Methods: seismic refraction and electrical resistivity method.
Methods of Boring: auger boring, wash boring, percussion boring and rotary drilling. Preparation of bore-log and soil investigation report.
Soil Sampling: Disturbed and undisturbed soil samples, features of sampler affecting soil disturbance.

UNIT-II

Earth Pressure in Soils: Types of earth pressures, active and passive earth pressure, Coloumb‘s wedge theory and Culmanns graphical construction for active and passive earth pressure.

Stability of Slopes - Finite and Infinite Slopes, Stability Number, Analysis for Stability of Slopes, Various Methods, Swedish Circle Method.

UNIT-III

Shallow foundations: types of shallow foundations, factors effecting locations of foundation, design considerations of shallow foundations, foundations on expansive soils.
Bearing capacity of soil: introduction, safe bearing capacity and allowable bearing pressure, estimation of ultimate bearing capacity based on terzagis‘s theory, in-situ tests such as static and dynamic cone penetration tests. General and local shear failure conditions, bearing capacity from plate load tests.

B.Tech Civil Engineering Fifth Semester Exam (CE-504) To Be Held in the year 2020,2021,2022,2023

UNIT-IV

Deep Foundation: Types Of Deep Foundation And Load Transfer Mechanism Pile Foundation-Types Of Pile Foundation, Pile Load Carrying Capacity From Static And Dynamic Formula(ENR And Hiley), Pile Load Test, Group Action Of Piles And Negative Skin Friction.
Settlement Analysis: Causes of Settlement, Computation of Settlement, Allowable Settlement, Measures to Reduce Settlement.

Text/Reference Books:-

1. SOIL MECHANICS AND FOUNDATION ENGINEERING — V.N.S MURTHY
2. SOIL MECHANICS & FOUNDATION ENGG. — ARORA K.R
3. SOIL MECHANICS AND FOUNDATION ENGG. — PUNMIA B.C
4. PRINCIPLES OF FOUNDATION ENGINEERING — B.M DAS

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fifth Semester Exam (CE-505) To Be Held in the year 2020,2021,2022,2023

Semester	V						
Category	Professional Core courses						
Course code	CE-505						
Course title	**Hydraulic Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Laminar Flow : Navier Strokes Equations, Hagen-Poiseuille's Equation for Laminar flow in Pipes, Stokes Law, Darcy's Law.

Turbulent Flow : Characteristics, Turbulent Shear, Velocity distribution in Turbulent Flow, Commercial Pipes and their laying, Water hammer

Boundary Layer Theory : Definition and Characteristics, Laminar Boundary Layer, Turbulent Boundary Layer, Hydrodynamically Smooth and Rough Surfaces. Applications of Momentum Equation. Separation and its control.

UNIT-II

Uniform Flow in Open Channels: Characteristics of uniform flow, Chezy's and Manning's formulae, uniform flow computations, most efficient channel sections, Manning‘s roughness coefficient and equivalent roughness.

Depth-Energy Relationships: Specific energy, specific force, specific energy and specific force diagrams, critical depth, critical flow computations.

UNIT-III

Gradually Varied Flow: Theory and analysis of gradually varied flow in prismatic channels, classification of surface profiles.

Rapidly Varied Flow in Open Channels: Theory of hydraulic jump, application of momentum equation to hydraulic jump in rectangular channel - length, height and location of jump in rectangular channel. Energy dissipation.

UNIT-IV

Pumps : Classification, Reciprocating Pumps, Rotodynamic Pumps, Velocity diagram, Specific speed.

B.Tech Civil Engineering Fifth Semester Exam (CE-505) To Be Held in the year ,2020,2021,2022,2023

Turbines : Impulse Turbines, Pelton Wheel, Reactions Turbines, Francis Turbine, Kaplan Turbine, Selection of Turbine.

Text/Reference Books:

1.	Fluid Mechanics and Hydraulic Machinery	Dr. R.K Bansal
2.	Open Channel Flow	K. Subramanya
3.	Open Channel Flow	RangaRaju
4.	Fluid Mechanics & Machinery	Modi& Seth
5.	Hydraulic Machines	Dr.JagdishLal

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Fifth Semester Exam (CE-506) To Be Held in the year ,2020,2021,2022,2023

Semester	V				
Category	Professional Core courses				
Course code	CE-506				
Course title	**Structural Analysis Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. Experiment on a two hinged arch for horizontal thrust & influence line for Horizontal thrust
2. Experimental and analytical study of a 3-bar pin-jointed Truss.
3. Experimental and analytical study of deflections for unsymmetrical bending of a Cantilever beam.
4. Begg'sdeformeter- verification of Muller Breslau principle.
5. Experimental and analytical study of an elastically coupled beam.
6. Determine the Forces in members of redundant frames.
7. Sway in portal frames - demonstration.
8. To find value of flexural rigidity (EI) for a given beam and compare it with theoretical value.

B.Tech Civil Engineering Fifth Semester Exam (CE-507) To Be Held in the year ,2020,2021,2022,2023

Semester	V				
Category	Professional Core courses				
Course code	CE-507				
Course title	**Geotechnical Engineering Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. To determine water content of the soil by oven drying method
2. To determine specific gravity of soils by pycnometer.
3. To determine omc and mdd of soil by Proctor's test.
4. To determine bulk density of soil by core cutter method.
5. To determine bulk density of soil by sand replacement method.
6. To determine gradation of soil by sieve analysis.
7. To determine gradation of soil by hydrometer analysis.
8. To perform liquid limit and plastic limit test.
9. To perform shrinkage limit test.
10. Unconfined compression Test
11. Direct Shear Test.

B.Tech Civil Engineering Fifth Semester Exam (CE-508) To Be Held in the year ,2020,2021,2022,2023

Semester	V				
Category	Professional Core courses				
Course code	CE-508				
Course title	**Transportation Engineering Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. To determine the toughness of the aggregate by aggregate Impact Test.
2. To determine the hardness of the aggregate by Los-Angeles Abrasion Test.
3. To determine the hardness of the aggregate by Dorry's Abrasion Test on Aggregates.
4. To determine the hardness of the aggregate by Deval Attrition Test on Aggregates.
5. To determine the Crushing Strength Test on Aggregates.
6. To determine the grade and hardness of the bitumen by Penetration Test.
7. To determine the elastic property of the bitumen by Ductility Test.
8. To determine the grade and hardness of the bitumen by Viscosity Test.
9. To determine the Softening Point Test on Bitumen.
10. To determine the Flash and Fire Point Test on Bitumen.

B.Tech Civil Engineering Fifth Semester Exam (PRO-501) To Be Held in the year ,2020,2021,2022,2023

Semester	V				
Category	Project Work				
Course code	PRO-501				
Course title	**Survey Camp**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	-	-	-	100	2

Use of all the important Surveying Instruments shall be made over the entire duration of Survey Camp, for preparation of :

1. Site Plan of the Area.
2. Location of roads and important Installations.
3. Leveling of the area to determine the difference of altitudes, at specified location
4. Preparation of Contour Map of the prescribed area.

NOTE: The site for the Survey Camp shall be selected by the College and duration of the Survey Camp shall be of at-least two weeks. Normally the camp shall be conducted after 4th Semester concludes (Summer Vacations).

B.Tech Civil Engineering Sixth Semester Exam To Be Held in the year 2021,2022,2023,2024

SCHEME OF STUDIES/EXAMINATIONS (Semester -VI) Civil Engineering

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major	Minor	Practical	Total	
1	CE-601	Irrigation Engineering	2:1:0	3	3	100	50	-	150	3
2	CE-602	Design of Concrete Structure	2:1:0	3	3	100	50	-	150	3
3	CE-603	Environmental Engineering	2:1:0	3	3	100	50	-	150	3
4	OECE-I	Open Elective-I	3:0:0	3	3	100	50	-	150	3
5	PECE-I	Program Elective-I	3:0:0	3	3	100	50	-	150	3
6	PECE-II	Program Elective-II	3:0:0	3	3	100	50	-	150	3
7	CE-604	Environmental Engineering Lab	0:0:2	2	1	-	-	50	50	3
8	CE-605	Irrigation Engineering Drawing	0:0:2	2	1	-	-	50	50	3
		Total	**15:3:4**	**22**	**20**	**600**	**3000**	**100**	**1000**	

B.Tech Civil Engineering Sixth Semester Exam To Be Held in the year 2021,2022,2023,2024

OPEN ELECTIVE-I

Sl. No	Code No.	Subject	Semester	Credits
1.	OECE-61	Cyber Law and Ethics	VI	3
2.	OECE-62	Human Resourse Development and Organizational Behaviour	VI	3
3.	OECE-63	Automation in Manufacturing	VI	3

PROGRAM ELECTIVE-I

Sl. No	Code No.	Subject	Semester	Credits
1.	PECE-61	Concrete Tehnology	VI	3
2.	PECE-62	Solid and Hazardous waste Management	VI	3
3.	PECE-63	Hydro Electric Power Development	VI	3

PROGRAM ELECTIVE-II

Sl. No	Code No.	Subject	Semester	Credits
1.	PECE-64	Repair & Rehabilitation of Structures	VI	3
2.	PECE-65	Construction Engineering & Management	VI	3
3.	PECE-66	Energy Efficient Buildings	VI	3

B.Tech Civil Engineering Sixth Semester Exam (CE-601) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Core courses						
Course code	CE-601						
Course title	**Irrigation Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Irrigation: Irrigation, need, advantages and disadvantages and sources of irrigation. Irrigation methods, surface and subsurface method, pressurized irrigation, drip, sprinkler and lift irrigation.

Design procedure for Irrigation Channels, Stable Channel Design. Water Logging and its control. Lining of Channels and Drainage.

