

2015 scheme CO's

**SEMESTER 1**

**1. C 101 -MA 101 CALCULUS**

CO's	Topic	Level
CO 1	Apply appropriate method for the convergence of a given series	L3
CO2	Apply the concept of partial differentiation in various problems	L3
CO3	Apply the concept of integration in various problems	L3
CO4	Apply the concept of vector Calculus in different problems	L3
CO5	Solve problems related to different types of integrals	L3

**2. C 102 PH 100 Engineering Physics**

CO's	Topic	Level
CO1	Explain the concepts of Different types of wave motions	L2
CO2	Apply the theories of properties of light in different situations.	L2
CO3	Identify the significance of various concepts of Quantum Mechanics and superconductivity.	L2
CO4	Explain the production, detection and applications of ultrasonic waves.	L2
CO5	Explain the essential principles of laser action and its working.	L2

**3. C 103 BE 100 Engineering Mechanics**

CO's	Topic	Level
CO1	Solve the practical engineering problems related to statics	L3
CO2	Calculate the support reactions of statically determinate beams	L2
CO3	Determine the properties of planes and solids	L2
CO4	Solve the engineering problems considering frictional forces	L3
CO5	Apply the concepts of dynamics to practical engineering problems	L3

#### 4.C 104 BE 101-01 Introduction to Civil Engineering

CO's	Topic	Level
CO1	Classify different types of buildings based on their occupancy	L2
CO2	Identify the suitability of building materials for their intended purposes	L3
CO3	Compare different types of masonry used in construction	L2
CO4	Describe the ingredients of concrete	L2
CO5	Explain different types of roofs and floors	L2

#### 5. C 105 BE 103 Introduction to Sustainable Engineering

CO's	Topic	Level
CO 1	Explain the concept and need of sustainability in engineering.	L2
CO2	Explain the role of engineering and technology within the realms of sustainability concept.	L2
CO3	Explain methods and tools of engineering to deliver sustainable product-service system development.	L2
CO4	Select areas of research in green engineering to strengthen the concept of sustainability.	L3
CO5	Identify the role and impact of various aspects of engineering and engineering decisions on environmental, societal, and economic problems.	L2

#### 6. C106 ME 100 Basics of Mechanical Engineering

CO's	Topic	Level
CO 1	Solve problems related to laws of Thermodynamics and Thermodynamic cycles	L2
CO2	Explain the role of engineering and technology within the realms of sustainability concept.	L3
CO3	Illustrate the working of energy conversion devices	L2
CO4	Illustrate the working of refrigerators and air conditioners	L2
CO5	Understand materials, manufacturing processes and machine tools	L2

#### 7.C 107 ME 110 Mechanical Engineering Workshop

CO's	Topic	Level
CO 1	Explain the rules and safety regulations for work in the mechanical workshop.	L2
CO2	List out a typical procedure for manufacturing of a part in the mechanical workshop	L1
CO3	Select proper tools and cutting data for a given material and manufacturing process.	L3
CO4	Extend the use of gauging equipment to verify that a manufactured part fulfills the requirements specified on a drawing.	L2
CO5	Make use of tools to carry out various operations in carpentry, smithy, fitting, welding and foundry.	L3

### 8. C108 PH 110 Engineering Physics Lab

CO's	Topic	Level
CO 1	Show the mode of using CRO for frequency and amplitude measurements.	L2
CO2	Apply the concepts of wave motions in Melde's String apparatus.	L3
CO3	Apply the theories of properties of light in different experiments.	L3
CO4	Illustrate the I-V Characteristics of solar cell.	L2
CO5	Utilize one's ability as an individual or in a team for the effective communication, practical	L3

### 9. C 109 CE 110 Civil Engineering workshop

CO's	Topic	Level
CO 1	Develop technical know-how of setting out of a building.	L3
CO2	Demonstrate masonry works of varying brick thickness.	L2
CO3	Solve for geometrical parameters of a structure using measuring instruments.	L3
CO4	Compare strength of various building materials.	L2
CO5	Obtain the Centre of Gravity and Moment of inertia of various objects.	L3

