



**MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE**  
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Website : [www.msec.edu.in](http://www.msec.edu.in)  
**DEPARTMENT OF CIVIL ENGINEERING**

**REGULATION-2013**  
**COURSE OUTCOMES**

**MA6351- Transforms and Partial Differential Equations (C201)**

C201.1	Formulate and solve partial differential equations.
C201.2	Evaluate Fourier series of periodic functions.
C201.3	Apply the method of separation of variables to find the solution of heat and wave equation.
C201.4	Illustrate the fourier transform techniques.
C201.5	Examine Z transform techniques and solve difference equations.

**GE6351-Environment Science and Engineering. (C202)**

C202.1	Gain knowledge on flora and fauna in our environment helps to know about social environment.
C202.2	Gain knowledge on the offensive effects of pollution in the day-to-day life.
C202.3	Gain knowledge on the basic concepts of Climate Change, Water scarcity and water shortage.
C202.4	Adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming.
C202.5	Gain knowledge about the problems faced by the society due to population explosion.

**CE6301-Engineering Geology (C203)**

C203.1	Understand the importance of various geological features, agencies and seismic zones in India.
C203.2	Gain a wide knowledge about the properties of various minerals and rock
C203.3	Gain knowledge about types and properties of rocks, their distribution and uses.
C203.4	Understand structure of folds, faults & joints and geophysical methods of investigation.
C203.5	Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour.

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**CE6302 – Mechanics of Solids (C204)**

C204.1	Know the behaviour of different material with its strength, stress, strain and deformation of solids with applications to bars, beams and thin cylinders.
C204.2	Know about the different types of supports and loading also able to find the shear force and bending moment in beams and understand concept of theory of simple bending with the induced stress resultants, deformations and about flitched beams
C204.3	Have sufficient knowledge to calculate the deflection of beams by different methods and selection of method for determining slope and deflection.
C204.4	Understand the effect of torsion on shafts and springs and apply basic equation of torsion in design of circular shafts and different types of springs.
C204.5	Have sufficient knowledge to analyse the pin jointed plane and space

**CE6303 - Mechanics of Fluids. (C205)**

C205.1	Gain knowledge about properties of fluids such as specific gravity, weight, volume and fluid statics problems in pressure measurement, forces on plane and buoyancy, floatation.
C205.2	Understand and solve problems related to equation of motion, continuity equation and Bernoulli's theorem, linear momentum equation and its applications
C205.3	Able to solve the losses of flow in pipes using Darcy and Weisbach's equation and also understand the concept of Moody's diagram
C205.4	Able to understand the turbulent and boundary layer of flow to find the drag force, displacement, energy and momentum thickness.
C205.5	Gain knowledge about dimensional, model and prototype analysis of hydraulic structures.

**CE6304 Surveying I. (C206)**

206.1	C	Gain knowledge about the fundamental principles and chain surveying and its applications.
206.2	C	Gain knowledge about the compass and plane table surveying and its applications.
206.3	C	Gain knowledge about the applications of levelling such as computation of areas, volumes, contours and mass haul diagrams.
206.4	C	Gain knowledge about the applications of levelling, its types, errors and adjustments.
206.5	C	Gain knowledge about theodolite and tachometric surveying.

  
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**CE6311 Survey Practical I. (C207)**

C207.1	Acquire practical knowledge of handling basic surveying instruments.
C207.2	Estimate the areas and locate the features using chain and plane table surveying.
C207.3	Capable of conducting surveys using compass survey and to adjust the compass traverse graphically.
C207.4	Estimate inaccessible distance and elevation of objects using levelling.
C207.5	Deduct reduced levels using various methods of levelling and developments of contour map and also will be able to study parts of theodolite

**CE6312 Computer Aided Building Drawing (C208)**

C208.1	Gain knowledge on the components of building types, specifications, orientation and functional requirements as per NBC.
C208.2	Gain knowledge about drawing tools, commands and shortcuts in drafting software.
C208.3	Draft the plan, elevation and sectional views of structures such as non-load bearing buildings, RCC framed structure, sloped roof and industrial buildings.
C208.4	Improve management of project life cycle using BIM.
C208.5	Draw model buildings in 2D and 3D view.

