



COURSE OUTCOMES

**DEPARTMENT OF CIVIL ENGINEERING,
JAWAHARLAL NEHRU GOVT. ENGG. COLLEGE
SUNDERNAGAR, MANDI (H.P.)**

B. Tech CE 3rd Sem

<u>Subject Name</u>	Subject Code HPTU	Subject code NBA
Probability and Statistics	MA-301	C201
Industrial Economics and Management	HS – 305	C202
Mechanics of Solids	CE-301	C203
Mechanics of Fluids - I	CE-302	C204
Engineering Surveying-I	CE-303	C205
Building Materials	CE-304	C206
Sociology & Elements of Indian History for Engineers	HS-306	C207
German Language – I	HS-307	C208
French Language - I	HS-308	C209
Building Material Testing Lab	CE-307	C210
Fluid Mechanics Lab	CE-308	C211
Surveying Lab – I	CE-309	C212

B. Tech CE 4th Sem

<u>Subject Name</u>	Subject Code HPTU	Subject code NBA
Optimization and Calculus of Variations	MA-401	C213
Human Values and Professional Ethics	HS-409	C214
Structural Analysis –I	CE-401	C215
Geotechnical Engg. –I	CE-402	C216
Engineering Surveying –II	CE-403	C217
Building Planning and Construction	CE-404	C218
Law for Engineers	HS-410	C219
German Language – II	HS-411	C220
French Language - II	HS-412	C221
Geotechnical Engg. Lab-I	CE-407	C222
Surveying Lab - II	CE-408	C223
Computer Aided Building Drawing Lab	CE-410	C224

B. Tech CE 5th Sem

<u>Subject Name</u>	<u>Subject Code HPTU</u>	<u>Subject code NBA</u>
Limit State Design of Concrete Structures - I	CE-501	C301
Structural Analysis - II	CE-502	C302
Geotechnical Engg. - II	CE-503	C303
Mechanics of Fluid - II	CE-504	C304
Environmental Engg. - I	CE-505	C305
Transportation Engg. - I	CE-506	C306
Element of Civil Engineering	CE-508	C307
Optimization Methods in Engineering	CE-509	C308
Environmental Impact Assessment	CE-510	C309
Transportation Engg. Lab	CE-511	C310
Environmental Engg. Lab	CE-512	C311
Computer Aided Design Practice Lab-I	CE-513	C312

B. Tech CE 6th Sem

<u>Subject Name</u>	<u>Subject Code HPTU</u>	<u>Subject code NBA</u>
Design of Concrete Structures-II	CE-601	C313
Transportation Engg. - II	CE-602	C314
Environmental Engg. - II	CE-603	C315
Hydrology and Water Resources Engg.	CE-604	C316
Engineering Geology and Rock Mechanics	CE-605	C317
Concrete Technology	CE-606	C318
Remote Sensing and Applications of GIS	CE-608	C319
Hydraulic Machines	CE-609	C320
Energy Efficient Buildings	CE-610	C321
Engineering Geology and Rock Mechanics Lab	CE-611	C322
Concrete Technology Lab	CE-612	C323
Seminar	CE-613	C324

B. Tech CE 7th Sem

<u>Subject Name</u>	<u>Subject Code HPTU</u>	<u>Subject code NBA</u>
Limit State Design of Metal Structures	CE-701	C401
Quantity Surveying and Valuation	CE-702	C402
Irrigation and Design of Hydraulic Structures	CE-703	C403
Construction Engineering and Management	CE-704	C404
Municipal Solid Waste Management	CE-708	C405
Bridge Engineering	CE-709	C406
Finite Element Method	CE-710	C407
Project Work -I	CE-711	C408
Industrial /Practical Training(Viva-Voice)	CE-712	C409
Computer Aided Design Practice Lab-II	CE-713	C410

B. Tech CE 8th Sem

<u>Subject Name</u>	<u>Subject Code HPTU</u>	<u>Subject code NBA</u>
Project Work – II	CE-808	C411
Industrial Project	CE-809	C412
Highway Pavement Design	CE -801	C413
Ground Water Hydrology	CE -802	C414
Water Power Engineering	CE -803	C415
Design of Pre-stressed Concrete Structures	CE -804	C416
Design of Earthquake Resistant Structures	CE -805	C417
Transportation System Planning	CE -806	C418