### Semester 2

### 10. C110 MA102 Differential Equations

CO's	Topic	Level
CO 1	Solve the given differential equations	L3
CO2	Develop the given function as Fourier series	L3
CO3	Solve given partial differential equations	L3
CO4	Solve one dimensional wave equations	L3
CO5	Solve one dimensional heat equations	L3

### 11.C 11 CY 100 Engineering Chemistry

CO's	Topic	Level
CO 1	Summarize the concepts in different types of spectroscopy.	L2
CO2	Relate the fundamentals of electrochemistry with possible applications.	L2
CO3	Demonstrate the right instrumentation technique in the analysis of materials.	L2
CO4	Select the appropriate engineering material for various applications.	L3
CO5	Interpret the scientific reasons behind significant issues in water technology.	L2

### 12. C 112 BE 110 Engineering Graphics

CO's	Topic	Level
CO 1	Make use of fundamental drawing standards in Engineering Drawings.	L3
CO2	Construct orthographic projections of straight lines.	L3
CO3	Construct orthographic projections of simple solids in various positions.	L3
CO4	Explain the features of CADD software.	L2
CO5	Construct isometric and perspective projections of simple solids.	L3

### 13. C 113 BE 102 Design and Engineering

CO's	Topic	Level
CO 1	Develop an innovative solution for a commonly used product.	L6
CO2	Design a product for function and strength	L6
CO3	Analyse design problems by scientific methods	L4
CO4	Create product centered and user centered design.	L6
CO5	Choose the best configuration for design optimization of a product	L6

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### 14. C 114 EE100 Basics of Electrical Engineering

CO's	Topic	Level
CO 1	Solve electric network equations.	L3
CO2	Solve magnetic circuits.	L3
CO3	Illustrate alternating current fundamentals.	L2
CO4	Explain electric supply system.	L2
CO5	Explain the elementary ideas of Electrical Machines	L2

### 15. C115 EC 100 Basics of Electronics Engineering

CO's	Topic	Level
CO 1	Compare the features of active and passive electronic components.	L2
CO2	Build simple electronic circuits using semiconductors.	L3
CO3	Interpret the significance of amplifiers and oscillators in an electronic circuit.	L2
CO4	Explain the fundamental idea about basic communication systems.	L2
CO5	Outline the basic principles and block diagrams of entertainment systems.	L2

**16.C 116 CY 110 Engineering Chemistry lab**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Develop light and fan circuit	<b>L3</b>
CO2	Illustrate the working of various electrical equipments	<b>L2</b>
CO3	Develop commercial installation wiring	<b>L3</b>
CO4	Utilize electrical measuring instruments to calculate power factor of the circuit.	<b>L2</b>
CO5	Utilize one's ability as an individual or in a team for development of effective communication, practical skill and document design	<b>L3</b>

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**17. C 117 EE 110 Electrical Engineering Workshop**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Develop light and fan circuit	<b>L3</b>
CO2	Illustrate the working of various electrical equipments	<b>L2</b>
CO3	Develop commercial installation wiring	<b>L3</b>
CO4	Utilize electrical measuring instruments to calculate power factor of the circuit.	<b>L2</b>
CO5	Utilize one's ability as an individual or in a team for development of effective communication, practical skill and document design	<b>L3</b>
CO4	Construct simple circuits using EDA tools.	<b>L2</b>
CO5	Identify faults and able to repair electronic systems.	<b>L3</b>

**SEMESTER 3****16. C201 MA 201 Complex Analysis and Linear Algebra**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Determine the properties of a given function and transformation	<b>L2</b>
CO2	Solve contour integrals	<b>L3</b>
CO3	Express the given function as power series	<b>L2</b>
CO4	Solve real definite integrals using residue theorem	<b>L3</b>
CO5	Solve a system of equations using Linear Algebra	<b>L3</b>