**MA6459 Numerical Methods. (C209)**

C209.1	Have clear perception of the power of numerical techniques ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.
C209.2	Gain knowledge of interpolation-forward and backward.
C209.3	Solve problems in differentiation and integration.
C209.4	solve various types of initial value partial differential Equations
C209.5	Solve various types of Seidal method problems.

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**CE6401 Construction Materials (C210)**

C210.1	Understand the properties of most common building materials such as stones, bricks and concrete blocks.
C210.2	Understand the typical and potential applications of lime, cement, aggregates and their properties.
C210.3	Understand the materials used in preparation of concrete and its mix design.
C210.4	Understand the applications of timber and other materials including their properties.
C210.5	Understand the importance of modern material for construction and their properties.

**CE6402 Strength of Materials. (C211)**

C211.1	Have a thorough knowledge about the analysis of indeterminate beams and the use of energy methods for estimating the slope and deflections of beam and trusses
C211.2	Gain knowledge on indeterminate beams and will be able to determine shear force and bending moment by using theorem of three moments.
C211.3	Have a basic idea of bucking loads of columns for different end conditions and also about thick and compound cylinders.
C211.4	Gain knowledge about the state of stresses in three dimensions, theories of failure and application in analysis of stress and load carrying capacity
C211.5	Have a clear idea about the unsymmetrical bending of beams, shear centre and curved beams by using Winkler Bach formula.

**CE6403 Applied Hydraulic Engineering (C212)**

C212.1	Gain knowledge of uniform flow fluid mechanics for addressing problems in open channels.
C212.2	Gain knowledge of various hydraulic engineering problems like gradually varied flows in study state conditions. The student will be able to relate the theory and compute the gradually varied flow problems.
C212.3	Gain knowledge of various hydraulic engineering problems like rapidly Varied flows in study state conditions. The student must be able to relate the theory and compute the Rapidly varied flow problems.
C212.4	Gain knowledge of various hydraulic machineries problems like in turbines. Students must be able to relate the theory and compute the Pumps problems
C212.5	Gain knowledge of various hydraulic machineries problems like in Pumps. Students should be able to relate the theory and compute the Pumps problems

  
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**CE6404 Surveying II. (C213)**


C213.1	Gain knowledge about the different elements of geodetic measurements, control survey methodology and its adjustments.
C213.2	Gain knowledge about components, working principle and applications of total station.
C213.3	Gain knowledge about the working principle of GPS, its components, signal structure and sources of error in measurements.
C213.4	Understand the concepts of modern surveying methods.
C213.5	Understand the concepts and applications of astronomical surveying.

**CE6405 Soil Mechanics (C214)**

C214.1	Classify the soil and assess the engineering properties, based on index properties.
C214.2	Understand the stress concepts and permeability in soils.
C214.3	Understand and identify the settlement in soil.
C214.4	Determine the shear strength of soil
C214.5	Analyse both finite and infinite slopes.

**CE6411 Strength of Materials Laboratory (C215)**

C215.1	Determine the important mechanical properties of materials.
C215.2	Perform different destructive testing on various materials
C215.3	Compute the hardness of various metals
C215.4	Evaluate the mechanical properties of various materials like Concrete, steel and wood.
C215.5	Determine the stiffness of the helical springs.

  
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**CE6502 Foundation Engineering (C302)**

C302.1	Understand the site investigation, methods and sampling with respect to foundation of building.
C302.2	Gain knowledge on bearing capacity and testing methods to find safe bearing capacity based on field investigation, laboratory test and methods of minimizing total and differential settlements.
C302.3	Design footings based on loads on structure, bearing capacity of soil and seismic force.
C302.4	Determine the load carrying capacity and settlement of pile foundation based on field investigation and soil properties.
C302.5	Gain knowledge on earth pressure analysis and stability analysis of retaining walls.

