



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (III)

Class:SE

Subject: CE:C301	Subject Name: Applied Mathematics-III	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Describe sound foundation in the mathematical fundamentals necessary to formulate, solve and analyze engineering problems.
2	Apply mathematical fundamentals necessary to formulate, solve and analyze engineering problems.
3	Use the basic principles of Laplace Transform, Fourier Series, Complex variables.
4	Analyze properties of complex analysis and mapping and bilinear transformation.
5	Explain partial differential equation such as vibration of string heat flow etc.
6	Study the theorem of complex integration and compute correlation equation and curve fitting.

Course outcome:

At the end of course, students will attain an ability to:

1	Demonstrate the ability of using Laplace Transform in solving the Ordinary Differential Equations and Partial Differential Equations.
2	Evaluate Fourier Series in solving the Ordinary Differential Equations and Partial Differential Equations.
3	Solve initial and boundary value problems involving ordinary differential equations.
4	Identify the analytic function, harmonic function, orthogonal trajectories.
5	Apply bilinear transformations and conformal mappings.
6	Implement theorems and calculate the contour integrals.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (III)

Class:SE

Subject: CE:C302	Name of Subject: Surveying-I	Credits: 05
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Course Objective:

At the end of course, student should be able to:

1	Classify techniques for measurement of distance, setting offsets and the functions of various instruments with their least counts, possible errors, advantages and limitations
2	Identify the different types of bearings, making corrections for Local attraction
3	Understand about the Benchmarks, computation of Reduced Levels and do the necessary
4	Study various method for calculation of areas and volumes for fields with irregular boundary
5	Measure the horizontal, vertical angles and setting out of angles
6	Prepare Radial contouring with the help of plane table.

Course outcome

At the end of course, students will attain an ability to;

1	Measure Linear measurements, chaining, ranging and offsetting and apply corrections
2	Determine the observing bearings, compute included angles and do corrections for Local Attraction
3	Calculate vertical distances, determine RL and identify & choose suitable types of levelling
4	Computation of areas and volumes by Plane Table Survey
5	Calculation of consecutive and independent co-ordinates by drawing the traverse and preparing Gale's Table by reproducing the omitted measurements
6	Analyse the obtained data and compute areas and volumes and represent data on plane surfaces as contours.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (III)

Class:SE

Subject: CEC303	Name of Subject: Strength of Materials	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Study the engineering properties of the materials and solids and analyze the concept of simple stress-strain and to evaluate the stress–strain behavior.
2	Evaluate the internal forces for the statically determinate and compound beams having internal hinges with different types of loading

3	Understand the concept and behavior of flexural members (beams) in flexure and strain energy due to axial force and impact load.
4	Identify the behavior of structural members under the action of shear forces and distribution of shear stresses for various cross sections.
5	Determine the effects of torsion on circular shaft and evaluate its effects
6	Apply the concepts of principal planes and principal stresses on beams along with combined stresses acting on members and thin cylindrical and spherical shells and apply to solve the problems.

Course outcome:

At the end of course, students will attain an ability to;

1	Determine the engineering properties for metals and non-metals and the strains induced
2	Understand the concepts of shear force, bending moment, axial force for statically determinate beams and compound beams having internal hinges; and subsequently, its application to draw the shear force, bending moment and axial force diagrams
3	Identify the flexural members for its structural behavior under the effect of flexure (bending),
4	Generate the behavior of the structural member under the action of shear and torsion either independently or in combination thereof
5	Study the deformation behavior of axially loaded columns having different end conditions and further, evaluate the strength of such columns.
6	Develop the concepts of principal planes and stresses and thin cylindrical and spherical shells and apply to solve the problems.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (III)

Class:SE

Subject: CE:C304	Name of Subject: Engineering Geology	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Acquire basic knowledge of geology and to understand its significance in various Civil Engineering Projects
2	Understand the ‘Theory of Plate Technics’ which helps to explain much of the global- scale geology including the formation of mountains, ocean, different landforms and the occurrence and the distribution of earthquake, volcanoes, landslides, etc.
3	Learn types of minerals and rocks in detail order to understand their origin, texture, structure and classification on which is helpful to comment on suitability of rock type for any civil engineering project.
4	Subdivide structural geology to understand deformation structure like fold, faults, joints, etc. and the forces responsible for their formation.
5	Extend methods of surface and sub-surface investigation and advantages and disadvantages caused due to geological condition during the construction of dam and tunnel.
6	Apply ground water zones, factor, controlling water bearing capacity of rocks, geological work of ground water technique of recharge of ground water.