<b>17. C202 CE 201 Mechanics of Solids</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Compare stress and strain developed in the material of a structural member under the action of external loadings.	L2
CO2	Solve statically determinate and indeterminate problems using relevant conditions.	L3
CO3	Develop the BMD and SFD for simply supported beams and cantilever beams.	L3
CO4	Apply bending theory for the calculation of normal stresses and shear stresses in beams.	L3
CO5	Explain structural behavior & stresses developed under various loadings.	L2

<b>18.C 203 CE 203 FLUID MECHANICS-1</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Explain fluid properties and forces exerted by fluid at rest on immersed and floating bodies.	L2
CO2	Classify different types of kinematic fluid flows.	L2
CO3	Explain different instruments and their principles for measuring fluid flow in pipes.	L2
CO4	Explain different instruments and their principles for measuring fluid flow in open channels.	L2
CO5	Identify the type of fluid flow using boundary conditions.	L3

<b>19. C 204 CE 205 Engineering Geology &amp; Seismology</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Explain the process of weathering	L2
CO2	Outline the geological aspects of subsurface water	L2
CO3	Identify the properties of rocks and minerals with respect to their engineering significance	L2
CO4	Explain the relevance of geological structures in construction	L2
CO5	Outline different natural hazards and their management strategies	L2

**20. C205 CE207 Surveying –I**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Compare the linear, angular and graphical methods used in surveying-L2	L2
CO2	Obtain the reduced levels of location using the concept of levelling - L3	L3
CO3	Compute the area and volume of earthwork excavation -L2	L2
CO4	Solve the errors in surveying using different methods -L3	L3
CO5	Explain the EDM principle for distance measurement using different surveying instruments-L2	L2

**21. C 206 HS 200 – Business Economics**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the basic economic problems	L2
CO2	Discribe various micro economic cocepts,demad ,supply ,market equilibrium and production	L2
CO3	Compare different market structures	L2
CO4	Make use of economic models for examining current economic senerio	L3
CO5	Prepare various busiisiness tools like balance sheet,cost benefit analysis and rate of return	L3

**22.C207 CE231- CIVIL ENGINEERING DRAFTING LAB**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the fundamentals of Civil Engineering Drawing	L2
CO2	Outline the principles of planning and building bye-laws	L2
CO3	Plan and draft buildings	L3
CO4	Develop Site plan and Building services plan	L3
CO5	Utilize one's ability as an individual or in a team for the effective communication, practical skill and document design	L3

**23.C 208 CE 233 SURVEYING LAB**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Plot the traverse of given area using prismatic compass.	L2
CO2	Develop the longitudinal section of the road surface using dumpy level.	L3
CO3	Obtain the geometric parameters of any given area using theodolite and total station	L3
CO4	Explain the parts and working procedure of digital level and hand held GPS	L2
CO5	Perform as a member or leader in team work through effective	L3

**SEMESTER 4****24. C209 MA 202 Probability distributions, Transforms and Numerical methods**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain different types of probability distributions to characterize the population.	L2
CO2	Solve integrals and differential equations using Laplace transforms.	L2
CO3	Express the given function as Fourier integrals.	L2
CO4	Solve differential equations using numerical methods	L2
CO5	Solve integrals using numerical methods communication and technical skills.	L2

**25.C210 CE 202 STRUCTURAL ANALYSIS- I**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Calculate the member forces of trusses using method of joints and method of sections. (L2)	L2
CO2	Apply unit load method and strain energy method for the determination of deflection of statically determinate structural systems. (L3)	L2
CO3	Solve the structural response of statically indeterminate structures using strain energy method and method of consistent deformation. (L3)	L3
CO4	Obtain influence lines for forces in beams and trusses under different types of moving loads. (L3)	L3
CO5	Describe the structural behavior of statically determinate and indeterminate suspension bridges and arches. (L2)	L2