UNIT-II

Soil-Water Relationship: Field capacity, permanent wilting point, evapotranspiration and consumptive use, measurements, crop and cropping seasons, assessment of crop water requirement, net irrigation requirement, duty and delta relationship.

Irrigation Outlets: Classes of outlets. Non modular outlets. Types of Semi Modules, Rigid Modules.

UNIT-III

Storage Head Works: Types of dams, gravity dam - selection of site, forces acting on dams, drainage gallery, joints in dams, elementary profile, limiting height of gravity dam, high and low dam, practical profile of a high gravity dam, design methods and design by gravity analysis only; arch dam, design methods, design by cylinder theory only; spillways and their types.

UNIT-IV

Diversion Head Works: Components, layout, design of surface and subsurface weirs and canal head regulator.

Canal Falls: Types of canal falls, Design of Sarda type and glacis falls.

B.Tech Civil Engineering Sixth Semester Exam (CE-601) To Be Held in the year 2021,2022,2023,2024

Text/Reference Books :-

1.	Irrigation Engineering & Hydraulic Structures	Garg, S.K.
2.	Irrigation (Practice & Design)	Khushalani, K.B
3.	Theory and Design of Irrigation Structures	Varshney, R.S. & Gupta
4.	Irrigation Engineering & Hydraulic Structures	Sahasrabudhe, S.R.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (CE-602) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Core courses						
Course code	CE-602						
Course title	**Design of Concrete Structure**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Elementary treatment of concrete technology:
Physical requirements of cement, aggregate, admixture and reinforcement, Strength and durability, shrinkage and creep. Design ofconcrete mixes, Acceptability criterion, I.S. Specifications

Design Philosophies in Reinforced Concrete:
Working stress and limit state methods, Limit state v/s working stress method, Building code, Normal distribution curve, characteristicstrength and characteristics loads, design values, Partial safety factors and factored loads, stress -strain relationship for concrete andsteel.

UNIT-II

Working Stress Method:
Basic assumptions, permissible stresses in concrete and steel, design of singly and doubly reinforced rectangular and flanged beamsin flexure, steel beam theory, inverted flanged beams, design examples.

Limit State Method:
Basic assumptions, Analysis and design of singly and doubly reinforced rectangular flanged beams, minimum and maximumreinforcement requirement, and design examples.

UNIT-III

Analysis and Design of Sections in shear bond and torsion:
Diagonal tension, shear reinforcement, development length, Anchorage and flexural bond, Torsional, stiffness, equivalent shear,Torsional reinforcement, Design examples.

Columns and Footings:
Effective length, Minimum eccentricity, short columns under axial compression, Uniaxial and biaxial bending, slender columns,Isolated and wall footings, Design examples

B.Tech Civil Engineering Sixth Semester Exam (CE-602) To Be Held in the year 2021,2022,2023,2024

UNIT-IV

Concrete Reinforcement and Detailing:

Requirements of good detailing cover to reinforcement, spacing of reinforcement, reinforcement splicing, Anchoring reinforcing bars inflexure and shear, curtailment of reinforcement.

One way and Two Ways Slabs:

General considerations, Design of one way and two ways slabs for distributed and concentrated loads, Nonrectangular slabs,openings in slabs, Design examples.

Text/ Reference Books:

1. Design of Reinforced Concrete Structures,P.Dayaratnam,Oxford& IBH Pub.,N.Delhi.
2. Reinforced Concrete-Limit State Design, A.K.Jain, Nem Chand & Bros.,Roorkee.
3. Reinforced Concrete, I.C.Syal&A,K,Goel, A.H,Wheeler&Co.Delhi.
4. Reinforced Concrfete Design, S.N.Sinha, TMH Pub.,N.Delhi.
5. SP-16(S&T)-1980, 'Design Aids for Reinforced Concrete to IS:456, BIS, N.Delhi.
6. SP-34(S&T)-1987 'Handbook on Concrete Reinforcement and Detailing', BIS, N.Delhi.
7. Reinforced Concrete Design – Pillai and Menon, TMH, New Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (CE-603) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Core courses						
Course code	CE-603						
Course title	**Environmental Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Water Quantity:
Importance and necessity of water supply scheme. Water demands and its variations. Estimation of total quantity of waterrequirement. Population forecasting. Quality and quantity of surface and ground water sources. Selection of a source ofwater supply. Types of intakes.

UNIT-II

Water Quality:
Impurities in water and their sanitary significance. Physical, chemical and bacteriological analysis of water. Water qualitystandards.

UNIT-III

Water Treatment:
Objectives, treatment processes and their sequence in conventional treatment plant, sedimentation – plain and aided withcoagulation. Types, features and design aspects. Mixing basins and Flocculation units. Filtration – mechanism involved,types of filters, slow and rapid sand filtration units (features and design aspects). Disinfection principles and aeration.

UNIT-IV

Water Distribution:
Distribution system – Gravity system, Pumping System, Dual system, Layout of Distribution System – Dead End System,Grid Iron System, Ring System, Radial System, their merits and demerits. Distribution Reservoir-functions & determinationof storage capacity.

Text/ RefferenceBooks:

1. Water Supply and Sewerage: E.W. Steel.
2. Water Supply Engineering: S.R. Kshirsagar.
3. Water Supply Engineering: S.K. Garg.
4. Water Supply Engineering: B.C. Punmia.
5. Manual on Water Supply and Treatment: Ministry of Urban Dev., New Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (OECE-61) To Be Held in the year 2021,2022,2023,2024

OPEN ELECTIVE – I

Semester	VI						
Category	Open Elective courses						
Course code	OECE-61						
Course title	**Cyber Law and Ethics**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy. Introduction to the Legal Perspectives of Cybercrimes and Cyber security, Cybercrime and the Legal Landscape around the World, Why Do We Need Cyber laws.

UNIT-II

The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Cybercrime and Punishment, Cyber law, Technology and Students: Indian Scenario.

UNIT-III

Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Rightsource of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Losing.

UNIT-IV

Ethics, Legal Developments, Cyber security in Society, Security in cyber laws case studies, General lawand Cyber Law-a Swift Analysis

Text/Reference Books:

1. SunitBelapure and Nina Godbole, Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives, Wiley India Pvt. Ltd, 2011.
2. Mark F Grady, FransescoParisi, “The Law and Economics of Cyber Security”, Cambridge University Press, 2006
3. Jonathan Rosenoer, “Cyber Law: The law of the Internet”, Springer-Verlag, 1997

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (OECE-62) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Open Elective courses						
Course code	OECE-62						
Course title	**Human Resourse Development and Organizational Behaviour**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

HRD – Features, objectives and benefit of HRD.
Learning – Learning process – reinforcement of learning, role of punishment – behavior modification – Perception Mechanism and its application in organization.

UNIT-II

Type of Training Apprentership training within Industry vestibule training, supervisory and Management, development E learning, class room lectures, Conferences, Seminars, out bound learning.
Career planning and development – concept, stages, career planning, process, development Programme.
Stress management – types of stress, coping with stress, Sources – functional and dysfunctional aspects.

UNIT-III

OB: Learning objectives, Definition & Meaning, Why to study OB, An OB model, New challenges for OB Manager
PERSONALITY: Meaning & Definition, Determinants of Personality, Personality Traits, Personality & OB PERCEPTION: Meaning & Definition, Perceptual process, Importance of Perception in OB MOTIVATION: Nature & Importance, Herzberg's Two Factor theory, Maslow's Need Hierarchy theory, Alderfer's ERG theory

UNIT-IV

COMMUNICATION: Importance, Types, Barriers to communication, Communication as a tool for improving Interpersonal Effectiveness
GROUPS IN ORGANISATION: Nature, Types, Why do people join groups, Group Cohesiveness & Group Decision Making managerial Implications, Effective Team Building

B.Tech Civil Engineering Sixth Semester Exam (OECE-62) To Be Held in the year 2021,2022,2023,2024

LEADERSHIP: Leadership & management, Theories of leadership- Trait theory, Behavioural Theory, Contingency Theory, Leadership & Followership, How to be an Effective Leader
CONFLICT: Nature of Conflict & Conflict Resolution.

Books for Reference

1. HRM -Dwivedi R.S
2. HRM - Sheswani and Khana
3. HRM -KishoriLal
4 Organizational BehaviorRobbins, S. P/ Judge, T. A/ Sanghi, S.
5 Organizational BehaviorChandan, J. S

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (OECE-63) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Open Elective courses						
Course code	OECE-63						
Course title	**Automation in Manufacturing**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT – I

INTRODUCTION: Types and strategies of automation, automation in machine tools, mechanical feeding and tool changing and machine tool control.

UNIT – II

AUTOMATED FLOW LINES: Methods of part transport, transfer mechanism, buffer storage, control function, design and fabrication considerations. Analysis of automated flow lines - General terminology and analysis of transfer lines without and with buffer storage, partial automation, implementation of automated flow lines.

UNIT – III

AUTOMATED MATERIAL HANDLING and STORAGE SYSTEMS: Types of equipment, functions, analysis of material handling systems, conveyor systems, automated guided vehicle systems. Automated storage and retrieval systems; work in process storage, interfacing handling and storage with manufacturing.

UNIT – IV

AUTOMATED INSPECTION: Fundamentals, types of inspection methods and equipment, Coordinate Measuring Machines, Machine Vision.

Text/ Reference Books

1. Automation, Production Systems and Computer Integrated Manufacturing : M.P. Groover./ PE/PHI.
2. Computer Control of Manufacturing Systems by YoramCoren.
3. Systems by YoramCoren.
4. Automation by W. Buekinsham.

B.Tech Civil Engineering Sixth Semester Exam (OECE-63) To Be Held in the year 2021,2022,2023,2024

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (PECE-61) To Be Held in the year 2021,2022,2023,2024

PROGRAMELECTIVE-I

Semester	VI						
Category	Professional Elective courses						
Course code	PECE-61						
Course title	**Concrete Technology**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Concrete and its ingredients: Properties of cement, aggregate, admixture, water and other additives; Related Indian Standard codes & guidelines.