Course outcome

At the end of course, students will attain an ability to;

1	Understand the significance of geological studies of seismic waves, agent modifying the earth's surface and action of wind, river, etc. on rocks.
2	Demonstrate the knowledge of geology to explain major geological process such as formation of mountain, ocean and occurrence and distribution of earthquake and volcanoes.
3	Analyze classification of minerals and rocks in terms of minerology and petrology.
4	Identify various geological structures like folds, faults, joints, etc. unconformity, their origin and distribution.
5	Apply methods of surface, sub-surface, investigation and advantages caused due to geological condition during the construction of dam and tunnel. Understand the causes and prevention of natural hazard like earthquake, volcano, landslide, etc
6	Prepare effective reports mentioning advantages and disadvantages caused due to geological condition and can evaluate any site for engineering project.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester(III)

Class:SE

Subject code: CEC305	Subject Name: Fluid Mechanics-I	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Understand the properties of fluids and basic concept to fluid mechanics and its relevance in civil engineering.
2	Study Fundamentals of hydrostatics viz. Pascal's law, hydrostatic and determination of hydrostatic pressure and center of pressure of surface.
3	Know the Principal of buoyancy and its application.
4	Understand The concept of fluid kinematics and ideal fluid flow.
5	Extend Concept of control volume, control surface and dynamics of fluid flow
6	Analyze various flow measuring devices and application.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Define various properties of fluids, state and explain different types of laws and principal of fluid mechanics.
2	Interpret different forms of pressure measurement and calculate hydrostatic force and its location for a given geometry and orientation of plane surface.
3	Compute force of buoyancy on a partially or fully submerged body and analyse the stability of a floating body.
4	Distinguish velocity potential function and stream function and solve for velocity and acceleration of a fluid at a given location in a fluid flow.
5	Derive Euler's Equation of motion and Deduce Bernoulli's equation.
6	Measure velocity and rate of flow using various devices.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code: CEC501	Subject Name: Structural Analysis-II	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Understand the concept of static and kinematic indeterminacy (degrees of freedom) of the structures such as beams & rigid pin jointed frames.
2	Analyze the statically determinate structures with reference to the variation in the temperature.
3	Demonstrate the flexibility method for evaluating the internal forces in the frame, beam and
4	Understand the concepts of various displacement method for indeterminate structures.
5	Compute the collapse load for continuous beams.
6	Extend the analyses of frame by approximate method.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Calculate the degree of indeterminacy of indeterminate structures such as beam, frame and truss.
2	Compute the stresses due to temperature variations in the structures (frame).
3	Analyze the indeterminate structure by force methods and developing the elastic curve in beams and frames under the action of loads.
4	Use the concepts of displacement method to obtain the solution of indeterminate structures.
5	Understand and explain the concept of plastic hinge, plastic moment carrying capacity, shape factor and collapse load for single and multiple span beams.
6	Demonstrate the ability to extend in the analysis of frames by approximate methods.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code: CEC502	Subject Name: Geotechnical Engineering-I	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Evaluate the types of soil and involving the weight, volume other parameters of soil.
2	Understand the index properties of soil which is measure of the engineering properties and classify the soil based on different classification systems.
3	Analyze the properties of soil related to flow of water.
4	Determine the concept of total stress, natural stress and effective stress in oil.
5	Study and identify the load determination concept through compression process.
6	Understand and interpret the technics of soil exploration assessing the sub soil condition and engineering properties of various strata along with presentation

Course Outcomes:

At the end of course, students will attain an ability to:

1	Understand the soil types index and engineering properties and relationship between various unit weights and another parameter.
2	Classify the soil with a view towards assessing the suitability of a given soil for use, either to use it to support a structure or to construct a structure therein.
3	Extend the use of Geosynthetic in soil to improve soil properties.
4	Evaluate the compression characteristics in laboratory and field hence interpret the result with compaction specification.
5	Interpret soil boring data for foundation design.
6	Conduct laboratory experiments to collect, analyze, interpret and present data