B. Tech CE 3rd Semester**Course Name: Probability and Statistics****Course Code: MA-301/ C201**

C201.1	Recall the counting principles, axiom, basic concepts of probability, formulae for mean, variance, covariance of discrete and continuous random variables, concepts of sampling distribution and linear co-relation, regression analysis.
C201.2	Demonstrate understanding of various probability models and their properties used for discrete and continuous random variables, prediction, confidence intervals, various estimators and concept of hypothesis testing.
C201.3	Solve the probability problems using classical probability, discrete and continuous random variables, problems related to prediction & confidence intervals.
C201.4	Apply methods of estimation, linear correlation & regression analysis, Goodness of fit and for independence of attributes.
C201.5	Draw inference using probability laws; test the hypothesis for Normal, Chi-square, t and F distributions, draw conclusions using prediction & confidence intervals and by the process of estimation.
C201.6	Defend strong/ weak correlation between variables; choose appropriate method for solution of problems including probability problems and test of hypothesis for distribution under consideration.

Course Name: Industrial Economics and Management**Course Code: HS-305/ C202**

C202.1	Describe the role of economics in the decision making process
C202.2	Estimate the present, annual and future worth comparison for cash flow
C202.3	Apply management function in various decision making
C202.4	Enumerate different cost entities in estimation and costing
C202.5	Estimate the pay- back period ,net present value , internal rate of returns.

Course Name: Mechanics of Solids	
Course Code: CE-301/ C203	
C203.1	Concept of stress strain behaviour of material and related theorem
C203.2	Describe bending moment , Shear force, deflection, Torsion, compression based on the behaviour of structural components
C203.3	Compute the resultant stresses in various structural components and draw BMD AND SFD
C203.4	Analyze the structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
C203.5	Categorize the different methods to determine the transverse deflection in beams, torsion of circular shaft and internal pressure in thin cylinder and sphere.
C203.6	Evaluate the behaviour of components based on material properties, boundary condition and different type of loading.

Course Name: Mechanics of Fluids I	
Course Code: CE-302/ C204	
C204.1	Understand the significance of properties of fluid and applications of fluid mechanics
C204.2	Apply the knowledge fluid statics, kinematics and dynamics while addressing problem of mechanical engineering
C204.3	Analyse the boundary layer & fluid flow phenomenon such as lift, drag etc. and concept of separation
C204.4	Estimate the discharge through a pipe and head losses in laminar and turbulent flow through pipe and fluid flow problems
C204.5	Develop a dimensionless number by grouping number of dependent and independent variables and establish a relationship between input and output parameters

Course Name: Engineering Surveying	
Course Code: CE-303/ C205	
C205.1	Define Surveying and basic concepts of surveying.
C205.2	Discuss different method of surveying
C205.3	Use different method of surveying
C205.4	Analyze and interpret survey data for Computing area and volume
C205.5	Develop top graphical map, L- section and cross section from the data
C205.6	Predict the appropriate method for any survey project

Course Name: Building Materials**Course Code: CE-304/ C206**

C206.1	Identify building materials like bricks, stone and lime on basis of physical and Mechanical tests.
C206.2	Illustrate the use of various materials for flooring & wall finishing purposes.
C206.3	Use different types of building materials for providing services in buildings.
C206.4	Analyze the use of bitumen and bituminous products in construction work.
C206.5	Choose right kind of materials as per specific requirement for building construction work.
C206.6	Produce a report on building materials on the basis of market survey in respect of brand name, use, properties and cost.

Course Name: Sociology & Elements of Indian History for Engineers**Course Code: HS-306/ C207**

C207.1	Define the basic concept of sociology & Indian history.
C207.2	Understanding importance of history in sociological concepts
C207.3	Demonstrate modernity and struggle for independence and political economy of Indian society
C207.4	Discuss social change in contemporary India through various processes
C207.5	Evaluating of urbanization process, social structure and social process
C207.6	Define the basic concept of sociology & Indian history.