Concrete behaviour in fresh and hardened states:Workability, Elasticity, Shrinkage, Creep, Fatigue, Strength in compression, tension, shear and bond; Influence of various factors on test results; Concrete cracking and type of cracks; Permeability and durability characteristics of concrete including resistance to sulphate& acid attack, alkali-aggregate reaction, freezing and thawing; Fire resistance.

UNIT II

Production of concrete:Mixing, handling, placing, compaction of concrete and related issues; Quality control; Behaviour in extreme environmental conditions like hot weather, cold weather and under water conditions.

Concrete mix design: Basic considerations, proportioning of material, effect of various parameters, trial mixes, Design by IS code.

UNIT III

Inspection and testing of concrete:Defects in concrete; Deterioration of concrete; Strength tests including compressive, split tensile, flexural, pullout etc.; Durability tests including permeability, carbonation, rapid chlorine ion penetration etc.; Destructive and Non-destructive testing of concrete; Acceptance and compliance requirements of concrete as per IS codes.

UNIT IV

Special concretes: Types and specifications; Fibre reinforced and steel reinforced concrete; Polymer concrete; Light weight concrete, High strength concrete, Prestressed concrete, Self Compacting Concrete, Pervious Concrete, Self Healing Concrete.

B.Tech Civil Engineering Sixth Semester Exam (PECE-61) To Be Held in the year 2021,2022,2023,2024

Text/Reference Books

1. 'Properties of Concrete', A. M. Neville, Prentice Hall
2. 'Concrete Technology', M. S. Shetty, S.Chand& Co.
3. 'Concrete Technology', M. L. Gambhir, Tata McGraw Hill Publishers, New Delhi
4. 'Concrete Technology', A. R. Santha Kumar, Oxford University Press, New Delhi

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (PECE-62) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Elective courses						
Course code	PECE-62						
Course title	**Solid and Hazardous waste Management**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

NATURE OF SOLID WASTES: Definition of solid waste, Industrial mining, Agricultural and domestic (urban) waste, Waste generation in Technological societies, Major legislations, Monitoring responsibilities, Sources & types of solid wastes, Sampling & characterization, Composition of MSW, Storage, Handling & future changes in waste composition
Municipal Solid Waste Management – Fundamentals Sources; composition; generation rates; collection of waste; separation, transfer and transport of waste; treatment and disposal options

UNIT-II

COLLECTION & TRANSPORT OF SOLID WASTE : Collection of solid wastes, Types of solid wastes collection systems, Analysis of collection systems, Alternative Techniques for collection systems, Collection & Transformation of solid wastes, Unit operations used in separating and processing material recovery facility, Need for transfer operations, Transport means and methods, Transfer stations types & design.

UNIT-III

SOLID WASTE DISPOSAL: Sanitary landfill- planning, Site selection, Design and operation, Aerobic landfill stabilization, Biological oxidation, Composting, Vermicomposting, Pyrolysis, Incineration & Energy Recovery, Bioremedial Waste categorization, Land reclamation – pre & post project land use planning, Physical, Chemical & Biological reclamations.

UNIT-IV

HAZARDOUS WASTE MANAGEMENT: Definition & identification of Hazardous Wastes, Sources & Characteristics of hazardous wastes, Hazardous waste in municipal waste, Hazardous waste regulations & legislations, Minimization of Hazardous wastes, Handling & storage of Hazardous wastes, Landmark episodes

B.Tech Civil Engineering Sixth Semester Exam (PECE-62) To Be Held in the year 2021,2022,2023,2024

HAZARDOUS WASTE TREATMENT: Hazardous Waste Treatment technologies, Physical, chemical & thermal methods of stabilizations, Solidification, Chemical Fixation & encapsulation, Incineration of Hazardous waste landfills, Reclamation of Hazardous waste landfill sites.

Text/Reference Books:

1. Solid wastes : Engineering Principles & Management Issues, Tchobanglous G, Thesien GH, Eliassen R, McGraw Hill Int. ED, Singapore, 1977
2. Solid waste management, Montell CL, John Willey, NY, 1975
3. Environmental engineering, Peavy HS, Rowe D R
4. Technobanglus G, Thesien GH, McGraw Hill Int. ED, Singapore, 1985
5. Hazardous waste management, Lagrega MD, Buckingham PL, Evans JV, McGraw Hill Int. Ed. NY, 2001 6. Biremediation Principles, Eweie JB, Ergas SJ, Chang DYP & Schroder ED, McGraw Hill Int. Ed. Singapore, 1988

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (PECE-63) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Elective courses						
Course code	PECE-63						
Course title	**Hydro Electric Power Development**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Introduction:
Sources of power, estimation of water power, necessity and importance of harnessing small hydro power, flow duration and power duration curves, load curve, load factors, capacity factors, utilization factors, firm and secondary power.

Types of Hydro Power Plants:
Elements of Hydro power, classification of hydro-power plants, run-of-river plants, storage plants diversion canal development, pumped storage plants, tidal power plants, base load and peak load plants in a power grid.

UNIT-II

Intakes:
Intake structures, functions and their types, components of intakes-forebay, trash racks, gates and valves, force required to operate gates.

Conveyance System:
Penstocks, design criterion, economical diameter anchor blocks, cradles and footings, water hammer, instantaneous closure of power canal, surge tank, surges in canals.

UNIT-III

Turbines:
Types of turbines, specific speed and classification of turbines, synchronous speed, scroll casing, flumes and draft tubes, dimensions of scroll sassing and draft tubes, setting of turbines

UNIT-IV

Power House: General layout and arrangements of hydro-power number and size of units, sub-structure, spacing of super-structure, underground power stations, tidal power.

B.Tech Civil Engineering Sixth Semester Exam (PECE-63) To Be Held in the year 2021,2022,2023,2024

Text/Reference Books :

1. Water Power Engineering, Dandekar, M.M. Sharma, K.N.
2. Hydro-Electric Engineering Practice Vol. I, II & III Brown
3. Water Power Engineering, Borrows, H.K.
4. Water Power Development, Vol. I & II, Mosonyi, E.
5. Water Power Engineering, M.M. Deshmukh.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (PECE-64) To Be Held in the year 2021,2022,2023,2024

PROGRAM ELECTIVE-II

Semester	VI						
Category	Professional Elective courses						
Course code	PECE-64						
Course title	**Repair & Rehabilitation of Structures**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Aging of structures – performance of structures – need for repair and rehabilitation – Distress in
concrete / steel structures, Causes of distress, Damage assessment and Evaluation models evaluation methods for condition, strength, serviceability

UNIT-II

Damage testing methods, Non Destructive testing methods, Semi destructive testing and Destructive test methods,

UNIT-III

Methods of repairs - Repair and maintenance of buildings, Repair materials, repair techniques, and quality control methods for repair of concrete, masonry, steel and timber.

UNIT-IV

Retrofit techniques required in structures resulting from change in function, loading, and seismic
forces, retrofit of foundations, base isolation and energy dissipation, Retrofit of Historical and heritage buildings.

Text/Reference Books:

1. Handbook of seismic retrofit of buildings, CPWD, IBC and IIT Madras, Narosa Publishing.
2. Seismic design, assessment and retrofitting of concrete buildings by Michael N. FardisSpringer
3 Repairs of Concrete Structures, by Allen, R.T. and Edwards, S. C., Blakie and Sons, UK

B.Tech Civil Engineering Sixth Semester Exam (PECE-64) To Be Held in the year 2021,2022,2023,2024

4. Maintenance and repair of Civil Structures, B L Gupta and Amit Gupta, Standard Publishers,

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (PECE-65) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Elective courses						
Course code	PECE-65						
Course title	**Construction Engineering and Management**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Construction Management
Significance, objectives and functions of construction management, types of constructions, resources for construction industry, stagesfor construction, construction team, engineering drawings.

Construction Contracts & Specifications
Introduction, types of contracts, contract document, specifications, important conditions of contract, arbitration.

UNIT-II

Construction Planning
Introduction, work breakdown structure, stages in planning-pre-tender stages, contract stage, scheduling, scheduling by bar charts,preparation of material, equipment, labour and finance schedule, limitation of bar charts, milestone charts.

Construction Organization
Principles of Organization, communication, leadership and human relations, types of Organizations, Organization for construction firm,site organization, temporary services, job layout.

UNIT-III

Network Techniques in Construction Management-I: CPM
Introduction, network techniques, work break down, classification of activities, rules for developing networks, network developmentlogicof network, allocation of time to various activities, Fulkerson's rule for numbering events, network analysis , determination ofproject schedules, critical path, ladder construction, float in activities, shared float, updating, resources allocation, resourcessmoothing and resources leveling.

Network Techniques in Construction Management-II-PERT
Probability concept in network, optimistic time, pessimistic time, most likely time, lapsed time, deviation, variance, standard deviation,slack critical path, probability of achieving completion time, central limit theorem.

B.Tech Civil Engineering Sixth Semester Exam (PECE-65) To Be Held in the year 2021,2022,2023,2024

UNIT-IV

Cost-Time Analysis

Cost versus time, direct cost, indirect cost, total project cost and optimum duration, contracting the network for cost optimization, stepsin time cost optimization, illustrative examples.

Inspection & Quality Control

Introduction, principles of inspection, enforcement of specifications, stages in inspection and quality control, testing of structures,statistical analysis.