<b>26.C 211 CE 204: CONSTRUCTION TECHNOLOGY</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Describe the components and manufacturing process of various construction materials	L2
CO2	Explain the properties of concrete and mix design procedure	L3
CO3	Explain various components of building and their construction techniques	L3
CO4	Develop a tall building model and vertical transportation system from basic concepts	L4
CO5	Identify the causes of failure of buildings and foundations.	L2

<b>27.C 212 CE206 FLUID MECHANICS -II</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the working of hydraulic machines	L3
CO2	Explain the types and working of Centrifugal Pumps	L3
CO3	Simulate the dynamics of uniform flow and non-uniform flow of fluid through open channels	L3
CO4	Design the open channels	L2
CO5	Derive the relation between different variables using their dimensions	L3

<b>28. C213 CE 208 GEOTECHNICAL ENGINEERING –I</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the basic soil properties.	L2
CO2	Obtain the index properties of soil.	L3
CO3	Examine the effect of water in soils.	L3
CO4	Analyze the response of soil, using shear strength, compressibility and compaction parameters.	L4
CO5	Describe the stability of slopes.	L2

<b>29.C 214 HS 210 LIFE SKILLS</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	To develop communication competence ,convey thoughts and ideas with clarity and focus, report writing skills and develop interview and group discussion skills.	L4
CO2	To build critical thinking process and problem solving skills	L3
CO3	To develop team dynamics and effectiveness that enable leadership qualities	L4
CO4	To compare Engineering ethics and human values	L2
CO5	To develop moral and social values, loyalty and to learn to appreciate the rights of others	L4

<b>30. C 215 CE 232 MATERIAL TESTING LAB 1</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Evaluate the hardness and toughness of a given specimen	L5
CO2	Obtain the fundamental material properties of a given specimen subjected to various loadings	L3
CO3	Analyze the bending behavior of structural members	L4
CO4	Examine the behavior of beams under deflection to verify Clerk Maxwell's theorem	L4
CO5	Explain the structural behavior and stresses developed under various loadings	L2

<b>31. C 216 CE234 FLUID MECHANICS LAB</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Experiment with the values of fluid properties and relationship between them	L3
CO2	Apply the principles of continuity, and energy to fluid motions	L3
CO3	Solve the practical fluid mechanics problems	L3
CO4	Solve the engineering problems of water conveyance in closed and open channels	L3
CO5	Utilize ones ability as an individual or in a team for the effective communication, practical skill and document design.	L3

## SEMESTER 5

<b>32. C 301 CE301 Design of Concrete Structures I</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Understand the different philosophies of design with emphasis on Limit State Method.	L2
CO2	Design various concrete structural elements using relevant IS codes.	L3
CO3	Analyse the behaviour of reinforced concrete members under different types of loading.	L4
CO4	Prepare reinforcement detailing of various reinforced concrete structural members as per relevant IS code handbooks.	L3
CO5	Interpret safety of various reinforced concrete members based on deflection and crack width criteria.	L2

<b>33. C302 CE 303 Structural Analysis - II</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Apply various methods for analysing continuous beams and beams curved in plan.	L3
CO2	Perform slope deflection method of analysis for beams and simple frames.	L3
CO3	Solve for stress resultants using moment distribution method in structures.	L3
CO4	Analyse the structures using Kani's method.	L4
CO5	Simulate the structures for stress resultants using plastic theory.	L3

<b>34.C 303 CE 305 Geotechnical Engineering –II</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Evaluate the bearing pressure of soil under different types of foundations	L3
CO2	Obtain the lateral earth pressure on earth retaining structures	L3
CO3	Assess the different types of settlement of foundations	L5
CO4	Estimate the load carrying capacity of piles	L3
CO5	Analyze machine foundation systems subjected to vibrations	L3

**35. C 304 CE 307 GEOMATICS**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Explain the various methods of traversing.	L2
CO2	Illustrate setting out of curves.	L2
CO3	Develop solutions using GPS surveying methods.	L3
CO4	Examine the various applications of Remote sensing in civil engineering.	L4
CO5	Utilize GIS to arrive at solutions for various civil engineering problems.	L3