Course Name: Building Material Testing Lab**Course Code: CE-307/ C210**

C210.1	Understand properties and tests on materials based on IS Codes and applications of each
C210.2	Apply the IS codes for conducting different tests and drafting the procedure for same
C210.3	Prepare samples of materials under specified conditions to conduct tests on them
C210.4	Choose the appropriate test for analyzing quality of materials
C210.5	Assess the quality of construction materials on the basis of their properties

Course Name: Fluid Mechanics Lab	
Course Code: CE-308/ C211	
C211.1	Estimate the friction and measure the frictional losses in fluid flow.
C211.2	Analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design
C211.3	predict the coefficient of discharge for flow through pipes.
C211.4	Conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases, as well as documenting them in engineering reports

Course Name: Surveying Lab – I	
Course Code: CE-309/ C212	
C212.1:	Provide knowledge of basic surveying instruments.
C212.2:	Develop skill in using chain, compass, plane table, levelling and theodolite.
C212.3:	Apply the knowledge of different instrument operations in civil engineering works.
C212.4:	Formulation the setting out of the foundation plan of building, sewer line, culvert, centre line of tunnel etc.
C212.5:	Manage the suggested or identified construction problem, solve in teams, in order to improve future problem solving ability.

B. Tech CE 4th Semester

Course Name: Optimization and Calculus of Variations	
Course Code: MA-401/C213	
C213.1	Define & classify the optimization problems, functional and extremum.
C213.2	Demonstrate understanding of using method of the solution to various optimization problems including numerical methods.
C213.3	Apply appropriate method for the solution of LPP, NLPP, extreme value problem using calculus of variation, networking problems including numerical method treatment to NLPP.
C213.4	Examine the LPP for unique, multiple optimal, infeasible solutions including degeneracy and functional for extremum using Euler's – Lagrange equations.
C213.5	Appraise the techniques used for solving LPP and networking problems.
C213.6	Formulate the LPP from real world problems and compile the techniques used for extremum of functional to find Geodesics on surfaces, solving Isoperimetric problems.

Course Name: Human Values and Professional Ethics	
Course Code: HS-409/C214	
C214.1	Identify the importance of human values and skill for sustained happiness
C214.2	Understand the significance of values in classroom and start applying them in their life and profession
C214.3	Develop appropriate technology and management patterns to create harmony in professional and personal life
C214.4	Explain the significance of trust ,mutually satisfying human behavior and enriching interaction with nature.
C214.5	Evaluate a holistic vision about existence in the light of understanding they are able to place various educational inputs appropriately.
C214.6	Use creative ideas for clarifying about human values in simple manners

Course Name: Structural Analysis –I**Course Code: CE-401/C215**

C215.1	State the concept of Determinate structural components with static and moving loads
C215.2	Illustrate the various methods to analyze the determinate structure
C215.3	Solve the problems related to determinate structural components by various methods of analysis
C215.4	Analyze and draw a shear force, bending moment and influence line diagram for determinate structures
C215.5	Relate an appropriate method based on the behavior of structural components for appropriate solution.
C215.6	Evaluate solutions of determinate structure depending upon their behavior.

Course Name: Geotechnical Engineering-I**Course Code: CE-402/C216**

C216.1	Identify the index properties of soil and their relationship with each other.
C216.2	Illustrate the phenomena of permeability and effective stress in the soil mass and to interpolate the change in the stresses induced due to various conditions.
C216.3	Use compaction and consolidation theory and to carry out settlement analysis.
C216.4	Analyze shear strength of given sample of soil.
C216.5	Detect and analyze various types of slope failures induced in the soil mass.
C216.6	Produce a report on the landslide that has occurred in a hilly area and to suggest remedial measures for prevention of landslide.

Course Name: Engineering Surveying-II**Course Code: CE-403/C217**

C217.1	Understand concepts of tachometric, curves etc.
C217.2	Discuss the field relation of tachometric and curves.
C217.3	Solve the problem related to tachometric and curves etc.
C217.4	Practice with advanced techniques in surveying like total station.
C217.5	Demonstrate the remote sensing system, GIS and GPS.
C217.6	Evaluate the advanced techniques in surveying with respect to old techniques.