Text/Reference Books :

1. Construction Planning & Management by P.S.Gehlot&B.M.Dhir, Wiley Eastern Ltd.
2. PERT & CPM -Principles & Applications by L.S.Srinath. Affiliated East-west Press (P)Ltd.
3. Project Planning & Control with PERT & CPM by B.C.Punmia&K.K.Khandelwal,Lakshmi Pub. Delhi
4. Construction Management & Planning by B.sengupta&H.Guha, Tata McGraw -Hills.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (PECE-66) To Be Held in the year 2021,2022,2023,2024

Semester	VI						
Category	Professional Elective courses						
Course code	PECE-66						
Course title	**Energy Efficient Buildings**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Introduction: Fundamentals of energy - Energy Production Systems - Heating, Ventilating and airconditioning –Solar Energy and Conservation - Energy Economic Analysis - Energy conservation and audits -Domestic energy consumption - savings -Energy use in buildings - Residential - commercial buildings.

Environmental: Energy and Resource conservation - Design of green buildings - Evaluation toolsfor building energy - Embodied and operating energy - Peak demand - Comfort and Indoor air quality - Visual and acoustical quality - Land, water and materials - Airborne emissions and waste management.

UNIT II

Design:

Natural building design consideration - Energy efficient design strategies - Contextual Factors - Longevity and process Assessment -Renewable energy sources and design.

Services: Energy in building design - Energy efficient and environment friendly building– Thermal phenomena - thermal comfort - Indoor Air quality - Climate, sun and Solar radiations.

UNIT III

Energy audit:

Types of energy audit - Analysis of results - Energy flow diagram – Energyconsumption/ Unit production - Identification of wastage -Priority of conservative measures - Maintenance of management programme.

B.Tech Civil Engineering Sixth Semester Exam (PECE-66) To Be Held in the year 2021,2022,2023,2024

UNIT IV

Energy Management:

Energy management of electrical equipment - Improvement of power factor, management of maximum demand - Energy savings in pumps - Fans - Compressed air systems Energy savings in Lighting systems - Air conditioning systems - Applications.

Text/ Reference Books

1. Moore F., Environmental Control System McGraw Hill, Inc., 1994.
2. Brown, G Z, Sun, Wind and Light: Architectural design strategies, John Wiley, 1985.
3. Cook, J, Award - Winning passive Solar Design, McGraw Hill, 1984.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Sixth Semester Exam (CE-604) To Be Held in the year 2021,2022,2023,2024

Semester	VI				
Category	Professional Core courses				
Course code	CE-604				
Course title	**Environmental Engineering Lab**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

LIST OF EXPERIMENTS

1. Determination of chlorides Color, ph and turbidity.
2. Determination of chlorides Total Solids, Suspended Solids and Dissolved Solids.
3. Determination of chlorides of Water.
4. Determination of Iron and Manganese in Water.
5. Determination of hardness of water.
6. Determination of B.O.D. of Sewage.
7. Determination of C.O.D. of domestic and industrial sewage.
8. Determination of volatile, mixed, filtrable and dissolved solids.
9. Measurement of SO_2 in ambient air.
10. Measurement of Particulate matter in air.

B.Tech Civil Engineering Sixth Semester Exam (CE-605) To Be Held in the year 2021,2022,2023,2024

Semester	VI				
Category	Professional Core courses				
Course code	CE-605				
Course title	**Irrigation Engineering Drawing**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	2	50	1

1. Drawing of Irrigation Channel with the data provided by the Department. The drawings shall include Longitudinal Section and Cross Section, showing all important details.
2. Drawing of a weir or a barrage with the data provided by the department. The students shall be required to furnish hydraulic and structural design.
3. Drawing of a cross drainage work with the given data.
4. Drawing of a earthen dam with the given data.

B.Tech Civil Engineering Seventh Semester Exam To Be Held in the year ,2021,2022,2023,2024

SCHEME OF EXAMINATIONS (Semester -VII) Civil Engineering

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major	Minor	Practical	Total	
1	CE-701	Hydrology and Water Resource Engineering	2:1:0	3	3	100	50	-	150	3
2	OECE-II	Open Elective - II	3:0:0	3	3	100	50	-	150	3
3	PECE-III	Program Elective - III	3:0:0	3	3	100	50	-	150	3
4	PECE-IV	Program Elective - IV	3:0:0	3	3	100	50	-	150	3
5	PRO-701	Minor Project	0:0:8	8	4	-		100	100	-
6	SEM-701	Seminar on Summer Internship	1:0:0	1	1	-	50	-	50	-
7	MOOC-03	Massive Open Online Courses(MOOCs)	0:0:2	2	1	-	50	-	50	-
		Total	**12:1:10**	**23**	**18**	**400**	**300**	**100**	**800**	

NOTE : The student have to carry out the MINOR Project either from Transportation Engineering, Hydraulic Engineering and Geotechnical Engineering.

B.Tech Civil Engineering Seventh Semester Exam To Be Held in the year ,2021,2022,2023,2024

OPEN ELECTIVE - II

Sl. No	Code No.	Subject	Semester	Credits
1.	OECE-71	Metro Systems and Engineering	**VII**	3
2.	OECE-72	Industrial Management	VII	3
3.	OECE-73	Production and Operation Management	VII	3

PROGRAM ELECTIVE-III

Sl. No	Code No.	Subject	Semester	Credits
1.	PECE-71	Environmental Impact Assessment	VII	3
2.	PECE-72	Foundation engineering	VII	3
3.	PECE-73	Industrial Waste Water Treatment	VII	3

PROGRAM ELECTIVE-IV

Sl. No	Code No.	Subject	Semester	Credits
1.	PECE-74	Railway Engineering	VII	3
2.	PECE-75	River Engineering	VII	3
2.	PECE-76	Ground Water Engineering	VII	3

B.Tech Civil Engineering Seventh Semester Exam (CE-701) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Professional Core courses						
Course code	CE-701						
Course title	**Hydrology and Water Resource Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Introduction: Hydrologic cycle, climate and water availability, water balances.
Precipitation and Evaporation: Precipitation— forms, classification, variability, measurement, data analysis, evaporation and its measurement, evapotranspiration and its measurement, Penman Monteith method.

UNIT-II

Infiltration: Factors affecting infiltration, estimation- Horton‘s equation and Green Ampt method, infiltration Indices.
Hyetograph and Hydrograph Analysis: Runoff — drainage basin characteristics, hyetograph and hydrograph concepts, assumptions and limitations of unit hydrograph, derivation of unit hydrograph, S-hydrograph, flow duration curve.

UNIT-III

Reservoirs: Types or reservoir, site selection, geological investigations, zones of storage, safe yield, reservoir capacity, reservoir sedimentation and control.
Hydrologic Analysis: Design flood, flood estimation, frequency analysis, flood routing through reservoirs and open channels.

UNIT-IV

Ground Water Hydrology: Zones of underground water, aquifers, aquifer parameters — porosity, specific yield, permeability, transmissibility and storage coefficient. Darcy's law, determination of discharge through unconfined and confined aquifers with steady flow conditions, Well hydraulics, types of wells, well construction and well development.

B.Tech Civil Engineering Seventh Semester Exam (CE-701) To Be Held in the year ,2021,2022,2023,2024

Drought Management and Water Harvesting: Definition of drought, causes, measures for water conservation and augmentation, drought contingency planning, water harvesting — rainwater collection, small dams, runoff enhancement, runoff collection, ponds, tanks.

Text/Reference Books

1. Engineering Hydrology K. Subramanya,
2. Hydrology And Water Resources Engineering T.K Sharma
3. Hydrology And Water Resources Engineering S.K Garg

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (OECE-71) To Be Held in the year 2021,2022,2023,2024

OPEN ELECTIVE-II

Semester	VII						
Category	Open Elective courses						
Course code	OECE-71						
Course title	**Metro Systems and Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

GENERAL: Overview of Metro Systems; Need for Metros; Routing studies; Basic Planning and
Financials
CIVIL ENGINEERING-Overview and construction methods for: Elevated and underground Stations; Viaduct spans and bridges; Underground tunnels; Depots; Commercial and Service buildings. Initial Surveys & Investigations; Basics of Construction Planning & Management, Construction Quality & Safety Systems. Traffic integration, multimodal transfers and pedestrian
facilities; Environmental and social safeguards; Track systems-permanent way. Facilities Management

UNIT-II

ELECTRONICS AND COMMUNICATION ENGINEERING- Signaling systems; Automatic fare collection; Operation Control Centre (OCC and BCC); SCADA and other control systems; Platform Screen Doors.

UNIT-III

MECHANICAL & TV + AC: Rolling stock, vehicle dynamics and structure; Tunnel Ventilation
systems; Air conditioning for stations and buildings; Fire control systems; Lifts and Escalators

UNIT-IV

ELECTRICAL: OHE, Traction Power; Substations- TSS and ASS; Power SCADA; Standby and Back-up systems; Green buildings, Carbon credits and clear air mechanics.

