Department of Civil Engineering

Year & Sem: I-I **Regulation:** R20

Course Name: LINEAR ALGEBRA & CALCULUS	**Course Code:** 20A54101
1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
2	Utilize mean value theorems to real life problems.
3	Familiarize with functions of several variables which is useful in optimization.
4	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems.
5	Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

Course Name: Engineering Physics	**Course Code:** 20A56101T
1	**Study** the different realms of physics and their applications in both scientific and technological systems through physical optics.
2	Identify the wave properties of light and the interaction of energy with the matter.
3	Asses the electromagnetic wave propagation and its power in different media.
4	Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields.
5	Explain the basic concepts of acoustics and ultrasonics.
6	Study the important properties of crystals like the presence of long-range order, periodicity and structure determination using X-ray diffraction technique.

Course Name: COMMUNICATIVE ENGLISH		**Course Code:** 20A52101T
1	Retrieve the knowledge of basic grammatical concepts	
2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English	
3	Apply grammatical structures to formulate sentences and correct word forms	
4	Analyze discourse markers to speak clearly on a specific topic in informal discussions	
5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.	

Course Name: COMMUNICATIVE ENGLISH LAB		**Course Code:** 20A52101P
1	Listening and repeating the sounds of English Language	
2	Understand the different aspects of the English language	
3	proficiency with emphasis on LSRW skills	
4	Apply communication skills through various language learning activities	
5	Analyse the English speech sounds, stress, rhythm, intonation and syllable	
6	Division for better listening and speaking comprehension	
7	Evaluate and exhibit acceptable etiquette essential in social and professional settings	

Course Name: BASIC ELECTRICAL & ELECTRONICS ENGINEERING		**Course Code:** 20A02101T
1	Apply concepts of KVL/KCL in solving DC circuits	
2	Understand and choose correct rating of a transformer for a specific application	
3	Illustrate working principles of DC Motor	
4	Identify type of electrical machine based on their operation	
5	Understand the basics of Power generation, Transmission and Distribution	

Course Name: ENGINEERING DRAWING		**Course Code:** 20A03101T
1	Draw various curves applied in engineering.	
2	Show projections of solids and sections graphically.	
3	Draw the development of surfaces of solids.	

Course Name: ENGINEERING GRAPHICS LAB		**Course Code:** 20A03101P
1	Use computers as a drafting tool.	
2	Draw isometric drawings using CAD packages.	
3	Draw orthographic drawings using CAD packages.	

Course Name: Engineering Physics Lab		**Course Code:** 20A56101P
1	Operate various optical instruments.	
2	Estimate wavelength of laser and particles size using laser.	
3	Evaluate the acceptance angle of an optical fiber and numerical aperture.	
4	Estimate the susceptibility and related magnetic parameters of magnetic materials.	
5	Plot the intensity of the magnetic field of circular coil carrying current with distance.	
6	Determine magnetic susceptibility of the material and its losses by B-H curve.	

Course Name: Basic Electrical & Electronics Engineering Lab		**Course Code:** 20A02101P
1	Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.	
2	Construct the given circuit in the lab.	
3	Analyze the application of diode as rectifiers, clippers and clampers and other circuits.	
4	Design simple electronic circuits and verify its functioning.	

Course Name: Engineering Physics Lab		**Course Code:** 20A56101P
1	Operate various optical instruments.	
2	Estimate wavelength of laser and particles size using laser.	
3	Evaluate the acceptance angle of an optical fiber and numerical aperture.	
4	Estimate the susceptibility and related magnetic parameters of magnetic materials.	
5	Plot the intensity of the magnetic field of circular coil carrying current with distance.	
6	Determine magnetic susceptibility of the material and its losses by B-H curve.	

Year & Sem: II-I **Regulation:** R19

Course Name: COMPLEX VARIABLES, TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		**Course Code: 19A54301**
1	Understand the analyticity of complex functions and conformal mappings.	
2	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improperintegrals along contours.	
3	Understand the usage of Laplace Transforms.	
4	Evaluate the Fourier series expansion of periodic functions.	
5	Formulate/solve/classify the solutions of Partial differential equations and also find the solution of one dimensional wave equation and heat equation.	