Course Name: Building Planning and Construction	
Course Code: CE-404/C218	
C218.1	Identify components of building and stages of building planning and building construction with technical terminology
C218.2	Realize the aim of building planning and functions of different building components and their types
C218.3	Apply the appropriate provisions of IS Code and Bye-laws for adequate planning and process for construction of building
C218.4	Compare the different building materials, types of construction and ways for planning to achieve most suitable outcome
C218.5	Evaluate a constructed building on the basis of its planning, quality of material and type of construction
C218.6	Plan any building and choose the most suitable type of material, component and type of construction

Course Name: Geotechnical Engg. Lab-I	
Course Code: CE-407/C222	
C222.1	Understand & Explain the basic concept or the fundamental theory of various experiments on different soil samples.
C222.2	Perform the laboratory and field tests for soil samples as per standard guidelines by recalling their properties.
C222.3	Interpret various data/results and analyze them for different soil samples alongwith the precautionary measures to be taken.
C222.4	Evaluate the results with standard values required for recommendation in different Civil Engineering design purposes.

Course Name: Surveying Lab - II	
Course Code: CE-408/C223	
C223.1:	Provide knowledge of basic surveying instruments.
C223.2:	Develop skill in using chain, compass, plane table, levelling and theodolite.
C223.3:	Apply the knowledge of different instrument operation in civil engineering works.
C223.4:	Formulation the setting out of foundation plan of building, sewer line, culvert, centre line of tunnel etc.
C223.5:	Manage the suggested or identified construction problem, solve in teams, in order to improve future problem solving ability.

Course Name: Computer Aided Building Drawing Lab**Course Code: CE-410/C224**

C224.1	Apply the concepts of engineering drawing and recognize the annotations and symbols of AutoCAD
C224.2	Realize the function of basic tools used in AutoCAD and significance of AutoCAD as a drafting tool for civil engineering
C224.3	Apply the theoretical knowledge/standards and different tools and commands to draft different views of simple and complex objects
C224.4	Choose the most suitable tools/commands for drafting any drawing or part of drawing
C224.5	Plan and draft different types of building components, building plans, RCC detailing and electrical drawings in AutoCAD according to drafting rules

B. Tech CE 5th Semester**Course Name: Limit State Design of Concrete Structures I****Course Code: CE-501/ C301**

C301.1	Understand the role and properties of reinforced concrete materials i.e. concrete mix, its constituents and steel and RCC members
C301.2	Compare and recognize various design philosophies and the structural behavior of RCC beams, columns, slabs.
C301.3	Interpret and apply suitable codal provisions and design philosophy.
C301.4	Analyse and evaluate the performance of reinforced concrete beams, slabs
C301.5	Recommend suitable design of RCC beams, slabs, columns according to given situation
C301.6	Predict and suggest possible behaviour of any RCC member in terms of flexure, shear, bond etc.

Course Name: Structural Analysis -II**Course Code: CE-502/ C302**

C302.1	State the concept of statically, kinematically, Influence line and plastic behavior of indeterminate structures
C302.2	Identify the various methods to analyse the indeterminate structure
C302.3	Employ various methods to analyze the indeterminate structural components
C302.4	Produce a Shear force, bending moment and influence line diagram for indeterminate structures
C302.5	Relate appropriate method based on the behaviour of structural components
C302.6	Evaluate a solutions of problem related to analysis of indeterminate structures

Course Name: Geotechnical Engineering. -II	
Course Code: CE-503/ C303	
C303.1	Summarize the concept of soil exploration, physical and mechanical parameters and characteristics of soils and relate to the engineering behaviour of soil
C303.2	Explain the various methods of exploration, earth pressure, slope stability and foundations theories.
C303.3	Apply the various theories to predict the behaviour of retaining walls, foundation soil and slopes under site conditions.
C303.4	Compare the different theories to determine the lateral earth pressure, soil pressure, bearing capacity of soil, settlement in retaining walls and foundations.
C303.5	Decide the most suitable type of retaining wall and foundation after determining soil parameters.
C303.6	Infer and evaluate the soil parameters at a site and propose suitable slope stability measures, design of retaining wall and design of foundation.