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code:CEC503	Subject Name: Applied Hydraulics	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Describe the concept of dynamics of fluid flow and dimensional analysis
2	Discuss the different hydraulic machines like centrifugal pumps, reciprocating pumps and turbines.
3	Analyze the mathematical techniques used in research work for conducting model test.
4	Evaluate the dynamic behavior of fluid flow analyzed by Newton's second law of motion.
5	Understand the uniform and non-uniform flow through open channel.
6	Examine and design open channel and understand the concept of surface profiles with hydraulic jump.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Apply the concept of dynamics of fluid flow to solve pipe bends and sprinkler problems.
2	Analyze the mathematical techniques used in dimensional analysis for design conducting model test.
3	Identify the dynamic behavior of fluid flow analyzed by Newton's second law of motion in case of flat, inclined, curved plates and propulsion of ships.
4	Discuss the different hydraulic machines like centrifugal pumps, reciprocating pumps and turbines
5	Explain the basic concept of open channel hydraulics and measure discharge through open channel for uniform flow.
6	Examine the occurrence of hydraulic jump and gradually varied flow and analyzing their parameters.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code: CEC504	Subject Name: Environmental Engineering-I	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Understand water supply system, its components and water demand by various consumers.
2	Test the quality of drinking water by various laboratory tests.
3	Summarize different processes in water treatment plant.
4	Discuss components of building water supply system.
5	Distinguish different rain water harvesting methods.
6	Generalize problems of air and noise pollution besides they will be prepared to contribute practical solution to environmental problems in our society.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Explain water supply system, its components and water demand by various consumers.
2	Determine the quality of water by various tests.
3	Illustrate different processes in water treatment facility and design different units for water treatment plants.
4	Discuss components of building water supply system.
5	Classify different rain water harvesting methods.
6	Interpret problems of air and noise pollution besides they will be prepared to contribute practical solution to environmental problems in our society.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code: CEC505	Subject Name: Transportation Engineering-I	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Describe highway alignment and different types of surveys for highway location.
2	Analyze the geometric design elements of highway.
3	Understand traffic engineering and to conduct traffic volume study.
4	Discuss properties of highway material and various test to be conducted to evaluate the suitability of highway materials.
5	Illustrate the different types of highway pavements.
6	Evaluate construction of different types of roads, strengthening of existing pavements and highway drainage.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Explain highway alignment and different types of surveys for highway location.
2	Design the geometric elements of highway.
3	Understand traffic engineering and to conduct traffic volume study.
4	Discuss properties of highway material and various test to be conducted to evaluate the suitability of highway materials.
5	Design flexible and rigid pavements.
6	Evaluate construction of different types of roads, strengthening of existing pavements and highway drainage.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code: CEDLO5062	Subject Name: Advance Concrete Technology	Credits:04
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Course Objective:

At the end of course, student should be able to

1	Describe the various materials and properties in concrete.
2	Understand the various properties of special concrete
3	Learn and calculate the Mix design by different methods.
4	Explore knowledge of Fiber Reinforced Concrete.
5	Identify and study the different procedures for testing concrete.
6	Discuss the concept of durability and cracking in concrete.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Explain the various materials and properties in concrete.
2	Identify the various properties of special concrete and its use in modern construction.
3	Evaluate and implement the Mix design by different methods.
4	Apply the knowledge of fiber Reinforced Concrete in design.
5	Describe the different procedures to carry out tests on concrete.
6	Illustrate the durability of concrete.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code: CE- DLO5063	Subject Name: Building Services and Repairs	Credits: 04
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Course Objective:

The course objectives are

1	Understand design concepts of various machineries like lift, escalators, vibrators, concrete mixers etc
2	Acquire knowledge of plumbing systems and fire safety in buildings
3	Get familiar with electrical systems and illumination design in buildings
4	Assess the causes of distress of concrete structures, seepage and leakage in concrete structures and their effect on steel corrosion
5	Evaluate and assess damage through condition survey and non destructive testing methods
6	Choose repair material, methodologies for crack repair and steel corrosion protection methods in field

Course Outcomes:

At the end of course, students will attain an ability to:

1	Understand various machineries like lift, escalator, vibrator, concrete mixers etc
2	Examine the causes of fire and suggest safety measures for fire and understand plumbing system
3	Outline different electrical services in buildings
4	Interpret the causes of deterioration of concrete structures
5	Assess the structural health of building and infra structural works
6	Implement techniques for repairing and employ methods of steel protection in the field



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (V)

Class:TE

Subject code:CE507	Subject Name: Business & Communication Ethics	Credits: 02
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Course Objective:

The course objectives are

1	Describe professional ethics and codes of professional practice
2	Classify and explain effective communication and interpersonal skills.
3	Apply multidisciplinary approach towards all life tasks. Prescribe an environment for students to work on Multidisciplinary projects as part of different teams to enhance their team building capabilities like leadership, motivation, teamwork etc.
4	Use their professional and ethical attitude, effective communication skills and teamwork with an ability to understand engineer's social responsibilities.
5	Support students with an academic environment where they will be aware of the excellence, leadership and lifelong learning needed for a successful professional career
6	Formulate students for successful careers that meets the global Industrial and Corporate requirement.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Illustrate a technical document using precise language, suitable vocabulary and appropriate style.
2	Demonstrate knowledge of professional and ethical responsibilities by effective communication in both verbal and written form.
3	Develop the life skills with key expertise to progress professionally by building stronger relationships.
4	Sketch an entrepreneurial approach and ability for life-long learning. Demonstrate awareness of contemporary issues.
5	Apply the traits of a suitable candidate for pursuing higher education/ job interview, upon being trained in the techniques of presentation and Interview skills.
6	Deliver formal presentations, effectively implementing the verbal and non-verbal skills. Participate and succeed in Campus placements and competitive examinations



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (VII)

Class:B.E

Subject code: CEC702	Subject: Theory of Reinforced Concrete Structures	Credits:06
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Course Objective:

At the end of course, student should be able to:

1	Develop the clear understanding amongst the students of the concepts of design of reinforced concrete structure Working stress method
2	Study the various clauses of IS: 456-2000 and its significance in the RCC design in Limit State Method (LSM).
3	Defend the concepts of LSM in the analysis and design of beams.
4	Extend the concepts of LSM in the analysis and design slabs.
5	Design the compression member by interrelating the LSM design Theory
6	Summarize the LSM concept to understand the design of footing.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Understand the pros and cons of the ULM and LSM vis-à-vis Working Stress method (WSM) studied in semester VI.
2	Implement the various clauses in IS:456 in designing the RCC structural member.
3	Apply the concepts of LSM in analyzing and designing the beams in flexure and shear.
4	Design the one way and two-way slab.
5	Develop the interaction curve and design the column.
6	Appraise the designing of different footings.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (VII)

Class:B.E

Subject code:CEC702	Subject: Quantity Survey Estimation and Valuation	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Read, understand and interpret plans, sections, detailed drawings and specifications for a construction project.
2	Understand the various methods of detailed and approximate estimates
3	Discuss the importance of relevant IS: 1200- 1964 codes and relevant Indian Standard specifications.
4	Compute the rate analysis for various items: standard and non-standard and the use of DSR in this process.
5	Understand the arbitration process.
6	Learn to determine value assessment of a property.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Read, understand and interpret plans, sections, detailed drawings and specifications for a construction project.
2	Prepare approximate and detailed estimates based on the quantity survey of the available general and detailed drawings.
3	Draft specifications, make bar bending schedules and draw mass haul diagrams.
4	Create rate analysis for various items: standard and non-standards with the help of DSR in this process.
5	Implement the arbitration process to resolve the ambiguity between two parties.
6	Understand the role of valuer and assess of the value of a property.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (VII)

Class:B.E

Subject code: CE-703	Subject Name: Water Resource Engineering -II	Credits:05
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Course Objective:

The course objectives are

1	Understand different types of dams and its suitability to a particular region
2	Study design consideration of earthen dams
3	Explain the design criteria of Earth and rock fill dams
4	Classify various types of Spillways and energy dissipaters
5	Evaluate the importance of silt theories for design of irrigation channels
6	Classification of canals and design of canal system.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Design the section of gravity dams, earth and rockfill dams, arch dams and buttress dams.
2	Draw seepage line & understand the Swedish circle method
3	Illustrate design of a spillways and energy dissipaters
4	Apply silt theories to design irrigation canals
5	Explain various types of canals and its maintenance
6	Sketches of different cross drainage works of a canal system



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Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (VII)

Class:B.E

Subject code: CE-DLO 7042	Subject Name:Solid Waste Management	Credits:05
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Course Objective:

The course objectives are

1	Make the students conversant with different aspects of the types, sources, generation, storage, collection, transport, processing and disposal of municipal solid waste.
2	Explain the different types of sources, sampling and characteristics of solid waste.
3	Impart knowledge and skills in the collection, storage, transport and recycling options for solid wastes including the related engineering principles, design criteria, methods and equipments.
4	Appreciate the current practices available and interpret the systems available in solid waste management.
5	Create awareness regarding the significance of recycling, reduce, reuse of solid wastes and also to impart students with the skill of design and operation of disposal system based on latest technology.
6	Provide students prerequisite knowledge necessary for higher studies and research in the field of Solid waste management.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Explain generation, storage, collection, transfer and transport, processing, recovery and disposal in the management of solid waste.
2	Understand the characteristics of different types of solid waste and the factors affecting variation.
3	Identify the methods of collection, storage and transportation of solid waste
4	Outline the suitable technical solutions for processing of wastes.
5	Ability to plan waste minimization and disposal of municipal solid waste.
6	Recognize the safe handling and treatment of Hazardous, Electronic and Biomedical waste.



Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (VII)

Class:B.E

Subject code:CEC-ILOC7017	Subject Name:Disaster Management and Mitigation Measures	Credits:03
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Course Objective:

The course objectives are

1	Understand various types of disaster occurring around the world
2	Study and understand the natural and man made disaster
3	To understand the disaster management policy and administration
4	Explain the institutional framework and understand the application of GIS in the field of disaster management.
5	Analyse the various ways to raise the finance for relief expenditure.
6	Apply the preventive and mitigation measures before, during and after disaster

Course Outcomes:

At the end of course, students will attain an ability to:

1	Understand the various types of disaster occurring around the world.
2	Get to know natural and manmade disaster and their extent and possible effects on the economy.
3	Get acquainted with government policies, acts and various organizational structure associated with an emergency.
4	Get to know the institutional framework and GIS application in disaster management.
5	Able to analyse the various ways to raise the funds for relief operations.
6	Get to know the simple do's and don'ts in such extreme events and act accordingly.