**CE6503 Environmental Engineering I (C303)**

C303.1	Understanding of water quality criteria and standards and their relation to public health.
C303.2	Have an insight into the structure of drinking water supply systems, including water transport, treatment and distribution.
C303.3	Have the ability to design various functional units in treatment system
C303.4	Know the detailed treatment systems involved in treating water including advanced treatment units
C303.5	Gain the ability to design and evaluate water supply systems and their alternatives on basis of chosen selection criteria.

**CE6504 Highway Engineering (C304)**

C304.1	Gain knowledge of history of road development, cross sections of road, classification of roads and factors influencing highway alignment.
C304.2	Gain knowledge of types of horizontal and vertical curves, concept of super elevation, transition curves and gradients.
C304.3	Gain knowledge of pavement components and design consideration of flexible and rigid pavement as per IRC guidelines.
C304.4	Gain knowledge about properties and testing of highway materials, quality control measures and highway drainage.
C304.5	Gain knowledge of pavement evaluation, maintenance of pavement, roughness, present serviceability index and skid resistance.

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**CE6505 Design of Reinforced Concrete Elements (C305)**

C305.1	Understand the type of loadings and various design methods for the design of RC elements and also able to classify the section.
C305.2	Analysis and design of beams and flanged beams and the types of loads acting on the slab and also design the various types of slabs by limit state method.
C305.3	Understand the design of beams for shear, bond and torsion
C305.4	Design columns for axial, uniaxial and biaxial eccentric loadings.
C305.5	Understand the safe bearing capacity of soil and Design the footing by limit state method

**CE6506 Construction Techniques, Equipment and Practice (C306)**

C306.1	Gain knowledge on manufacturing process of concrete and its testing methods.
C306.2	Gain knowledge on the general construction method step by step practicing in site.
C306.3	Gain knowledge on the sub structures.
C306.4	Gain knowledge on the super structures.
C306.5	Gain knowledge on selection factors, various types of equipment for earthwork, foundation concreting, material handling, erection, dredging, trenching and tunnelling.

**GE6674 Communication and Soft skills- Laboratory Based (C307)**

C307.1	Take international examination such as IELTS and TOEFL.
C307.2	Make presentations and Participate in Group Discussions
C307.3	Successfully answer questions in interviews

  
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**CE6511 Soil Mechanics Laboratory (C308)**

C308.1	Gain knowledge of site specific field investigations including collection of soil samples for testing and observation of soil behaviour/ building damage.
C308.2	Identify and classify soil based on standard geotechnical engineering practice.
C308.3	Capable of performing laboratory compaction and in-place density tests for fill quality control.
C308.4	Determine index properties of the soil and its behaviour
C308.5	Determine engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.

**CE6512 Survey Camp (C309)**

C309.1	Gain a thorough knowledge of preparation of contours in different terrains
C309.2	Gain a good idea of calculation of earthwork excavation.
C309.3	Apply a variety of techniques about computing large areas
C309.4	Well versed with the concept of astronomical surveying
C309.5	Capable of drawing the features of different elements along the proposal road

**CE6601 Design of Reinforced Concrete & Brick Masonry Structures. (C310)**

C310.1	Basic knowledge on the design of retaining wall.
C310.2	Gain knowledge about embankment structures and their types.
C310.3	Knowledge about working stress method and their component of structures.
C310.4	Basic knowledge about cracks and determine collapse load by using virtual work method.
C310.5	Gain knowledge about brick masonry structures and will be able to design brick masonry structures.

  
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**CE6602 Structural Analysis II (C311)**

C311.1	Gain knowledge about flexibility method and will be able to analyse the structures by using matrix flexibility method.
C311.2	Gain knowledge about stiffness method and will be able to analyse the structures by using stiffness matrix methods.
C311.3	Gain knowledge about finite element method and will be able to solve Plane stress and plane strain problems for triangular elements, truss element, beam element
C311.4	Gain knowledge about Upper and lower bound theorems and will be able to perform plastic analysis of indeterminate beams and frames.
C311.5	Gain knowledge about space trusses and cable structures and will be able to analyse the suspension bridges with two and three hinged stiffening girders and also space truss using tension coefficient method.