Course Name: Mechanics of Fluid - II	
Course Code: CE-504/ C304	
C304.1	Recall the principle and concepts studied in the fluid mechanics-1.
C304.2	Explain the phenomena associated with fluid flow.
C304.3	Apply the mathematical methods to determine various parameters in a fluid flow.
C304.4	Analyze the various forces associated with fluid flow.
C304.5	Determine the various factors that affects the fluid flow.
C304.6	Predict the performance and dimensions of the system associated with fluid flow.

Course Name: Environmental Engineering. - I	
Course Code: CE-505/ C305	
C305.1	Memorize the basic concepts of fluid mechanics, biological & chemical science.
C305.2	Understand different sources of water, water quality, treatment technologies, distribution system .
C305.3	Utilize different water demand methods, treatment technologies, water distribution systems.
C305.4	Examine water sources & qualities, suitable treatment techniques as per standards & guidelines.
C305.5	Assess different water purification technologies, distribution systems to meet real field constraints.
C305.6	Propose new idea about sustainable water supply system in relation with societal & environmental needs.

Course Name: Transportation Engineering. - I	
Course Code: CE-506/ C306	
C306.1	Identify the fundamental understanding highway alignment, various types of traffic surveys, data collection, analysis, inference and their presentation.
C306.2	Recognize the mathematically developed design standards for horizontal and vertical geometry as well as super elevation.
C306.3	Dramatize the mathematics behind the development of tables and charts for determining highway design criteria.
C306.4	Distinguish and solve the hypothesis, evidence related to various traffic engineering and pavement material.
C306.5	Invent or formulate acumen for higher education and research.
C306.6	Assess and recommend the various numerical and computational models in Traffic engineering.

Course Name: Transportation Engg. Lab**Course Code: CE-511/ C310**

C310.1	Identify and memories the concepts of the aggregate and bitumen and their binding phenomenon.
C310.2	Summarize the most efficient binding proportion for economics while understanding the availability of raw materials and the environment
C310.3	Apply appropriate standard and specifications of binding material to meet the need of pavement design.
C310.4	Analyses the various properties of binding material and solve the problems of various terrain.
C310.5	Formulate acumen for various technical research topics and invent new material utilizing appropriate technical literature

Course Name: Environmental Engg. Lab**Course Code: CE-512/C311**

C311.1	Relate with the basic chemical sciences.
C311.2	Understand the fundamental theory of various experiments and their application in real field.
C311.3	Conduct various experiments/tests on water samples as per standard procedures individually & within team.
C311.4	Interpret various data/results and analyze them along with the precautionary measures to be taken.
C311.5	Evaluate the test results & provide conclusion/suggestion according to their quality for various usages according to the standard guidelines.

Course Name: Computer Aided Design Practice Lab-I**Course Code: CE-513/ C312**

C312.1	Explore the various civil software and tools for simulation and designing of building components/ frames
C312.2	Simulate analysis and design of component members of frames and trusses using computer aided design
C312.3	Compare theoretical results with computer aided results
C312.4	Interpret the results of analysis and design of framed building and truss and prepare a working drawing

B. Tech CE 6th Semester

Course Name: Design of Concrete Structures-II	
Course Code: CE-601/C313	
C313.1	Recognize the properties and nature of earthquakes and RCC structural components
C313.2	Identify the different types of loads acting on RCC structures and their structural behaviour
C313.3	Apply the design criteria according to IS specifications for deciding suitable dimensions and reinforcement in footings, retaining walls, water tanks, buildings etc for loads
C313.4	Compare the different types of design-analysis methods and different type of structures suitable for prevailing conditions to conclude an economic and efficient design
C313.5	Decide and design the most suitable type of RCC footing, retaining wall, water tank or earthquake resistant feature
C313.6	Predict and evaluate the performance of all types of footings, R/walls, Water tanks and achieve Earthquake resistant building by applying IS code provisions

Course Name: Transportation Engg. -II	
Course Code: CE-602/C314	
C314.1	Identify and memorize the fundamental concept of railway engineering, airport engineering & intelligent transport systems.
C314.2	Summarize the analytical and practical knowledge of airport and railway design by solving the traffic and transportation problems through these analytical models
C314.3	Apply and practice the various principles of effective design of airports, railway and for the development of intelligent transport systems.
C314.4	Analyses and compute various design parameters for construction and development of airports, railways and innovative intelligent transport systems.
C314.5	Invent or formulate acumen for higher education and research through exploring new material, design parameters.
C314.6	Assess and recommend the various numerical and computational models in transportation engineering.