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Course Objectives and Course Outcomes

Department of Civil Engineering

Odd Semester (VII)

Class:B.E

Subject code: ILO7016	Subject Name: Cyber Security and Laws	Credits:03
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Course Objective:

The course objectives are

1	Explain and identify different types cybercrime and cyber law
2	Illustrate how criminal plan the attacks in system and mobile devices
3	Recognize various security challenges in mobile device for different types of attack.
4	Give example of different tools and methods in Cyber Security.
5	Judge Indian IT Act 2008 and its latest amendments
6	Summarize various types of security standards compliances

Course Outcomes:

At the end of course, students will attain an ability to:

1	Propose the concept of cybercrime and its effect on outside world.
2	Classify various security challenges in electronic device for different types of attack.
3	Use different tools and methods in Cyber Offenses
4	Distinguish different aspects of cyber law.
5	Interpret and apply IT law in various legal issues
6	Categorize Information Security Standards compliance during software design and development



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (IV)

Class:S.E.

Subject code:CE:C401	Subject Name: Applied Mathematics-IV	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Create an ability to relate engineering problems to mathematical context.
2	Produce and provide a solid foundation in mathematical fundamentals required to solve engineering
3	Infer the basic principles of Vector analyses, complex integration, probability, test of
4	Prepare students for competitive exams.
5	Classify linear programming problem and probability distribution.
6	Identify significance of sampling theory.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Examine and calculate the system of linear equations using matrix algebra with its specific rules
2	Demonstrate basics of vector calculus
3	Apply the concept of probability distribution and sampling theory to engineering problems
4	Use principles of vector calculus to the analysis of engineering problems.
5	Identify, formulate and solve engineering problems
6	Illustrate basic theory of correlations and regression



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (IV)

Class:S.E.

Subject code: CEC402	Subject Name: Surveying -II	Credits:4.5
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Course Objective:

At the end of course, student should be able to:

1	Design simple, compound, reverse and transition curve using the angular, theodolites and Rankine's deflection methods.
2	Measure different layout from surveying data using tangent correction and chord gradient methods.
3	Outline the setting out of work for the foundation, tunnel,etc with the help of theodolite.
4	Classify the Special Survey Instruments like electronic theodolite, total station.
5	Determine the application of modern methods of surveying.
6	Identify the legal documents and role of revenue department in maintaining survey records.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Survey of different curves by using angular, theodolites and Rankine's deflection methods.
2	Measure the sight distance by tangent correction and chord gradient methods.
3	Determine the horizontal and vertical control, setting out a foundation plans with theodolite.
4	Classify the special survey instruments.
5	Distinguish modern methods of surveying using GPS, remote sensing, GIS, etc.
6	Identify the legal documents and role of revenue department in maintaining survey records.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (IV)

Class:S.E.

Subject code: CEC403	Subject Name: Structural Analysis-I	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Understand the analysis of statically determinate portal frames.
2	Study the concept of evaluating rotation and displacement parameters of frames by various methods.
3	Analyze three hinged arches, cables and suspension bridges and girders
4	Explain the basic concepts regarding buckling behaviour of axially and transversally loaded beam-columns
5	Demonstrate the concept of rolling loads and influence lines diagrams.
6	Identify the concept of shear center and unsymmetrical bending.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Analyse statically determinate portal frames and plot SFD/BMD for them.
2	Understand beams and frames for rotation and displacements using various methods.
3	Identify structures like 3 hinged arches, cable and suspension bridges and girders.
4	Learn column struts and their buckling behaviour under loading conditions.
5	Apply rolling loads over beams and trusses in order to find the reactions.
6	Compute unsymmetrical bendings of structural members and evaluate shear centers for same.



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Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (IV)

Class:S.E.

Subject code: CEC404	Subject Name: Building Design and Drawing	Credits: 3.5
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Course Objective:

At the end of course, student should be able to:

1	Define, evaluate and apply the principles and code of practices for planning and designing of residential buildings and study the various building components and building services.
2	Study the designing of dog legged as well as open newel staircase.
3	Define and draw one point and two-point perspective.
4	Study the concept of town planning, architectural planning and built environment.
5	Understand the concept of Green buildings.
6	Define, evaluate and apply the principles and code of practices for planning and designing of various public buildings and study the various components and building services as well as apply the knowledge of overall planning and designing by using CAAD software.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Define, evaluate and apply the principles and code of practices for planning and designing of residential buildings and study the various building components and building services.
2	Study the designing of dog legged as well as open newel staircase.
3	Define and draw one point and two-point perspective.
4	Study the concept of town planning, architectural planning and built environment.
5	Understand the concept of Green buildings.
6	Define, evaluate and apply the principles and code of practices for planning and designing of various public buildings and study the various components and building services as well as apply the knowledge of overall planning and designing by using CAAD software.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (IV)

Class:S.E.