Course Name: STRENGTH OF MATERIALS-I		**Course Code:** 19A01301
1	Understand the different types of couples and force systems	
2	Determine the centroid and moment of inertia for different cross-sections	
3	Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and	

	strain energy.
4	Develop shear force and bending moment diagrams for different load cases.
5	Compute the flexural stresses and shear stresses for different loading cases and different cross-sections.

Course Name: FLUID MECHANICS	**Course Code:** 19A01302
1	Understand the principles of fluid statics, kinematics and dynamics
2	Familiarize basic terms used in fluid mechanics
3	Understand flow characteristics and classify the flows
4	Apply the continuity, momentum and energy principles
5	Estimate various losses in flow through channels

Course Name: SURVEYING	**Course Code:** 19A01303
1	Calculate angles, distances and levels
2	Identify data collection methods and prepare field notes
3	Understand the working principles of survey instruments
4	Estimate the volumes of earth work
5	Able to use modern survey instruments.

Course Name: BUILDING MATERIALS AND CONSTRUCTION	**Course Code:** 19A01304
1	Understand the characteristics of various building materials such as stone and clay product.

2	Evaluate the properties of the binding materials for their suitability in building construction.
3	Apply the ferrous and non-ferrous materials in building construction.
4	Understand the construction procedure of various building components such as stair cases, masonry and flooring.
5	Understand the installation of electrical, sanitary and plumbing fittings in buildings.

Course Name: PYTHON PROGRAMMING	**Course Code:** 19A05304
1	Apply the features of Python language in various real applications.
2	Select appropriate data structure of Python for solving a problem.
3	Design object oriented programs using Python for solving real-world problems.
4	Apply modularity to programs.

Course Name: UNIVERSAL HUMAN VALUES	**Course Code:** 19A52301
1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
3	They would have better critical ability.
4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).

Course Name: STRENGTH OF MATERIALS LABORATORY	**Course Code:** 19A01301
1	By performing the various tests in this laboratory the student will be able to know the

	structural behaviour various structural elements when subjected to external loads

Course Name: FLUID MECHANICS LABORATORY	**Course Code:** 19A01302
1	By performing the various tests in this laboratory the student will be able to know the principles of discharge measuring devices and head loss due to sudden contraction and expansion in pipes.

Course Name: SURVEYING LABORATORY	**Course Code:** 19A01303
1	By performing the various tests in this laboratory the student will be able to know the principles of surveying in chain surveying, compass surveying, plane table surveying, levelling, theodolite surveying and total station

Course Name: ENVIRONMENTAL SCIENCE VALUES	**Course Code:** 19A99301
1	Grasp multidisciplinary nature of environmental studies and various renewable and nonrenewable resources.
2	Understand flow and bio-geo- chemical cycles and ecological pyramids.
3	Understand various causes of pollution and solid waste management and related preventive measures.
4	About the rainwater harvesting, watershed management, ozone layer depletion and wasteland reclamation.
5	Casus of population explosion, value education and welfare programmes.

Year & Sem: III-I **Regulation:** R15

Course Name: Design and Drawing of Reinforced concrete Structures	**Course Code:**15A01501
1	Students will understand the properties and behavior of reinforced cement concrete.
2	Students will be able to design reinforced flexure members.
3	Students will be able to design reinforced Compression members.
4	Students will be able to analyze different types of failures in reinforced concrete structures.
5	Students will be able to understand the concept of one way slab and two way slab.
6	Understand the behavior of RCC Column and various types of end conditions.
7	Students will be able to analyze and design Isolated footing and Combined footing using IS 456:2000 Code book.

Course Name: Estimation and Costing	**Course Code:**15A01502
1	Understand basic concept of estimation and costing units and specification
2	Prepare detailed estimation for various civil engineering structures
3	Understand the analysis of rate abstract estimation
4	Prepare the estimation of steel reinforcement for different elements
5	Compute the volume of earthwork and reservoirs capacity
6	Prepare the detailed estimation of irrigation and public health engineering structures
7	Understand valuation of building

Course Name: Geotechnical Engineering-I	**Course Code:**15A01503
1	Understand the basic properties of soils such as phase relationships, unit weight, water content, grain size distribution, index properties, methods of soil classifications and compaction characteristics in soils.
2	Understand the concepts of total, neutral and effective stress in soils, principles of Darcy's law, permeability and seepage in soils and their effects in engineering applications.
3	Analyze the basic concepts of stress distribution under point load, area shape load conditions using Bossiness's and Westergaard's theories.
4	Compute principles of Terzaghi's theory of primary consolidation, settlement in soils and associated properties.
5	Evaluate shear stress and shear strength properties in soils, Mohr diagrams, and methods of finding the shear strength parameters of soils using direct shear test, unconfined compression test and tri-axial shear tests.
6	Determine soil properties under the all loads acting on the soil.