**CE6603 Design of Steel Structures (C312)**

C312.1	Design the connection for steel structures using rivet, bolt and weld
C312.2	Identify the different failure modes of steel tension and compression members and compute their design strength
C312.3	To select the most suitable section shape and size for tension and compression members
C312.4	Design the beam subjected to uniaxial and biaxial bending
C312.5	Design the various structural component in industrial steel structures.

**CE6604 Railways, Airports and Harbour Engineering.(C313)**

C313.1	Gain knowledge about the design of railway elements.
C313.2	Gain knowledge about hierarchy order of construction and maintenance of Metro, Mono and Underground railways.
C313.3	Plan and design the airport runway and plan the orientation of structures.
C313.4	Plan and design harbours and gain knowledge of the construction of coastal structures and their elements with proper environmental concern for port operations.
C313.5	Design runway, gain knowledge on pavement design principles and elements of taxiway, passenger facilities & services

  
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**CE6605 Environmental Engineering II (C314)**

C314.1	Understand the planning for sewage systems.
C314.2	Gain knowledge of designing, laying and testing of sewerage systems
C314.3	Know the primary treatment units for sewage.
C314.4	Know the detailed treatment systems involved in treating sewage including advanced treatment units.
C314.5	Know the disposal and sludge management techniques.

**CE6004 Architecture. (C315)**

C315.1	Understand the basics of architecture, elements and principles and knowledge of its function and application.
C315.2	Understand the concept of architectural surveying and rules to explore and aid in designing.
C315.3	Utilise the building typology and their regulation, application of the standards and rules to design a given building
C315.4	Classify the concepts of climate and building types, green building concepts and their uses.
C315.5	Gain knowledge on town planning concepts, standards and the overall master plan along with their principles.

**CE6611 Environmental Engineering Laboratory.(C316)**

C316.1	Determine physical, chemical and biological characteristics of water and wastewater.
C316.2	Calculate optimum dosage of coagulant.
C316.3	Assess the quality of water and waste water.
C316.4	Quantify the pollutant concentration in water and wastewater.
C316.5	Examine the conditions for the growth of micro-organisms.

  
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**C6612 Concrete and Highway Engineering laboratory (C317)**

C317.1	Assess the principles of testing fresh concrete.
C317.2	Gain experience on conducting the tests on hardened concrete.
C317.3	Gain experience on conducting various tests on aggregates.
C317.4	Gain experience on conducting various tests on bitumen.
C317.5	Understand the techniques to characterize various pavement materials through relevant tests conducted on bituminous mixes.

**CE6701 Structural Dynamics and Earthquake Engineering. (C401)**

C401.1	Apply the laws of dynamics to establish simple and realistic mathematical models of engineering
C401.2	Formulate equation of motion for single degree of freedom subjected to free and forced vibrations
C401.3	Determinate the natural frequency for multi-storey building subjected to dynamic loading
C401.4	Summarize the characteristics of earthquake and its effect on structures
C401.5	Estimate lateral forces and the behaviour of reinforced concrete and pre-stressed concrete structure under earthquake loading

**CE6702 Prestressed Concrete Structures. (C402)**

C402.1	Understand the materials used in prestressed elements and stress distribution of prestressed concrete members and to analyze the prestressed concrete beams.
C402.2	Have knowledge on methods of prestressing and able to design various prestressed concrete structural elements.
C402.3	Analyse for deflection of prestressed concrete members and design anchorage zone.
C402.4	Gain knowledge on analyze and design of composite beams and continuous beams.
C402.5	Design a prestressed concrete structures-sleeper, tanks pipes and poles.

  
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### CE6703 Water Resources and Irrigation Engineering. (C403)

C404.1	Gain knowledge on water resources planning and design, operation and management of reservoir system.
C404.2	Know about the national water policy, master planning of water resources, consumptive and non-consumptive use of water resources.
C404.3	Gain knowledge on merits and demerits, irrigation efficiency and crop water requirement based on different methods
C404.4	Gain knowledge on types of canal irrigation and its components with function.
C404.5	Know about the different methods of irrigation, irrigation scheduling, water distribution system and participatory irrigation management.