Subject:CEC405	Subject: Building Materials and Construction Technology	Credits: 05
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Course Objective:

At the end of course, student should be able to:

1	Classify the building materials, symbol and their requirements.
2	Determine the manufacturing process, properties, and use of different types of building materials
3	Test the properties of concrete, manufacturing process of concrete and different types of admixture.
4	Categorize the types and uses of glasses and defects in timber.
5	Develop the concept and optimization of mix design for different environmental conditions.
6	Identify various components of building masonry, roof and floor, staircase etc., their functions and methods of construction to achieve good knowledge about building construction.

Course outcome:

At the end of course, students will attain an ability to:

1	Identify and list the various building materials, their properties and symbols
2	Illustrate and interpret manufacturing process of basic construction materials
3	Learn the properties of ingredients of concrete and types of admixture.
4	Classify the types and uses of glasses and defects in timber.
5	Design and interpret concrete mix for various grades.
6	Distinguish various masonry construction, finishes and formworks.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (IV)

Class:S.E.

Subject:CEC406	Subject: Fluid Mechanics II	Credits: 04
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Course Objective:

At the end of course, student should be able to:

1	Measure the pipe flow problems, losses incurred during transmission of power through pipe and nozzle.
2	To determine power transmit, condition and diameter of nozzle for maximum transmission of power.
3	Measure basic equation of flow, velocity of sound and propagation of pressure waves.
4	Develop boundary layer over flat surfaces and between the plates by separation and control method.
5	Test Reynolds experiment and critical velocity of laminar flow through circular pipes and between the plates.
6	Rate the resistance to flow in smooth and rough pipes using shear stress in turbulent flow and Prandtl's mixing length Theory.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Measure loss of head through pipes, pipe network and water hammer
2	Determine the flow through nozzles.
3	Compute compressible flow in a fluid.
4	Justify the development of boundary layer over surfaces.
5	Distinguish laminar flow through pipes and between the plates.
6	Rate the resistance to flow in smooth and rough pipes.



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Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code: CE:C604	Subject Name: Environmental Engineering-II	Credits:04
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Course Objective:

At the end of course, students should able to:

1	Understand and explain the role of sanitation and its relation to public health and environment and distinguish knowledge of wastewater collection system.
2	Learn and identify various physical, chemical and biological characteristics of wastewater and treatment flow sheet of WWTP.
3	Classify the various secondary treatment methods its design. (ASP, Aerated lagoon and Oxidation ponds).
4	Summarize the appropriate treatment, reclamation and resource recovery and re-use at both centralized and decentralized levels.
5	Generalize the concepts of various sludge treatment methods and its disposal methods.
6	Provide necessary skill for understanding and operation of solid waste management facilities.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Formulate approaches towards wastewater collection systems in buildings and municipal areas and to determine the quantity of wastewater and storm water production. Also, gain the knowledge of the construction of new sewer line and importance of sewer appurtenances.
2	Analyze the characteristics of wastewater and design the primary treatment for wastewater.
3	Apply on-site treatment methods and solve Analyze and design wastewater treatment systems(ASP, Aerated lagoon and Oxidation ponds).
4	Identify and apply proper treatment for reclamation and reuse of wastewater and disposal.
5	Generalize various sludge treatment methods and its disposal methods.
6	Provide knowledge of solid waste collection system, characteristics of solid waste and to identify hazardous waste.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code: CEC601	Subject Name: Geotechnical Engineering-II	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Examine the knowledge of consolidation of soils & settlement.
2	Evaluate the shear strength characteristics of the soil also they generalize the related problems
3	Discriminate stability of slopes, comprehend lateral earth pressure theories and apply them in stability analysis of retaining walls.
4	Categorize the design of shallow as well as deep foundations.
5	Demonstrate knowledge of underground conduits and braced cuts.
6	Interpret the knowledge of ground improvement techniques.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Appraise the consolidation parameters for the soil.
2	Calculate the shear strength parameters for the soil
3	Differentiate the factors of safety of different types of slopes under various soil conditions and infer the stability of slopes, retaining walls & lateral earth pressures.
4	Interpolate the bearing capacity of shallow foundation using theoretical and field methods also formulate the load bearing capacity of individual as well as group of pile foundations and their settlement using theoretical and field methods.
5	Extend the conduits and calculate the load carried by the struts of a braced cut under various soil conditions.
6	Defend the ground improvement techniques.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code:CE:C603	Subject Name: Transportation Engineering II	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Differentiate the various components of railway track, materials used, in construction and maintenance of railway track.
2	Analyze the geometric design of railway and traffic control of train movement.
3	Determine the various imaginary surfaces of an airport, geometric standards, runway taxiway lighting.
4	Classify the various parking system, holding apron, hangars drainage system and air traffic forecasting in aviation
5	Distinguish the various modes of water transportation, types of breakwater, harbours and port facilities equipment
6	Identify the fundamental concepts of bridge engineering