Course Name: Engineering Geology	**Course Code:**15A01504
1	Understand the Structure of the planet Earth, characteristics of the crust mantle and the core.
2	Identify the Structure and composition of geological formations creation, classification and basic properties of minerals and rocks.
3	Estimate the Changes in geological formations. Endogenous, processes tectonic movements of the Earth's crust .organic procedures and their results. Earthquakes faults and folds.
4	Identify the subsurface information and ground water potential sites through geophysical
5	Analyze the geological investigations and principles for natural hazards and select sites for dams.
6	Distinguish different types of dams (Gravity, Earth dam etc.). Analysis of dam failures of the past. Geological factors influencing water lightness and life of reservoir
7	Interpret the Purpose of tunneling, Effects of tunneling on the ground ,Role of Geological considerations

Course Name: Structural Analysis-II	**Course Code:**15A01505
1	Solve the problems on determinate and indeterminate arches
2	Solve the problems on single bay, single storied portal frames with & without side – sway using slope-deflection method
3	Use the moment – distribution method for analyzing the single bay- single storied portal frames with & without side sway
4	Determine the fixed end moments for continuous beams, single – bay, single storied portal frames with and without side sway using Kani's method.
5	Determine the final BMs at the joints of continuous beams with & without support settlements using matrix methods
6	Determine the ultimate strength of fixed and continuous beams using plastic theory

Course Name: Cost Effective Housing Techniques	**Course Code:** 15A01506
1	Analyze the construction equipments for cost effective housing techniques.
2	Understand the principles of sustainable housing policies and programs.
3	Analyze the adoption of innovative cost effective construction techniques.
4	Create knowledge on planning, design, evaluation, construction and financing of housing projects with low cost housing techniques.
5	Understand the suitable techniques in rural and disaster prone areas by using locally available materials like lime, fly ash, clay, gypsum.
6	Evaluate the techniques of alternative building materials for low cost housing.

Course Name: Engineering Geology Lab	**Course Code:**15A01508
1	Understand the physical properties and identification of minerals.
2	Understand the Megascopic description and identification of rocks.
3	Interpreted and drawing of sections for geological maps showing tilted beds, faults uniformities etc.
4	Analyze Simple Structural Geology problems
5	Understand the physical properties and identification of minerals.

Course Name: Geotechnical Engineering laboratory	**Course Code:**15A01509

1	Student will be able to acquire knowledge on types of soils & on properties of different soils.
2	Student will be able to study cohesiveness of soil that will help in grouting of ground surface.
3	Student is able to get knowledge on load bearing capacity of soils for the design of earth structures like piles, piers, retaining walls & abutments.
4	Student will be able to get knowledge regarding permeability of soils which helpful in examining of water table and for design of irrigation canals.
5	Student will be able to analyze the consolidation of soils that will useful in the design of flexible pavements & water structures like dams and bridges.
6	Student will be able to get knowledge regarding shear capacity of soil. This concept is useful in the design of pile foundation.

Course Name: Audit Course –Social Values & Ethics	**Course Code:**15A99501
1	Able to understand the nature of the individual and the relationship between the self and the community
2	Understanding major ideas, values, beliefs, and experiences that have shaped human history and cultures
3	These issues will help to sensitize students to be broader towards the social, cultural, economic and human issues, involved in social changes
4	Making engineering and technology students aware of the various issues concerning man and society.
5	Exemplify the importance of physical education and Yoga.

Year & Sem: IV-I **Regulation:** R15

Course Name: Finite Element Methods	**Course Code:**15A01701
1	To obtain an understanding of the fundamental theory of the FEA method and understand the concept behind variational methods and weighted residual method in FEM.
2	To develop the ability to generate the governing finite element equations for systems governed by partial differential equations.
3	To understand the use of basic finite element for structural applications using truss, beam, frame and plane elements.
4	To develop a basic understanding of the limitations of the finite element and understand the possible error source in its use.
5	Able to apply suitable boundary conditions to a global structural equation and reduce it to a solvable form
6	Develop element characteristic equation procedure and generation of global stiffness equation will be applied.