**36. C 305 CE 309: WATER RESOURCE ENGINEERING**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Estimate various components of hydrologic cycle.	L3
CO2	Determine crop water requirements for design of irrigation systems.	L2
CO3	Explain the features of various river training works.	L2
CO4	Estimate the storage capacity or reservoirs and their useful life.	L3
CO5	Examine ground water potential in the given region from knowledge acquired from aquifers and wells.	L4

**37.C 306 CE 361 ADVANCED CONCRETE TECHNOLOGY**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the testing of materials used in concrete as per IS Codes.	L2
CO2	Identify the methods for determining the properties of fresh and hardened concrete.	L3
CO3	Determine the quantities of ingredients in concrete mix using ACI and IS code procedures.	L5
CO4	Explain durability and non destructive testing procedures of concretes.	L2
CO5	Develop special concretes depending on specific applications.	L3

**38. C 308 CE 331 MATERIAL TESTING LAB II**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Evaluate the suitability of basic ingredients for concrete.	L5
CO2	Obtain the workability in fresh concrete.	L3
CO3	Analyze the strength of hardened concrete and other building materials.	L4
CO4	Design the concrete mixes using IS Method.	L3
CO5	Perform as a member or leader in teamwork through communication and technical skills.	L3

**39.C 309 CE 333 GEOTECHNICAL ENGINEERING LAB**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Classify fine-grained and coarse grained soil for engineering use.	L3
CO2	Obtain engineering properties of soil.	L3
CO3	Choose the density of soil for the construction of embankments and earth dams.	L3
CO4	Evaluate the suitability of sub grade material for road construction.	L5
CO5	Perform as a member or leader in teamwork through communication and technical skills.	L3

**40. C 307 CE 341 DESIGN PROJECT**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the application and feasibility of an identified problem in Civil Engineering.	L2
CO2	Apply the engineering and technological solutions required to improve and economize infrastructure and environment.	L3
CO3	Analyze a problem in the field of civil engineering through studies and experiments to attain the project objectives.	L4
CO4	Evaluate the data collected for designing a structure/system/process to meet desired needs within realistic constraints.	L5
CO5	Develop a technical dissertation for a solution to practical engineering problem by Functioning as a team through effective communication, presentation and technical skills.	L6

## SEMESTER 6

<b>41. C 310 CE 302 Design of Hydraulic Structures</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the various components of a diversion headworks.	L2
CO2	Design canals through alluvial soil.	L3
CO3	Design various hydraulic structures such as aqueducts, canal falls etc.	L3
CO4	Illustrate the functions of various components of a gravity dam.	L2
CO5	Summarise energy dissipation in different types of spillways.	L2

<b>42.C 311 CE 304 Design of Concrete Structures II</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Design short columns and slender columns according to relevant design charts	L3
CO2	Design RCC footings and retaining walls according to relevant codal provisions	L3
CO3	Design RCC circular slabs and domes.	L3
CO4	Design RCC water tanks according to relevant codal provisions.	L3
CO5	Explain the concepts of prestressing and losses in prestressing.	L2

<b>43. C 312 CE 306 Computer Programming &amp; Computational Technique</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Illustrate the fundamentals of computer programming using C ++	L2
CO2	Utilize various programming constructs in solving problems.	L3
CO3	Develop C++ programs using functions and files.	L3
CO4	Outline the basic concepts of object oriented programming.	L2
CO5	Solve problems using various numerical methods.	L3

<b>44. C313 CE 308 TRANSPORTATION ENGINEERING I</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the cross section and alignment of highways with the help of engineering surveys.	L2
CO2	Inspect geometric design of highways based on codal requirements.	L4
CO3	Summarize the measures for improvement of traffic performance on road network.	L2
CO4	Identify suitable materials for construction of highways using appropriate testing method.	L3
CO5	Explain the various aspects of Airport Planning and Design	L2