Course Outcomes:

At the end of course, students will attain an ability to:

1	Examine the components of permanent way and its construction, yards, modernization of railway track.
2	Identify the concept of geometric design of railway track and railway traffic control.
3	Classify airport planning, obstructions and orientation of runway.
4	Distinguish the concept of geometric design of runway, taxiway, etc. and the knowledge of various signaling system for air traffic control.
5	Differentiate the system of water transportation, types of breakwater, harbours and port facilities equipment
6	Determine the basic idea about the bridge engineering.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code:CE:C602	Subject Name: Design and Drawing of Steel Structures	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Understand the concept of bolted and welded connections and use of indian standard code of practice for design.
2	Analyze tension and compression members
3	Evaluate design of built up column sections with lacing and battening.
4	Know the procedure for designing column bases for steel columns.
5	Carry out design of laterally supported and unsupported beams and entire floor system.
6	Learn the design of steel roof trusses and welded plate girder.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Analyse and design bolted and welded connections.
2	Understand and carry out the design of tension and compression members.
3	Implement design of laced and battened built up steel columns.
4	Design slab base and gusseted bases for columns
5	Identify and design laterally supported and unsupported beam sections
6	Apply design of steel roof truss and welded plate girders for industrial buildings.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code:CE:C605	Subject Name: Water Resources Engineering-I	Credits:04
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Course Objective:

At the end of course, student should be able to:

1	Explain the various types of irrigation projects.
2	Generalize the various techniques and methods of irrigation.
3	Represents the irrigation requirements of crops.
4	Construct storage capacity of reservoirs
5	Appraise the elements of hydrologic cycle and calculate catchment yield.
6	Infer the hydraulics of wells and groundwater exploration methods.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Classify various types of irrigation projects
2	Extend the different irrigation methods and effective use of water resources.
3	Calculate the crop water requirements and irrigation requirement.
4	Derive hydrographs and calculate runoff of a catchment area.
5	Explain the steady state and unsteady state conditions of any aquifer and design water wells.
6	Estimate the capacity of a reservoir for different purposes.



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Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code: CEC607	Subject Name: Software Applications in Civil Engineering	Credits:01
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Course Objective:

The course objectives are

1	Students shall be introduced and demonstrated to different kind of software packages available in various fields of civil engineering.
2	To understand the applications of these software packages.
3	To apply software results and their valuation by relating them with analytical results by conventional methods
4	Generate awareness about ongoing softwares used in the industry.
5	Categorize various domains in civil department and scope of work
6	To differentiate, summarize and apply the knowledge of different softwares like Microsoft Projects,Excel,Autocad , STAAD,MATLAB

Course Outcomes:

At the end of course, students will attain an ability to:

1	Explain the use of software in various disciplines of civil engineering.
2	Demonstrate the ability to use the software in chosen field and provide solutions to field problems.
3	Evaluate the software results using judgement about range of answers.
4	Identify the software application in particular field of Civil Engineering
5	Discover open source software used in case of specific problems.
6	Select the software according to the nature and type of work



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VI)

Class:T.E

Subject code: CEDLO6061	Subject Name: Advanced Construction Equipment	Credits:04
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Course Objective:

The course objectives are

1	Identify the different types of Conventional construction equipment used in construction sites
2	Extend the depth knowledge about the different Tunnel boring machines
3	Infer an outlook on Modern Formwork systems
4	Illustrate the equipments for construction of underground utilities, road construction and bridges/flyovers
5	Paraphrase about the equipments/ techniques for setting up of power generation structures.
6	Conclude the overall understanding about the equipments for construction of transporting facilities

Course Outcomes:

At the end of course, students will attain an ability to:

1	Understand the use/applications of various conventional construction equipments and select best out of them for a particular site requirement.
2	Discover the modern methods/equipments used for underground as well as underwater tunnelling.
3	Compare conventional and modern methods of formwork on the basis of productivity, reuse value, ease of erection and dismantling, flexibility offered and overall cost
4	Will have good knowledge about the Pipe line insertion systems, Methods of construction for bridges/flyovers etc
5	Gain knowledge and interpret about the setting up of different kinds of the power generating structures.
6	Inculcate the techniques involved and the equipments required thereof for construction of various transporting facilities.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VIII)

Class:B.E

Subject code: CE:C801	Subject Name: Design and Drawing of Reinforced Concrete Structures	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Defend the analysis and design of Raft Foundation
2	Interpret the design of dog legged and open well type staircase using Limit State Method
3	Understand the complete analysis and design of residential and industrial buildings using relevant IS codes
4	Illustrate the analysis and design of different types of retaining walls.
5	Infer the analysis and design of Circular water tank using relevant IS codes by Working Stress Method.
6	Extend the complete analysis and design of Rectangular water tank using relevant IS codes by working stress method.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Calculate the loads to analysis and design of Raft Foundation
2	Solve the design of different types of staircase using Limit State Method
3	Analysis and design of residential and industrial buildings individually or in a group by using relevant IS codes.
4	Justify the design of various retaining wall by Limit State Method.
5	Generate the complete design of Circular water tank using IS-code method and Approximate method using Working Stress Method.
6	Illustrate the complete design of Rectangular water tank using IS-code method and Approximate method using Working Stress Method.



Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VIII)

Class:B.E

Subject code:CE:C803	Subject Name:Construction Management	Credits:05
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Course Objective:

At the end of course, student should be able to

1	Understand the basic principles and functions of construction management.
2	Illustrate the roles & responsibilities of various construction projects.
3	Generalize the scheduling techniques such as CPM & PERT.
4	Interrelate the knowledge of time-cost optimization and effective utilization of resources on construction sites
5	Summarize the allocation of resources and project monitoring.
6	Describe about the safety & quality aspect of construction works.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Manipulate the knowledge of management functions like planning, scheduling, executing and controlling to construction projects.
2	Dramatize the knowledge of construction project by organizing & mobilize the sites in industry.
3	Demonstrate their capability for preparing the project networks to work out best possible time for completing the project.
4	Extend the exercise of time-cost relationship in practices.
5	Implement the safety as well as quality aspects during the execution of civil engineering
6	Inculcate the managerial skills in their future during actual execution of projects.



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Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VIII)

Class:B.E

Subject code: CE-E804	Subject Name: Industrial Waste Treatment	Credits:05
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Course Objective:

At the end of course, student should be able to:

1	Describe the different characteristics of liquid waste generated from different industries, their sampling and analysis.
2	Understand the effect of industrial waste on self-purification and on environment of streams.
3	Study the general treatment of industrial waste like neutralization, equalization and segregation.
4	Explain the waste produced from different industries and their treatment.
5	Assess the environmental impact and environmental audit for industrial waste.
6	Design, operation and maintenance of common effluent treatment plants (CETPs)

Course Outcomes:

At the end of course, students will attain an ability to:

1	Explain the different characteristics of liquid waste generated from different industries, their sampling and analysis.
2	Understand the effect of industrial waste on self-purification and on environment of streams.
3	Analyze the general treatment of industrial waste like neutralization, equalization and segregation.
4	Explain the waste produced from different industries and their treatment.
5	Assess the environmental impact and environmental audit for industrial waste.
6	Design, operation and maintenance of common effluent treatment plants (CETPs)



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Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VIII)

Class:B.E

Subject code: CE-C ILOC8028	Subject Name: Environmental Management	Credits: 03
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Course Objective:

At the end of course, student should be able to:

1	Understand global environmental concerns and identify environmental issues relevant to India.
2	Emphasize the significance and goal of environment management
3	Study and learn the concepts of ecology and ecosystem.
4	Acquire knowledge of EMS, ISO 14001 standard.
5	Describe role & functions of Government as a planning and regulating agency for Environment Management.
6	Familiarize with environment related legislations

Course Outcomes:

At the end of course, students will attain an ability to:

1	Identify causes and effects of major environmental issues and concerns.
2	Understand the concept of environmental management.
3	Understand ecosystem and interdependence between living organisms, food chain etc
4	Acquaint with the concept of Environment Management System, ISO 14001 standard, EMS Certification.
5	Acquire knowledge about the functions of Government for environment protection and management
6	Interpret environment related legislations.



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Course Objectives and Course Outcomes

Department of Civil Engineering

EVEN Semester (VIII)

Class:B.E

Subject code: CE-C ILOC8021	Subject Name: Project Management Teaching Scheme	Credits:03
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Course Objective:

At the end of course, student should be able to:

1	Define Project, Project Management, Operations, necessity of Project Management, role of Project Manager and managing the same in various organizational structure.
2	Select and initiate projects strategically.
3	Plan and schedule the Project including estimation and budgeting with the help of work breakdown structure using networking and scheduling techniques.
4	Assess the risk management in Project and plan accordingly.
5	Understand the process of contracting, executing, monitoring, controlling the projects.
6	Appraise the project management life cycle and make them knowledgeable about various phases from project initiation through closure.

Course Outcomes:

At the end of course, students will attain an ability to:

1	Apply selection criteria and select an appropriate project from different options.
2	Able to start the project and create effective project team, and monitor the stagewise development and growth of the project.
3	Write work breakdown structure for a project and develop a schedule based on it.
4	Identify opportunities and threats to the project and decide an approach to deal with them strategically.
5	Use earned value technique and determine as well as predict the status of a project.
6	Capture lessons learned during project phases and document them for future reference.