B.Tech Civil Engineering Seventh Semester Exam (OECE-71) To Be Held in the year 2021,2022,2023,2024

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (OECE-72) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Open Elective courses						
Course code	OECE-72						
Course title	**Industrial Management**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Entrepreneurship: Definition and types, Difference Between Intrapreneur&Entrepreneur, Qualities of good Entrepreneurs-Role of Entrepreneurs in the economic development of a country, Functions of entrepreneur, Factors affecting entrepreneurship, Entrepreneurship as a career option for technocrats in India, Schemes and policies for entrepreneurship development. Women Entrepreneur: Classification of Women Entrepreneur in India, Problems of Women Entrepreneur, steps for promoting women entrepreneurship.
Legal Forms of Industrial Ownership: Sole Proprietorship. Partnership. Joint Stock Company

UNIT II

Industrial Development in India after Independence: Industrial Policy of the Five-Year Plans, Industrial Policy (1956, 1977, 1991), Need for Economic Reforms and their Assessment, Multi-National Corporations (MNCs) - Concept, Merits & Demerits of MNCs
Industrial Relations: Workers participation in management: Meaning, Objectives & Forms, TradeUnion: Objectives, Functions, Present Position, and Weakness Industrial Conflict: Sources and managing conflict, Collective Bargaining: Meaning, Process, Essential conditions for effective bargaining

UNIT III

Management: Meaning, definition, Characteristics, Importance & Functions of Management, Management Theories – Taylor's Scientific Management Theory & Henry Fayol's Administrative Management Theory. MBO – Definition, Features, Process, Advantages & Limitations of MBO.
Departmentation& Delegation of Authority: Meaning, Importance, Basis or pattern ofDepartmentation, Delegation of Authority: Meaning, Characteristics, Importance, Process, Obstacles/ Barriers to effective delegation of authority, Authority Relationships - Line Organization, Line &Staff **.**

B.Tech Civil Engineering Seventh Semester Exam (OECE-72) To Be Held in the year ,2021,2022,2023,2024

UNIT IV

Personnel Management & Decision Making: Meaning, Objectives, Characteristics, Principles &Functions of Personal department. Decision making- Meaning, Importance & Steps in Decision Making.

Wage Administration & Job Enrolment: Concept of Wages, Characteristics of good wage, Factors affecting wages, Methods of wage payments. Job Evaluation-Objectives, Principles &Methods of job evaluation.

Text/Reference Books:-

1. "Principles of Management", by George Terry & Stephen G. Franklin.
2. "Essentials of Management", by Harold Koontz & Heinz.
3. "Industrial Engineering & Production Management", M. Mahajan.

"Business Organisation& Management", Dr. B. P. Singh & Dr. T. N. Chhabra

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (OECE-73) To Be Held in the year ,2021,2022,2023,2024

Semester	VII						
Category	Open Elective courses						
Course code	OECE-73						
Course title	**Production and Operation Management**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Introduction: System concept of production;Principles of good product design, tolerance design; quality and cost considerations; Product life cycle; Types and characteristics ofproduction system; Productivity; Process and product focused organization structures;standardization, value engineering and analysis; Management decisions – strategic, tactical and operational.
Forecasting: Patterns of a time series – trend , cyclical, seasonal and irregular; Forecasting techniques : moving average, simple exponential smoothing, linear regression; Forecasting a time series with trend and seasonal component.

UNIT II

Materials Management and Inventory Control: Components of materials management; Inventory control : EOQ model, Economic lot size model, Inventory model with planned shortages, Quantity discounts for EOQ model; ABC analysis; Just-in-time inventory management.
Machine Scheduling: Concept of Single machine scheduling – shortest processing time (SPT)rule to minimize mean flow time, Earliest due date (EDD) rule to minimize maximum lateness,Total tardiness minimizing model; Minimizing makespan with identical parallel machines;Johnson's rule for 2 and 3 machines scheduling.

UNIT III

Quality Assurance: Meaning of Quality; Quality assurance system; choice of process and quality; Inspection and control of quality; Maintenance function & quality; Process control charts : x-chart and R-chart, p-chart and c-chart; Acceptance sampling : Operating characteristic(O.C) curve, Single sampling plan, Double sampling plan, Acceptance sampling by variables;
concept of Six Sigma.
Reliability and Maintenance: Reliability, availability and maintainability; distribution of failure

and repair times; determination of MTBF and MTTR, reliability models; system reliability.

UNIT IV

Work System Design: Taylor's scientific management, Gilbreths's contributions; productivity – concepts and measurements; method study, micro-motion study, principles of motion economy; work measurement – stop watch time study, work sampling, standard data, PMTS; ergonomics; job evaluation, merit rating, incentive schemes, and wage administration.
Operation Research: Linear programming – problem formulation, simplex method, duality and sensitivity analysis; transportation and assignment models; simple queuing models.

Text/Reference Books:

1. Modern Production/Operations Management, 8th ed.by Buffa and Sarin, John Wiley & Sons.
2. Production and Operations Management by R. Panneerselvam, PHI.
3. Operations Management by Russell & Taylor, 4th ed.' PHI.
4. Production and Operations Management by Adam and Ebert, PHI.
5. Industrial engineering and management by OP Khana, Dhanpatrai publications.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PECE-71) To Be Held in the year ,2021,2022,2023,2024

PROGRAMELECTIVE-III

Semester	VII						
Category	Professional Elective courses						
Course code	PECE-71						
Course title	**Environmental Impact Assessment**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-1

Evolution of environmental impact assessment (EIA), EIA at project,regional and policy levels,strategic EIA, EIA process, screening and scoping criteria,rapid and comprehensive EIA,specialized areas - environmental health impact assessment and environmental risk analysis. Economic valuation methods and cost-benefit analysis.

UNIT-II

Practical applications of EIA, EIA methodologies and baseline data collection.

UNIT-III

Prediction and assessment of impacts on physical, biological and socio-economic environment. Environmental management plan, post project monitoring, EIA report and EIS, review process.

UNIT-IV

Case studies on project, regional and sectoral EIA, legislative and environmental clearance procedures in India and other countries, siting criteria, CRZ, public participation, resettlement and rehabilitation.

Reference/Text Books :

1. Introduction To Environmental Impact Assessment : P.Morris
2. Environmental Assessment : R.K Jain, L.V Urbran
3. Introduction to Environmental Impact Assesment:J. Glasson

B.Tech Civil Engineering Seventh Semester Exam (PECE-71) To Be Held in the year ,2021,2022,2023,2024

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PECE-72) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Professional Elective courses						
Course code	PECE-72						
Course title	**Foundation Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Selection of foundation and Sub-soil exploration/investigation:
Types of foundation, Factors affecting the selection of type of foundations, steps in choosing types of foundation based on soil condition, Objectives and planning of exploration program, methods of exploration-wash boring and rotary drilling-depth of boring, soil samples and soil samplers-representative and undisturbed sampling, field penetration tests: SPT, SCPT, DCPT. Introduction to geophysical methods, Bore log and report writing, data interpretation.

UNIT-II

Shallow Foundation:
Introduction, significant depth, design criteria, modes of shear failures.Detail study of bearing capacity theories (Prandtl, Rankine, Terzaghi, Skempton), bearing capacity determination using IS Code, Presumptive bearing capacity. Settlement, components of settlement & its estimation, permissible settlement, Proportioning of footing for equal settlement, allowable bearing pressure. Bearing capacity from in-situ tests(SPT, SCPT, PLATE LOAD), Factors affecting bearing capacity including Water Table., Bearing capacity of raft/mat foundation as per codal provisions, Contact pressure under rigid and flexible footings. Floating foundation. Types of pavements & its design.

UNIT-III

Pile foundations :
Introduction, load transfer mechanism, types of piles and their function, factors influencing selection of pile, their method of installation and their load carrying characteristics for cohesive and granular soils, piles subjected to vertical loads- pile load carrying capacity from static formula,dynamic formulae (ENR and Hiley), penetration test data & Pile load test (IS 2911). Pile group: carrying capacity, efficiency and settlement. Negative skin friction

UNIT-IV

Retaining walls : Types (types of flexible and rigid earth retention systems: counter fort, gravity, diaphragm walls, sheet pile walls, soldier piles and lagging)

B.Tech Civil Engineering Seventh Semester Exam (PECE-72) To Be Held in the year ,2021,2022,2023,2024

Text/Reference Books:

1) P. Purushothama Raj; Soil Mechanics and Foundation Engineering; Pearson Education.
2) B.C. Punamia; Soil Mechanics & Foundation Engineering; Laxmi Pub. Pvt. Ltd., Delhi.
3) Alamsingh; Soil Mechanics & Foundation Engineering; CBS Publishers & Distributors, Delhi
4) Taylor D.W.; Fundamentals of Soil Mechanics; Asia Publishing House, Mumbai
5) V. N. S. Murthy; Soil Mechanics & Foundation Engineering; SaiKripa Technical Consultants, Banglore

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PECE-73) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Professional Elective courses						
Course code	PECE-73						
Course title	**Industrial Waste Water Treatment**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Effects of industrial wastes on streams, sewerage systems and wastewater treatment plants.

UNIT-II

Minimizing the effects of industrial effluents on waste water treatment plants and receiving streams-conservation of water, process change, reuse of waste water, volume reduction, strength reduction, neutralization, equalization and proportioning.

UNIT-III

Population equivalent. Industrial effluent standards for disposal into inland surface water sources and on land for irrigation.

UNIT-IV

Study of the following Industries from waste generation, quality and its treatment including brief overview of manufacturing process:
Textile, tannery, sugar mill, distillery, dairy, pulp & paper, metal plating, oil refinery, nitrogenous fertilizers, thermal power plants and radio active wastes.

Text/Reference Books:

1. Industrial and Hazardous Waste Treatment by N.L.Nemerow&A.Dasgupta.
2. Industrial Effluents by N.Manivasakam.
3. Waste Water Treatment by M.N.Rao&A.K.Dutta.

B.Tech Civil Engineering Seventh Semester Exam (PECE-73) To Be Held in the year ,2021,2022,2023,2024

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PECE-74) To Be Held in the year ,2021,2022,2023,2024

PROGRAMELECTIVE-IV

Semester	VII						
Category	Professional Elective courses						
Course code	PECE-74						
Course title	**Railway Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT – I

Introduction: Modes of transportation, universal scenario and Indian railways, railway track development, Grades and Curve Compensation, Coning of Wheel and Canting of Rails, component parts, gauge, wheel and axle arrangement

UNIT – II

Resistances and Stresses: Various resistances and their evaluation, hauling capacity, tractive effort, locomotives and their classification, stresses in the track and its components.