<b>45.C 314 HS 300 Principles of Management</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the managerial roles and functions.	L2
CO2	Explain the management theories, contributions and managerial ethics.	L2
CO3	Apply the planning and organizational concepts for decision making.	L3
CO4	Identify the staffing and HRD functions.	L3
CO5	Describe the different approaches, leadership behaviour and styles.	L2

<b>46. C 329 CE 374 AIR QUALITY MANAGEMENT</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Outline various sources and types of air pollution.	L2
CO2	Explain effects of gaseous and particulate air pollutants.	L2
CO3	Identify meteorological aspects of air pollutant dispersion and plume behaviour.	L3
CO4	CO4 Examine dispersion phenomenon of air pollutant.	L4
CO5	CO5 Recommend various control measures for achieving atmospheric stability.	L5

<b>47. C316 CE 332 Transportation Engineering Lab</b>		
<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Analyze the suitability of soil as a pavement subgrade material.	L4
CO2	Evaluate the suitability of bitumen and coarse aggregates as pavement construction materials.	L5
CO3	Design bituminous mixes for pavement layers.	L3
CO4	Examine the functional adequacy of pavements based on roughness of pavement surface.	L4
CO5	Perform as a member or leader in teamwork through communication and technical skills.	L3

**48. C 317 CE 334COMPUTER AIDED CIVIL ENGINEERING LAB**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	To select the appropriate Structural system for a conventional reinforced concrete Structure.	L3
CO2	Determine the preliminary designs of structures assuming preliminary dimensions.	L4
CO3	Apply the fundamentals of reinforced concrete to design structures like foundations and staircases.	L3
CO4	Construct Bar Chart using Project Management Software Primavera for Preparation of Bar Chart .	L3
CO5	Perform as a member or leader in team work through effective.	L3

**49.C313\_CET 308 COMPREHENSIVE COURSE WORK**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Learn to prepare for a competitive examination.	L3
CO2	Comprehend the questions in Civil Engineering field and answer them with confidence.	L4
CO3	Communicate effectively with faculty in scholarly environments.	L4
CO4	Analyze the comprehensive knowledge gained in basic courses in the field of Civil Engineering.	L4

**SEMESTER 7****48. C401\_CE 401 DESIGN OF STEEL STRUCTURES**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Design different types of connections in structural steel construction according to code provisions.	L3
CO2	design tension members and compression members according to code provisions.	L3
CO3	Design beams and plate girders according to code provisions.	L3
CO4	Design roof truss according to code provisions.	L3
CO5	Design structural components using timber.	L3



**49. C402 \_CE 403 STRUCTURAL ANALYSIS III**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Analyse the structures using approximate methods.	L4
CO2	Analyse trusses, continuous beams and rigid frames using flexibility method.	L4
CO3	Analyse trusses, continuous beams and rigid frames by stiffness method.	L4
CO4	Examine Finite element procedures by direct stiffness method.	L3
CO5	Simulate the response of SDOF systems using the basics of structural dynamics.	L3

**50. C 403 \_CE 405 ENVIRONMENTAL ENGINEERING I**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Estimate the water demand by population forecasting methods taking into account the fluctuations in demand.	L3
CO2	Analyze the quality of drinking water.	L4
CO3	Design the various units of water treatment.	L3
CO4	Categorize the disinfection methods as per the water quality.	L4
CO5	Develop the different layout and methods used in layout of water distribution network.	L3

**51. C 404 \_CE 407 Transportation Engineering II**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Develop the evolution of Indian Railways for Nation Building.	L3
CO2	Determine the geometric formation of railway alignment.	L5
CO3	Develop the concepts of railway operations, control and maintenance.	L3
CO4	Identify the key factors involved in the construction of tunnel based on design criteria.	L3
CO5	Develop the concepts of Harbour and Dock Engineering.	L3

**52.C 405 CE 409 QUANTITY SURVEYING AND VALUATION**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO1	Develop the specification for different items of work in a building.	L3
CO2	Analyze the rate of items of work based on material and workmanship as per IS specification.	L4
CO3	Prepare a detailed estimate of quantity and cost for different items of work related to construction.	L2
CO4	Discuss bar bending schedule for various items of work in construction .	L2
CO5	Elaborate different methods of valuation for land and building.	L2