### CE6704 Estimation and Quantity Surveying. (C404)

C404.1	Understand the different sectional of buildings structures from foundation to superstructure, apply different types of estimates in different situations and also able to prepare the estimate of quantities of items of works in building structures.
C404.2	study drawings related to estimate of an all items in each structure like water supply and sanitary works, road works and irrigation works
C404.3	write the general and detail specification of each item of building structures and also able to understand the rate analysis of each item of work, concepts of contract documents, rules for tender document etc.
C404.4	Prepare valuation based on different method followed in practice for land and buildings and standard rent calculation.
C404.5	Prepare the reports with respect to various construction projects.

### CE6010 Pavement Engineering. (C405)

C405.1	Understand the cross section of road works or pavements, study of different layers in pavement and its stress and deflection due to repeated loading.
C405.2	Gain knowledge about design procedure for flexible pavements through IRC guidelines, empirical methods, semi empirical methods and factors affecting the pavement.
C405.3	Have the knowledge of design methods in rigid pavements through IRC guidelines and Westergaards approach in analysis, scope of concrete roads in India.
C405.4	Gain knowledge about evaluation based on physical appearance, structural evaluation and pavement maintenance.
C405.5	Have the knowledge of testing, field control and stabilization of pavements with the use of geosynthetic method.

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**CE6011 Air Pollution Management. (C406)**

C406.1	Understand the nature, characteristics and basic concepts of air pollutants.
C406.2	Design stacks and to study the plume characteristics in relation to atmosphere
C406.3	Design and evaluate air pollutant alternatives on basis of chosen selection criteria
C406.4	Understand of the nature and basic concepts of air pollutant management and their standards
C406.5	Identify, formulate and solve air and noise pollution problems

**CE6711 Computer Aided Design and Drafting Laboratory (C407)**

C407.1	knowledge in design and drawing of RCC cantilever and counter fort type retaining walls with reinforcement details
C407.2	knowledge in design of solid slab and RCC Tee beam bridges for IRC loading and reinforcement details
C407.3	knowledge in design and drafting of circular and rectangular RCC water tanks
C407.4	knowledge in design of plate Girder Bridge, Truss Girder bridges and detailed drawings including connections
C407.5	Knowledge in design of hemispherical bottomed steel tank.

**CE6712 Design Project. (C408)**

C408.1	Design projects and will have a better experience in design.
C408.2	Gain an experience in various design problems related to Civil engineering.
C408.3	Gain knowledge on updated latest software.
C408.4	Solve complex civil engineering problems in design and analysis.
C408.5	Have a better experience in analysis of civil structures.

  
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**MG6851 Principles of Management. (C409)**

C409.1	Perform managerial functions like planning, organizing, staffing, leading & controlling.
C409.2	Acquire a basic knowledge on international aspect of management
C409.3	Gain a basic knowledge of management and its evolution.
C409.4	Gain knowledge of budgetary control and their strategies.
C409.5	Understand the motivational theories existing in management.

**CE6016 Prefabricated Structures (C410)**

C410.1	Gain knowledge about design principles, layout of factory and stages of loading in precast of different elements and precast construction.
C410.2	Acquire knowledge about panel systems, slabs, connection used in precast construction and they will be in a position to design the elements.
C410.3	Gain knowledge about types of floor systems, stairs and roofs used in precast construction.
C410.4	Know the types of walls used in precast construction, sealants, design of joints.
C410.5	Gain knowledge in behaviour of structural elements during abnormal loadings.

**CE6016 Repair and Rehabilitation of Structures (C411)**

C411.1	Determine the various types of cracks and maintenance in R.C structures and masonry structures.
C411.2	Identify the requirements of serviceability and durability in concrete.
C411.3	Understand and classify various types of repairing materials to regain its strength.
C411.4	Identify the damage of the structures by non-destructive testing.
C411.5	Understand the various techniques of rehabilitation of structures.

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**CE6811 Project Work (C412)**

C412.1	Take up challenging practical problems.
C412.2	Solve problems by formulating proper methodologies.
C412.3	Gain knowledge of the civil engineering field.
C412.4	Gain knowledge and be up to date with the latest technology.
C412.5	Find solutions for complex civil engineering problems.

  
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