UNIT-III

Component parts and design of railway track: Rails and their requirements, creep and wear in rails, rail joints, long welding rails and short welded rails, types of sleepers and their merits and demerits, requirements of ballast, design of ballast section, track fastenings, check rails and guard rails, railway cross-section, various types of gradients, Degree of a Curve, Maximum Degree of a Curve, Branching of Curvesdesign of horizontal curves, transition curves and vertical curves, Superelevation (Cant).

UNIT-IV

Points and Crossings and Signals: Working and design of a turnout, types of track junctions, design of crossover and diamond crossing, types of signals and their functions, interlocking, advanced methods of train control. High speed rails.

Text/Reference Books :

1. Railway Engineering Sexena and Arora

B.Tech Civil Engineering Seventh Semester Exam (PECE-74) To Be Held in the year 2021,2022,2023,2024

2.	Railway Track Design	Antia K.F.
3.	Railway Engineering	Satish Chandra

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PECE-75) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Professional Elective courses						
Course code	PECE-75						
Course title	**River Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Introduction, classification of Rivers, Mechanics of alluvial rivers including channel and flood plain features, Sediment transport and budgets, River morphology and various classification schemes.

UNIT-II

Behaviour of Rivers: Introduction, River Channel patterns, Straight river channels, causes, characteristics and shapes of meanders and control, cutoff, Braided Rivers, Bed forms, Instability of rivers, Hydraulic geometry, Delta formation and control.

UNIT-III

Mechanics of Alluvial Rivers, Rivers and restoration structures, Socio-cultural influences and ethics of stream restoration
Bio-engineering Techniques, Classification review, Natural Channel Design Analysis, Time Series, Analysis of flow, Sediment and channel geometry data.

UNIT-IV

River Training and Protection Works: Introduction, Classification of River Training, Types of training works, Protection for Bridges with reduced waterway, Design of Guide Band, embankment and spurs/dampners and other river/ flood protection works

Reference/Text Book:

1. River Behaviour Management and Training (Vol. I & II), CBI&P, New Delhi.
2. Irrigation & Water Power Engineering- B. C. Punmia and Pande B. B. Lal.
3. River Engineering by Margeret Peterson

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PECE-76) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Professional Elective courses						
Course code	PECE-76						
Course title	**Ground Water Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Properties of Aquifers, Formation constants, compressibility of aquifers, Equation of motion forsteady and unsteady ground water flow in isotropic homogeneous aquifers, Dupit's assumptions. Unconfined flow with a recharge, tile drain problem. Ground water exploration and methods of investigations.

UNIT-II

Effect of Boundaries, interference of water, leaky aquifers, Thiem's equilibrium formula forunconfined and confined aquifers and determination of hydraulic properties of aquifers. Partial penetration of an aquifer by a well, spherical flow in a well. Non equilibrium formula for aquifer (unsteady radial flows).

UNIT-III

Tubewells, optimum capacity, silting of tubewell, design of Tubewells in different aquifers,tubewell types, parts, bore hole, strains, its types, well pipe, causing pipe, blind pipe. Construction and working of tubewells, site selection, drilling operation, cable tool method, hydraulic method, rivers Rotary Method and drilling fluids, well screen assembly installation, verticality and alignment of tubewells, gravel packing, development of tubewells, sickness, in construction and corrosion and failure of tubewells, Pumping equipment and hydraulic testing of pumps.

B.Tech Civil Engineering Seventh Semester Exam (PECE-76) To Be Held in the year 2021,2022,2023,2024

UNIT-IV

Artificial Recharge of Ground Water, considerations and methods, recharge techniques inducedinfiltration, water spreading, flooding, basins, ditching, modification of natural channels, irrigation, recharge pits, shafts and recharge wells.

Text/Reference Books:

1 Groundwater Hydrology, D.K. Todd, John Wiley &Songs Inc. New York.
2 Groundwater H.M. Raghunath, Wiley Eastern Ltd., N.Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Seventh Semester Exam (PRO-701) To Be Held in the year 2021,2022,2023,2024

Semester	VII				
Category	Project Work				
Course code	PRO-701				
Course title	**Minor Project**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	8	100	4

The students will have to work on a project during 7th semester. The topic of the project shall have to be approved by the concerned teacher and should be relevant to the field of Civil Engineering. This require complete literature survey, design, fabrication, simulation of some models and/or some preliminary laboratory experiments etc.

Distribution of Marks

Distribution of Marks as per University statues:

Total Marks for End semester Evaluation = 100 marks

1) Presentation/ Demonstration = 30 marks 30%
2) Viva-voce = 30 marks 30%
3) Actual work done = 40marks 40%

Award of Marks

Marks under (1) and (2) will be awarded by the Departmental committee constituted, comprising of convener and at least two members.
Marks under (3) will be awarded by the Project Guide/supervisor concern.

NOTE : The student have to carry out the MINOR Project either from Transportation Engineering, Hydraulic Engineering and Geotechnical Engineering.

B.Tech Civil Engineering Seventh Semester Exam (SEM-701) To Be Held in the year 2021,2022,2023,2024

Semester	VII						
Category	Project Work						
Course code	SEM-701						
Course title	**Seminar on Summer Internship**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	1	0	0	-	50	50	1

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Civil Engineering in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the concern HOD for evaluation.

Guidelines for evaluation of Practical Training:

Each student shall be evaluated individually by the departmental committee during the lecture allotted for this seminar, so that by the end of 7^{th} semester each student has been evaluated. The committee shall have a convener and at least two members.

Distribution of Marks as per the University statues:

Total Marks for Evaluation		= 50 marks	
i)	Report	= 20	40%
ii)	Viva-Voce	= 15	30%
iii)	Miscellaneous Marks	= 15	30%

Due weightage will be given to those who have opted for Industrial Training outside the State as well as keeping in view the profile of that Industry.

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

B.Tech Civil Engineering Eighth Semester Exam To Be Held in the year 2022,2023,2024,2025

SCHEME OF EXAMINATIONS (Semester -VIII) Civil Engineering

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major	Minor	Practical	Total	
1	CE-801	Engineering Economics, Estimation & Costing	3:0:0	3	3	100	50	-	150	3
2	OECE-III	Open Elective-III	3:0:0	3	3	100	50	-	150	3
3	PECE-V	Program Elective-V	3:0:0	3	3	100	50	-	150	3
4	PECE-VI	Program Elective-VI	3:0:0	3	3	100	50	-	150	3
5	PRO-801	Major Project	0:0:12	12	6	-	-	200	200	-
		Total	**14:0:12**	**26**	**18**	**400**	**200**	**200**	**800**	

Note: The student have to carry out the MAJOR Project either from Structural Engineering, Environmental Engineering and Water Resource Engineering.

B.Tech Civil Engineering Eighth Semester Exam To Be Held in the year ,2022,2023,2024,2025

OPEN ELECTIVE - III

Sl. No	Code No.	Subject	Semester	Credits
1	OECE-81	Economic Policies in India	VII	3
2	OECE-82	Fundamentals of Management	VIII	3
2	OECE-83	Air and Noise Pollution control	VIII	3

PROGRAM ELECTIVE-V

Sl. No	Code No.	Subject	Semester	Credits
1.	PECE-81	Prestress Concrete	VIII	3
2.	PECE-82	Elements of Earthquake Engineering	VIII	3
2.	PECE-83	Bridge Engineering	VIII	3

PROGRAM ELECTIVE-VI

Sl. No	Code No.	Subject	Semester	Credits
1.	PECE-84	Wastewater Treatment	VIII	3
2.	PECE-85	Traffic Engineering and Management	VIII	3
2.	PECE-86	Geosynthetics Engineering	VIII	3

B.Tech Civil Engineering Eighth Semester Exam (CE-801) To Be Held in the year ,2022,2023,2024,2025

Semester	VIII						
Category	Professional Core courses						
Course code	CE-801						
Course title	**Engineering Economics, Estimation & Costing**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	2	1	0	100	50	150	3

UNIT-I

Estimate:

Principles of estimation, units, items of work, different kinds of estimates, different methods of estimation, estimation of materials in single room building, two roomed building with different sections of walls, foundation, floors and roofs, R.B. and R.VC.C. works, Plastering, White-washing, Distempering and painting, doors and windows, lump sum items, Estimates of canals, roads etc.

UNIT-II

Specification of Works:

Necessity of specifications, types of specifications, general specifications, specification for bricks, cement, sand, water, lime, reinforcement; Detailed specifications for Earthwork, Cement, concrete, brick work, floorings, D.P.C., R.C.C., cement plastering, white and colour washing, distempering, painting.

UNIT-III

Rate Analysis:

Purpose, importance and requirements of rate analysis, units of measurement, preparation of rate analysis, procedure of rate analysis for items:- Earthwork, concrete works, R.C.C. works, reinforced brick work, plastering, painting, finishing(white-washing, distempering).

UNIT-IV

Public Works Account:

Introduction, function of P.W. department, contract, guidelines, types of contracts, their advantages and disadvantages, Tender and acceptance of tender, Earnest money, security money, retention money, performance guarantee, secured advance, mobilization advance, measurement book, cash book, preparation, examination and payment of bills, first and final bills, administrative sanction, technical sanction. Maintenance of muster ROLL precaution filling preparation of pay bill, measurement of book for payment of contractors, different types of payment, first & final, running advance and final payment

B.Tech Civil Engineering Eighth Semester Exam (CE-801) To Be Held in the year 2022,2023,2024,2025

Text/Reference Books

1. Estimating & Costing in Civil Engg..: Theory & Practice by B.N.Dutta, S.Dutta& Co., Lucknow.
2. Civil Estimating and Costing by A.K Upadhyay, S.K Kataria& Sons, Daryaganj, New Delhi
3. Estimating, Costing & Specification in Civil Engg. byM.Chakarborty, Calcutta.
4. Estimating and Costing for Building & Civil Engg.Works by P.L.Bhasin, S.Chand& Co., N.Delhi.
5. Building Construction Estimating by George H.Cooper, McGraw Hill Book Co., New York

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (OECE-81) To Be Held in the year 2022,2023,2024,2025

OPEN ELECTIVE-III

Semester	VIII						
Category	Open Elective courses						
Course code	OECE-81						
Course title	**Economic Policies in India**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Framework of Indian Economy

National Income: Trends and Structure of National Income , Demographic Features and Indicators of Economic Growth and Development Rural-Urban Migration and issues related to Urbanization, Poverty debate and Inequality, Nature, Policy and Implications , Unemployment-Nature, Central and State Government's policies, policy implications, Employment trends in Organized and Unorganized Sector.