**53. C410 \_CE 469 ENVIRONMENTAL IMPACT ASSESSMENT**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Analyze the EIA process and its key elements.	L4
CO2	Identify the various sources of pollutants.	L3
CO3	Analyze the impact of pollutants on micro and macro scales.	L4
CO4	Examine the role of environmental engineer and public participation in EIA.	L4
CO5	Propose an Environmental Management Plan for a developmental project.	L6

**54. C 414 \_CE 431 ENVIRONMENTAL ENGINEERING LAB**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Analyse and interpret laboratorial results.	L4
CO2	Determine the parameters related to water and wastewater quality and know which tests are appropriate for given environmental problems.	L5
CO3	Identify the necessity of water and wastewater treatment on people and the environment.	L3
CO4	Develop necessary background for subsequent courses in environmental engineering.	L3
CO5	Perform as a member or leader in teamwork through communication and technical skills.	L3

**55.C 413 CE 451 SEMINAR & PROJECT PRELIMINARY**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Discover the knowledge, facts and techniques in the related area.	L4
CO2	Prepare a technical presentation citing relevant references.	L3
CO3	Identify a problem in the field of civil engineering through studies and experiments to attain the project objectives.	L3
CO4	Analyze the data collected for designing a structure/system/process to meet desired needs within realistic constraints.	L4
CO5	Function as a team for technical dissertation to practical engineering problem through effective communication, presentation and technical skills.	L4

**SEMESTER 8****56. C 415 CE 402 ENVIRONMENTAL ENGINEERING II**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Describe various sources and characteristics of wastewater treatment.	L2
CO2	Adopt various treatment methods available for wastewater treatment.	L3
CO3	Analyse the functions of various waste water treatment units.	L4
CO4	Design various units for waste water treatment.	L3
CO5	Analyse the different methods used for treating and disposal of sewage sludge.	L4

**57. C416 CE 404 CIVIL ENGINEERING PROJECT MANAGEMENT**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Apply the principles of planning & scheduling of civil engineering projects by optimized use of equipment and resources.	L3
CO2	Analyze the suitability of network diagrams for construction adhering to the cost and time.	L4
CO3	Propose a reasonable solution for disputes settlement of construction projects with emphasis on ethics.	L6
CO4	Develop the techniques of effective material management and safe construction practices.	L3
CO5	Perceive key factors involved in construction procedures and quality management.	L5

**58. C 422 CE 474 MUNICIPAL SOLID WASTE MANAGEMENT**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Classify the different categories of municipal solid waste.	L4

CO2	Explain composition of solid waste with methods of handling,sampling and storage of solid waste.	L5
CO3	Compare the different methods of collection and transfer of solid waste.	L4
CO4	Importance of different processing techniques.	L5
CO5	Elaborate composting and incineration of solid waste.	L6

**59. C 424 FS 482 RESPONSIBLE ENGINEERING**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Explain the role of human values, morals and ethics for professional excellence.	L2
CO2	Explain the role of human values, morals and ethics for professional excellence.	L3
CO3	List the role of engineers in social experimentation and their responsibility for safety.	L3
CO4	Summarize the responsibilities and rights of engineers in ethical perspective.	L2
CO5	Explain the various zones of global issues in ethical aspects.	L2

**60.C 423 CE 492 PROJECT**

<b>CO's</b>	<b>Topic</b>	<b>Level</b>
CO 1	Discover the knowledge, facts and techniques in the related area.	L4
CO2	Prepare a technical presentation citing relevant references.	L3
CO3	Identify a problem in the field of civil engineering through studies and experiments to attain the project objectives.	L3
CO4	Analyze the data collected for modelling/designing a structure/system/process to meet desired needs within realistic constraints.	L4
CO5	Function as a team for technical dissertation to practical engineering problem through effective communication, presentation and technical skills.	L4