Course Name: Environmental Engg. -II Course Code: CE-603/C315	
C315.1	Relate the basic concepts of chemical & environmental sciences related to wastewater & solid waste.
C315.2	Understand different types & components of sewerage systems, different flow conditions, concepts of different treatment methods, methods of wastewater and solid waste disposal.
C315.3	Make use of different methods for treatment & disposal techniques, design of sewers in various flow conditions.
C315.4	Analyze different wastewater treatment methods, appurtenances & solid waste disposal techniques.
C315.5	Assess different wastewater treatment methods, solid waste management techniques according to standard guidelines
C315.6	Give new idea about wastewater & solid waste management system in relation with societal needs & for sustainable environment.

Course Name: Hydrology & Water Resources Engg. Course Code: CE-604/C316	
C316.1	Memorize & Relate basic geographical sciences, water sciences, meteorological events with engineering hydrological processes.
C316.2	Illustrate various hydrological processes, groundwater flow; their characteristics & factors, reservoir capacity & yield, sustainable management of water resources.
C316.3	Apply the measurement techniques of different hydrological processes, reservoir capacity & groundwater yield for further applications of the produced data.
C316.4	Inspect the hydrological processes, flood events and their produced data.
C316.5	Evaluate the data for frequency studies & water yield.
C316.6	Propose new ideas related to hydrological processes & ground water to achieve sustainable water resources.

Course Name: Engineering Geology and Rock Mechanics Course Code: CE-605/C317	
C317.1	Summarize the concept of soil exploration, physical and mechanical parameters and characteristics of soils and relate to the engineering behavior of soil
C317.2	Explain the various methods of exploration, earth pressure, slope stability and foundations theories.
C317.3	Apply the various theories to predict the behavior of retaining walls, foundation soil and slopes under site conditions.
C317.4	Compare the different theories to determine the lateral earth pressure, soil pressure, bearing capacity of soil, settlement in retaining walls and foundations.
C317.5	Decide the most suitable type of retaining wall and foundation after determining soil parameters.
C317.6	Infer and evaluate the soil parameters at a site and propose suitable slope stability measures, design of retaining wall and design of foundation.

Course Name: Concrete Technology Course Code: CE-606/C318	
C318.1	State and understand the different types of concrete with their properties.
C318.2	Outline the difference between ordinary, high strength and special concrete with their application.
C318.3	Know and memorize procedure and requirement of various tests on concrete
C318.4	Categorize and perform various tests on different concrete in laboratory
C318.5	Compare test results with acceptable criteria and IS code provision.
C318.6	Demonstrate and design concrete mix by IS code method.

Course Name: Hydraulic Machines	
Course Code: CE-609/C320	
C320.1	Learn the basic properties and functions of pumps and turbines.
C320.2	Understand the working principles and construction of pumps and turbines.
C320.3	Compute the work done, efficiencies and various other characteristics of pumps and turbines by applying the concepts of Fluid Mechanics.
C320.4	Classify the various types of pumps & turbines according to their construction, working and applications.
C320.5	Select the most suitable type of pumps & turbines to match the specific conditions of operation and evaluate their performance.
C320.6	Generalize the working and performance of pumps & turbines and propose the required design.

Course Name: Engineering Geology and Rock Mechanics Lab	
Course Code: CE-611/C322	
C322.1	Identify and memorize the fundamental concept of crystal, minerals and need of rock mechanics
C322.2	Summarize the analytical and practical knowledge of identification of rocks and study of topographical features
C322.3	Apply the various principles of engineering geology for the benefit of society and environment protection
C322.4	Analyses and compute various design parameters for crystal, minerals and need of rock mechanics
C322.5	Invent or formulate acumen for higher education and research through exploring new material, design parameters to solve the geology and rock mechanics problems

Course Name: Concrete Technology Lab.