UNIT-II

Development Strategies in India

Agricultural- Pricing, Marketing and Financing of Primary Sector , Economic Reforms Rationale of Economic Reforms, Liberalization, Privatization and Globalization of the Economy Changing structure of India's Foreign Trade, Role of Public Sector- Redefining the role of Public Sector, Government Policy towards Public Sector, problems associated with Privatization, issues regarding Deregulation-Disinvestment and future of Economic Reforms.

UNIT-III

The Economic Policy and Infrastructure Development

Energy and Transport, Social Infrastructure- Education, Health and Gender related issues, Social Inclusion , Issues and policies in Financing Infrastructure Development, Indian Financial System- issues of Financial Inclusion, Financial Sector Reforms-review of Monetary Policy of R.B.I. Capital Market in India.

UNIT-IV

The Economic Policy and Industrial Sector

Industrial Sector in Pre-reforms period, Growth and Pattern of Industrialization, Industrial Sector in Post-reform period- growth and pattern of Micro, Small, Medium Enterprises ,

problems of India's Industrial ExportsLabour Market- issues in Labour Market Reforms and approaches to Employment Generation

Text/Reference Books:

• Brahmananda, P.R. and V.A. Panchmukhi.[2001], Ed. 'Development Experience in Indian Economy, Inter-state Perspective,' Bookwell, New Delhi.
• Gupta,S.P.[1989],'Planning and Development in India: A Critique,' Allied Publishers Private Limited, New Delhi.
• Bhagwati, Jagdish.[2004],'In Defense of Globalization,' Oxford University Press, U.K.
• Dhingra, Ishwar //C.[2006],'Indian Economy,' Sultan Chand and Sons, New Delhi.
• Datt, Ruddar and Sundaram, K.P.M.[Latest edition] ,'Indian Economy,' S. Chand and Co, New Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (OECE-82) To Be Held in the year ,2022,2023,2024,2025

Semester	VIII						
Category	Open Elective courses						
Course code	OECE-82						
Course title	**Fundamental of Management**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Introduction to Management: Meaning, Definition, nature, importance & Functions, Management as Art, Science & Profession- Management as social System, Concepts of management-Administration Evolution of Management Thought: Development of Management Thought- Scientific management, Administrative Theory of Management, Bureaucratic Organization, Behavioral approach (Neo Classical Theory): Human Relations Movement; Behavioral Science approach; Modern approach to management – Systems approach and contingency approach.

UNIT-II

Planning: nature, purpose and functions, types of plans, planning process, Strategies and Policies: Concept of Corporate Strategy, formulation of strategy, Types of strategies, Management by objectives (MBO), SWOT analysis, Types of policies, principles of formulation of policies 4. Organizing: nature, importance, process, organization structure: Line and Staff organization, Delegation of Authority and responsibility, Centralization and Decentralization, Decision Making Process , Decision Making Models, Departmentalization: Concept and Types (Project and Matrix), formal & informal organizations

UNIT-III

Staffing: concept, process, features; manpower planning; Job Analysis: concept and process; Recruitment and selection: concept, process, sources of recruitment; performance appraisal, training and development Directing: Communication- nature, process, formal and informal, barriers to Effective Communication, Theories of motivation-Maslow, Herzberg, McGregor ; Leadership – concept and theories, Managerial Grid, Situational Leadership. Transactional and Transformational Leadership

B.Tech Civil Engineering Eighth Semester Exam (OECE-82) To Be Held in the year 2022,2023,2024,2025

UNIT-IV

Controlling: concept, process, types, barriers to controlling, controlling Techniques: budgetary control, Return on investment, Management information system-MIS , TQM-Total Quality Management, Network Analysis- PERT and CPM. Recent Trends in Management: - Social Responsibility of Management–Management of Crisis, Total Quality Management, Stress Management, ., Concept of Corporate Social Responsibility (CSR) and business ethics. Functional aspects of business: Conceptual framework of functional areas of management-Finance; Marketing and Human Resources

Reference/Text Books

1. Management Concepts - Robbins, S.P; Pearson Education India
2. Principles of Management - Koontz &O'Donnel; (McGraw Hill)

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (OECE-83) To Be Held in the year 2022,2023,2024,2025

Semester	VIII						
Category	Open Elective courses						
Course code	OECE-83						
Course title	**Air And Noise Pollution Control**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Sources Of Air Pollution Stationary and mobile, fugitive emissions, secondary pollutants; Effects of air pollution in regional and global scale, air pollution episodes; Emission factors inventory and predictive equations.
Atmospheric Meteorology Wind profiles, turbulent diffusion, topographic effects, separated flows, temperature profiles in atmosphere, stability, inversions, and plume behavior

UNIT-II

Air Quality Monitoring Objectives, time and space variability in air quality; air sampling design, analysis and interpretation of air pollution data, guidelines of network design in urban and rural areas.Stack monitoring. Air pollution standards and indices. Dispersion of air pollutants and modeling, Basic concepts, inversion layer and mixing height, atmospheric stability classes, theory and application of acoustic sounding (SODAR) technique. Boxmodel, The Gaussian dispersion model point, area and line sources. Prediction of effective stack height physics of plume rise, Holland‟s equation, Briggs equation, etc. modifications of Gaussian dispersion models; indoor air quality models. Air pollution control devices.

UNIT-III

Effects Of Air Pollution And Air Monitoring Instruments:
Human health, plants, animals and microbes, archeological monuments and aesthetics, Orsat apparatus, Respirable dust sampler and source monitors.

UNIT-1V

Noise Pollution: Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psycho-acoustics and noise criteria, effects of noise on health, annoyance rating schemes; special noise environments: Infra-sound, ultrasound, impulsive

sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices.

Reference/Text Books

1. Environmental Engineering – Arcadio P. Sincero and Gregoria A. Sincero, Prentice Hall of India, 1999. 2. Environmental Pollution Control Engineering- CS Rao, Wiley Eastern Ltd., New Delhi, 1996.
3. Environmental Noise Pollution – PE Cunniff, McGraw Hill, New York, 1987.
4. Handbook of Noise Measurement – APG Peterson & EE Gross PH, Englewood cliffs New Jersey, latest edition.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (PECE-81) To Be Held in the year 2022,2023,2024,2025

PROGRAM ELECTIVE- V

Semester	VIII						
Category	Professional Elective courses						
Course code	PECE-81						
Course title	**Prestress Concrete**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Introduction: Basic concepts of prestressing, terminology, advantages and applications ofprestressedconcrete.Materials for Prestressed Concrete: High strength Concrete, permissible stresses in concrete, high strength steel, permissible stresses in steel. **Prestressing Systems**: Prestensioning and post tensioning systems, various types of tensioning devices, Lec-Macall systems, MagnelBlaton post tensioning, Freyssinet systems, Gifford Udal system.

UNIT II

Losses of Prestress: Types of losses of prestress, loss due to elastic deformation of concrete, lossdue to shrinkage of concrete, loss due to creep of concrete, loss due to relaxation of stress in steel, loss due to friction, loss due to anchorage slip, total loss in pretensioned and post tensioned members. **Analysis of Prestress and Bending stresses**: Basic assumptions, resultant stresses at a section, concept of load balancing, cracking moment.

UNIT III

Deflections: Factors influencing deflections, short term deflections of un-cracked members,deflections of cracked members, prediction of long term deflections.
Shear and TorsionalResistance: Ultimate shear resistance of prestressed concrete members, prestressed concretemembers in torsion, design of reinforcements for torsion, shear and bending.

B.Tech Civil Engineering Eighth Semester Exam (PECE-81) To Be Held in the year 2022,2023,2024,2025

UNIT IV

Design of Flexural Members : Dimensioning of flexural members, design of pre-tensioned andpost tensioned beams, design of partially prestressed members, design of one way and two way slabs, continuous beams.Design for axial tension, compression and bending, bond and bearing.

Text/Reference Books

1. Prestressed Concrete by N. Krishna Raju, TMH Publishing Company, New Delhi,
2. Prestressed Concrete by P. Dayartnam, Oxford and IBH Publication, New Delhi.
3.Design of PrestressedConcreet Structures by T Y Lin& Ned H. Burns

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (PECE-82) To Be Held in the year ,2022,2023,2024,2025

Semester	VIII						
Category	Professional Elective courses						
Course code	PECE-82						
Course title	**Elements of Eartquake Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Seismology: Introduction, plate tectonics, earthquake distribution & mechanism, seismicity,seismic wave, earthquake magnitude & intensity, seismic zoning &seismometry.
Single degree of freedom systems: Various types of dynamic loads, vibration of single degree offreedom system, free or forced vibrations, types of damping, critical damping, transmissibility, vibration measuring instruments, response spectrum.

UNIT-II

Multi-degree of Freedom (MDOF) systems: Equation of motion, normal modes & naturalfrequencies, semi-definite systems, dynamic vibration absorbers, vibration dampers, principle of orthogonally, Stodolas method, Holzer's method, matrix method, modal analysis & its limitations, Mode superposition method.