Course Name: Transportation Engineering-II	**Course Code:**15A01702
1	Create knowledge about gauges, creep of rails, coning of wheels, adzing of sleepers, rail fastening concepts in railway design and components of railway track.
2	Analyze the construction process, maintenance and operation of railways.
3	Evaluate the components of airport planning and layout, runway design and specifications for runway and taxiway, and lightings for air traffic control.
4	Understand the classifications and, navigational aids and dredging operations of port and harbor engineering.
5	Understand the functions of rail, air, water transport systems and their importance.
6	Apply the working of design elements used in road, rail, water and air mode of transport systems.

Course Name: Environmental Engineering	**Course Code:**15A01703
1	Understand the Source of water and water demand.
2	Understand the water distribution processes, operation and maintenance of water supply
3	Analyze the sewage characteristics of waste water and Design of waste water treatment plant units
4	Analyze the characteristics of water.
5	Identify the solid and gases form pollutants.
6	Understand the water treatment concepts and methods

Course Name: Water Resources Engineering-II	**Course Code:**15A01704
1	Understand the basic concepts of the water resources structures
2	Evaluate the problems and potential methods of solution for the regional water shortages; determining water storage capacities of the reservoirs of any scale.

3	Design open channels of different types vulnerable to erosion/scour
4	Knowledge of irrigation techniques, efficiencies, optimal irrigation of the fields, consumptive water requirements of the crops and crop types.
5	Recognize safety valves of the dams; spillways, their types, aim of construction, design and understand the energy dissipation systems at the downstream end.
6	Know the details and the aim of construction of different type of the dams and be able to follow the basic design calculations

Course Name: Ground Improvement Techniques	**Course Code:**15A01706
1	Identify the type of problems in problematic soils and solve their problems using different ground improvement techniques
2	Understand the importance of vibro-compaction and compaction piles on in-situ densification of soil.
3	Understand the ground improvement techniques such as ground anchors, rock bolting and soil nailing
4	Design of reinforced earth retaining structures.
5	Understand the basic concepts of geosynthetics and consolidation of soil
6	Understand the concept of shear strength in soil

Course Name: Bridge Engineering	**Course Code:**15A01708
1	Design the basic components of bridge structures like bridge deck slabs, longitudinal girders, transverse girders, piers and well foundations.
2	Understand the IRC classes of loading and railway bridge rules for detailed calculation of loadings and design of various components
3	Know the methods of design of structural components of different types of Bridges

Course Name: CAD Laboratory	**Course Code:**15A05711
1	Student will be able to analyze the building components.
2	To understand the provision of reinforcement in beams, columns, slabs and footings.
3	Will make the models in different types of beams, columns, slabs and footings regarding the reinforcement details.
4	Will identify the minimum and maximum reinforcement in building components.
5	To calculate the deflection, bending moment and shear force for a particular component.

Course Name: Environmental Engineering Laboratory		**Course Code:**15A05712
1	Acquainted with methods for water quality characterization and toxic analysis.	
2	Estimating the water parameters like pH, chlorides, sulphates, and nitrares.	
3	Understand the effective water treatment, the determination of optimum dosage of coagulant and chloride demand also estimating.	
4	Identify the industrial effluents and also estimating the BOD and COD of effluent.	

Year & Sem: IV-II **Regulation:** R15

Course Name: Advanced Structural Engineering		**Course Code:**15A01802
1	Design of roof systems with reference to Indian standards	
2	Design of water retaining and storage structures	
3	Design of silos and chimneys.	

Course Name: Environmental Impact Assessment and Management		**Course Code:**15A01804
1	Understand the importance of Environmental Impact Assessment studies.	
2	Perform the screening and scoping of an Environmental Impact Assessment based on existing requirements.	
3	Analyze major environmental issues for large development projects.	
4	Understand the environmental audit, environmental protection & prevention act.	
5	Carry out Environmental Impact Assessment studies & prepare Environmental Impact Assessment report for industries, highways, hospitals infrastructure and developmental projects.	

6	Evaluate an Environmental Impact Assessment & translate its conclusions into actions.

HOD **PRINCIPAL**