Course Code: CE-612/C323

C323.1	Recall the properties of and tests conducted on concrete and visualize its constituents
C323.2	Predict the behaviour of concrete and admixture modified concrete
C323.3	Apply the IS methods to cast different concrete mix and conduct different tests to evaluate the properties of concrete as per IS codes
C323.4	Infer the results after conducting different workability, tension, compression, flexure, non-destructive, permeability tests on concrete

B. Tech CE 7th Semester**Course Name: Limit State Design of Metal Structures****Course Code: CE-701/ C401**

C401.1	Recognize the need and properties of structural steel sections in structures
C401.2	Identify design philosophies and structural behaviour for the steel sections in terms of tension, compression, flexure.
C401.3	Classify the types of connections and check the safety and design of different types of connections
C401.4	Analyse different types of steel tension, compression, beams members
C401.5	Choose and select the appropriate design methodology, size and shape of steel, other metal sections
C401.6	Suggest the section and structural behaviour of any type of metal section

Course Name: Quantity Surveying and Valuation**Course Code: CE-702/ C402**

C402.1	Identify the civil engineering materials, their specifications & uses for civil engineering structures and understand the accounts related fundamentals.
C402.2	Interpret different quantity estimate methods & accounts related terms.
C402.3	Make use of the quantity estimation methods & account procedures for civil engineering structures.
C402.4	Compare various items of works & their rates, contracts, tenders for estimation purposes.
C402.5	Assess contracts, tenders in construction practices in compliance with safety & legal issues and actual value of any property .
C402.6	Compose new ideas for estimation & valuation of civil engineering structures.

Course Name: Irrigation and Design of Hydraulic Structures**Course Code: CE-703/ C403**

C403.1	Identify and recognize the basics of irrigation and design for hydraulic structure in Civil Engineering.
C403.2	Summarize or infer the irrigation methods and multi variable hydraulic design problems in an open ended solution space with appropriate solution
C403.3	Apply the hydraulics and water resources background by involving the students in water structures design applications.
C403.4	Distinguish and solve the hypothesis, evidence related to various hydraulic structures like dams, falls and spillway to assess safety to society
C403.5	Invent or formulate acumen for higher education and research.

Course Name: Construction Engineering and Management**Course Code: CE-704/ C404**

C404.1:	To identify different types of tenders and their suitability for various construction works..
C404.2:	To illustrate the use of various construction equipments and their suitability for various construction works.
C404.3:	To use arbitration methodology for settlement of construction related disputes
C404.4:	To analyze CPM and PERT network for planning the construction activities.
C404.5:	To evaluate different inventory control systems for effective utilization of the resources.
C404.6:	To produce a report on the inventory management analysis on the basis of given material details.

Course Name: MUNICIPAL SOLID WASTE MANAGEMENT**Course Code: CE-708/ C405**

C405.1	Memorise the fundamental concept of solid waste management.
C405.2	Explain the sources, types and characteristics of the municipal solid waste, its ill effects on society, the principles of solid waste management with its benefits and also public & private participation.
C405.3	Identify collection methods, storage options, transfer, various waste processing techniques & disposal methods for minimization of wastes and resources recovery.
C405.4	Distinguish various waste processing techniques according to their characteristics.
C405.5	Support waste processing techniques according to standard statutory provisions.
C405.6	Get new idea about management of municipal solid waste for sustainable environment.

Course Name: COMPUTER AIDED DESIGN PRACTICE LAB- II**Course Code: CE-713/ C408**

C410.1	Identify the tools and features of WaterGEMS software and basic theories and laws of Water Resource and Water supply engineering used in the same.
C410.2	Apply the software for modelling and analysis of components of water distribution networks
C410.3	Analyze the model for different scenarios/conditions and interpret the results.
C410.4	Evaluate various results according to various real field scenarios/conditions of water distribution
C410.5	Choose the appropriate tool/feature of WaterGEMS software to model and analyse and compare different conditions of water distribution network.