UNIT-III

Seismic Analysis and Design: General principles, assumptions, Seismic coefficient method,response spectrum method, strength and deflection, design criterion for structures, significance of ductility, codal provisions, and design examples.

UNIT-IV

Seismic performance, Repair and strengthening: Methods for assessing seismic performance,influence of design ductility and masonry infills, criterion for repair and strengthening techniques and their applications, addition of new structural elements.
Vibrational control: General features of structural control, base isolation, active and paasivecontrol system, earthquake resistance design as per IS: 1893, IS: 4326 and: 13920.

B.Tech Civil Engineering Eighth Semester Exam (PECE-82) To Be Held in the year 2022,2023,2024,2025

Text/Reference Books:

1) Elements Of Earthquake of Engineering, Jai Krishna, A. R.Chandershekaran&Brajesh Chandra, South Asian Pub New Delhi.
2) Dynamics of Structures, Clough &Penzion, McGraw Hill.
3) Earthquake Engineering, Y-X Hu, S-C. Liu and W. Dong, E and FN Sons., Madras.
4) Earthquake Resistant Concrete Structures, George G. Penelis and J. Kapoors, E and FN Sons., Madras.
5) Structural Dynamic, Mario Paz, CBB Pub. N.Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (PECE-83) To Be Held in the year 2022,2023,2024,2025

Semester	VIII						
Category	Professional Elective courses						
Course code	PECE-83						
Course title	**Bridge Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Introduction:
Definition, components of bridge, classification of bridges, selection of site , economical span, aesthetics consideration, necessary investigations and essential design data.

Standard Specifications for Roads and Railways Bridges:
General, Indian Road Congress Bridge Code, width of carriage way, clearance, various loads to be considered for the design of roads and railway bridges, detailed explanation of IRC standard live loads.

UNIT-II

Design Consideration for R. C. C. Bridges:
Various types of R.C.C. bridges(brief description of each type) , design of R.C.C. culvert and T-beam bridges.

UNIT-III

Design Consideration for Steel Bridges:
Various types of steel bridges (brief description of each), design of truss and plate girder bridges.

UNIT-IV

Hydraulic & Structural Design:
Piers, abutments, wing-wall and approaches.

Brief Description:
Bearings, joints, articulation and other details.

Bridge Foundation:
Various types, necessary investigations and design criteria of well foundation.

B.Tech Civil Engineering Eighth Semester Exam (PECE-83) To Be Held in the year ,2022,2023,2024,2025

Text/Reference Books:

1. Essentials of Bridge Engineering, D.J.Victor, Oxford & IBH Pub.N.Delhi.
2. Design of Bridges, N.KrishnaRaju, Oxford & IBH, N.Delhi.
3. Bridge Deck Analysis, R.P.Pama&A.R.Cusens, John Wiley & Sons.
4. Design of Bridge Structures, T.R.Jagadish&M.A.Jairam, Prentice Hall of India, N.Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (PECE-84) To Be Held in the year 2022,2023,2024,2025

PROGRAM ELECTIVE- VI

Semester	VIII						
Category	Professional Elective courses						
Course code	PECE-84						
Course title	**Wastewater Treatment**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT-I

Wastewater and Wastewater Characteristics: Wastewater composition,Physical Chemical and Biological characteristics of wastewater,significance of BOD, COD, BOD, estimations of wastewater and storm water.

Wastewater Collection and Conveyance: Separate and combined systems, patterns of sewage collection systems.Types and shapes of sewers, sewer materials, hydraulics of flow in sewers.

UNIT-II

Primary Treatment of Sewage: Anaerobic Processes- anaerobic digester, UASB reactor, septic tanks, Imhoff tank, sludge handling, disposal of effluent and sludge.

Secondary Treatment of Sewage: Biological wastewater treatment systems - aerobic processes, activated sludge process and its modifications, trickling filter, RBC,Oxidation Ponds and Aerated lagoons.

UNIT-III

Design and Construction of Sewers: Design of severs - design period, design flow for separate, storm and combined sewers, full flow and partial flow conditions, design of separate sewers using Manning‘s formula. Sever cconstruction: shoring, trenching, laying to grade, jointing and testing of sewers.

B.Tech Civil Engineering Eighth Semester Exam (PECE-84) To Be Held in the year 2022,2023,2024,2025

Sewer Appurtenances: Plumbing system for buildings, One pipe and two pipe systems, sanitary fittings and appliances -traps, anti-syphonage, inspection chambers, intercepting traps, manhole, street inlets, storm water overflows, inverted siphons.

UNIT-IV

Wastewater Disposal: Wastewater disposal standards, methods of disposal, dilution, self-purification of surface water bodies (Streeter Phelp‘s equation, Oxygen sag curve), land disposal, sewage farming, deep well injection, soil dispersion systems.

Introduction to Solid Waste Management: Generation, onsite storage, collection, separation, processing and disposal.

Text/Reference Books:

1. Waste Water Engineering: Metcalf and Eddy.
2. Sewage and Sewage Treatment: S.K. Garg.
3. Sewage and Sewage Treatment: S.R. Krishansagar.
4. Waste Water Engineering: B.C. Punmia.
5. Manual on Sewerage and Sewage Treatment: Ministry of Urban Dev., New Delhi.

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (PECE-85) To Be Held in the year ,2022,2023,2024,2025

Semester	VIII						
Category	Professional Elective courses						
Course code	PECE-85						
Course title	**Traffic Engineering and Management**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Traffic Planning And Characteristics

Road Characteristics – Road user characteristics – PIEV theory – Vehicle Performance characteristics – Fundamentals of Traffic Flow – Urban Traffic problems in India – Integrated planning of town ,country ,regional and all urban infrastructure – Towards Sustainable approach. – land use & transport and modal integration.

UNIT II

Traffic Surveys

Traffic Surveys – Speed, journey time and delay surveys – Vehicles Volume Survey including nonmotorized transports – Methods and interpretation – Origin Destination Survey – Methods and presentation – Parking Survey – Accident analyses -Methods, interpretation and presentation – Statistical applications in traffic studies and traffic forecasting – Level of service – Concept, applications and significance.

UNIT III

Traffic Design And Visual Aids

Intersection Design – channelization, Rotary intersection design – Signal design – Coordination of signals — Grade separation – Traffic signs including VMS and road markings – Significant roles of traffic control personnel – Networking pedestrian facilities & cycle tracks

UNIT IV

Traffic Management

Area Traffic Management System – Traffic System Management (TSM) with IRC standards –- Traffic Regulatory Measures-Travel Demand Management (TDM) – Direct and indirect methods – Congestion and parking pricing – All segregation methods- Coordination among

different agencies – Intelligent Transport System for traffic management, enforcement and education.

Text/Rerference Books

1. Kadiyali.L.R. “TrafficEngineeringandTransportPlanning”, KhannaPublishers, Delhi, 2013
2. Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management
3. Salter. R.I and Hounsell N.B, “Highway Traffic Analysis and design”, Macmillan Press Ltd.1996

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

Semester	VIII						
Category	Professional Elective courses						
Course code	PECE-86						
Course title	**Geosynthetics Engineering**						
Exam Duration	**3 Hours**						
Scheme and Credits	**Hours/week**			**Marks**			**Credits**
	L	T	P	Major	Minor	Total	
	3	0	0	100	50	150	3

UNIT I

Basic Description of Geosynthetics:
Historical Development, The Nomenclature, Function, Use around the World, Applications, Development in India.
Raw Materials – Their Durability and Ageing:
Raw Materials, Durability, Degrading Agencies, Polymers, Biological Resistance, Chemical Resistance, Weathering Resistance

UNIT II

Manufacutinr Methods:
Fibres, Yarn, Nonwoven Geotextiles, Woven Geotextiles, D.S.F. Fabrics.
Geogrids- Testing and Evaluation:
Factors influencing Testing, Sampling, Physical Properties, and Mechanical Properties under Uniaxial loading, Creep Testing

UNIT III

Erosion Control with Geogrids:
Wind Erosion, Rain Water Erosion, Erosion Control Measures, Placement of Geogrid
Bearing Capacity Improvement with Geogrids:
Advantages, Mechanism, Modes of Failure, Friction Coefficient, Experimental Studies.

UNIT IV

Application of Geosynthetics in Water Resource Projects: Case Study: Dharoidam,Hiran II Dam, Meda Creek Irrigation Scheme, Lining of Kakarpar Canal

Text /Reference Books:

1. Designing with Geosynthetics, (Prentice Hall) by Robert M. Koerner.
2. Engineering with Geosynthetics, (Tata MacGraw Hill) by G.V. Rao & G.V.S. Raju.

B.Tech Civil Engineering Eighth Semester Exam (PECE-86) To Be Held in the year 2022,2023,2024,2025

NOTE: There shall be total eight questions, two from each unit. Each question will carry 20 marks. Students have to attempt at least one question from each unit. Total five questions have to be attempted.

B.Tech Civil Engineering Eighth Semester Exam (PRO-801) To Be Held in the year 2022,2023,2024,2025

Semester	VIII				
Category	Project work				
Course code	PRO-801				
Course title	**Major Project**				
Scheme and Credits	**Hours/week**			**Marks**	**Credits**
	L	T	P	Practical	
	0	0	12	200	6

Major Project work will be taken up by every student of 8th semester Civil Engineering at the beginning of the Semester.

.Guidelines for evaluation of Project work in 8th semester:

Sub-distribution of marks:

- For External Examiner : 100
- For Internal Examiner: : 100

Sub distribution of internal Marks:

- Mark distribution of internal Project work as per the University statues shall be based on:
  a. Viva-Voce = 30%
  b. Presentation = 30%
  c. Report = 40%

Note: The student have to carry out the MAJOR Project either from Structural Engineering, Environmental Engineering and Water Resource Engineering.