Course Objectives

Third semester

TITLE OF THE COURSE: **STRENGTH OF MATERIALS**

Course Objectives: This course will enable students;

1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements.

2. To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.

3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements.

4. To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.

5. To evaluate the behavior of torsional members, columns and struts.

TITLE OF THE COURSE: **FLUIDS MECHANICS**

Course Objectives: The objectives of this course are to make students to learn:

1. The Fundamental properties of fluids and its applications.

2. Hydrostatic laws and application to practical problem solving

3. Principles of Kinematics and Hydro-Dynamics for practical applications

4. Basic design of pipes and pipe networks considering flow, pressure and its losses.

5. The basic flow rate measurements

TITLE OF THE COURSE: **BASIC SURVEYING**

Course Objectives: This course will enable students to;

1. Understand the basic principles of Surveying

2. Learn Linear and Angular measurements to arrive at solutions to basic surveying problems.

3. Employ conventional surveying data capturing techniques and process the data for computations.

4. Analyze the obtained spatial data to compute areas and volumes and draw contours to represent 3D data on plane figures.

TITLE OF THE COURSE: **ENGINEERING GEOLOGY**

Course Objectives: This course will enable students to;

1.To understand the internal structure and composition of the earth.

2. To comprehend the properties, occurrence and uses of minerals in various industries.

3. To learn about geo-morphological agents such as river, wind, sea waves, and their implications in implementing civil engineering projects.

4. To gain knowledge about the structures of the rocks and their considerations in the selection of site for dams, tunnels, bridges and highways.

5. To learn the application of Topographic maps, remote sensing and GIS in Civil engineering practices and natural resource management.

TITLE OF THE COURSE: **Building Materials and Construction**

Course Objectives: This course will develop a student;

1. In recognizing the good materials to be used for the construction work

2. In investigation of soil condition, Deciding and design of suitable foundation for different structures

3. In supervision of different types of masonry

4. In selection of materials, design and supervision of suitable type of floor and roof.

5. To gain knowledge about doors, windows, plastering, painting, damp proofing, scaffolding, shoring, underpinning and to take suitable engineering measures.

TITLE OF THE COURSE: **BUILDING MATERIALS T ESTING LABORATORY**

Course Objectives: The objectives of this course is to make students to learn:

1. Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials.

2. Ability to function on multi-disciplinary teams in the area of materials testing.

3. Ability to use the techniques, skills and modern engineering tools necessary for engineering.

4. Understanding of professional and ethical responsibility in the areas of material testing.

5. Ability to communicate effectively the mechanical properties of materials.

TITLE OF THE COURSE**: BASIC SURVEYING PRACTICE**

Course Objectives: The objectives of this course is to make students to

1. Apply the basic principles of engineering surveying and measurements

2. Follow effectively field procedures required for a professional surveyor

3. Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Fourth Semester

TITLE OF THE COURSE: **Analysis of Determinate Structures**

Course Objectives: This course will enable students to

1. Apply knowledge of mathematics and engineering in calculating slope and deflections

2. Identify, formulate and solve engineering problems

3. Analyze structural systems and interpret data

4. Engage in lifelong learning with the advances in Structural Engineering

TITLE OF THE COURSE**: APPLIED HYDRAULICS**

Course Objectives: The objectives of this course is to make students to learn

1. Principles of dimensional analysis to design hydraulic models and Design of various models

2. Design the open channels of various cross sections including design of economical sections.

3. Energy concepts of fluid in open channel, Energy dissipation, Water surface profiles at different conditions.

4. The working principles of the hydraulic machines for the given data and analyzing the performance of Turbines for various design data.

TITLE OF THE COURSE: **Concrete Technology**

Course objectives: This course will enable students to:

1. Recognize the importance of material characteristics and their contributions to strength development in Concrete

2. Proportion ingredients of Concrete to arrive at most desirable mechanical properties of Concrete.

3. Ascertain and measure engineering properties of concrete in fresh and hardened state which meet the requirement of real time structures.

TITLE OF THE COURSE: **Basic Geotechnical Engineering**

Course Objectives: This course will enable students

1. To appreciate basic concepts of soil mechanics as an integral part in the knowledge of civil engineering. Also to become familiar broadly with geotechnical engineering problems such as, foundation engineering, flow of water through soil medium and terminologies associated with geotechnical engineering.

2. To know the basic engineering properties and the mechanical behaviour of different types of soil. This includes strength-deformation characteristics under shearing stresses. Also consolidation properties of clayey soils.

3. To determine the improvement in mechanical behaviour by densification of soil deposits using compaction.

4. To know how the properties of soils that can be measured in the lab

TITLE OF THE COURSE: **Advanced Surveying**

Course Objectives: This course will enable students to:

1. Apply geometric principles to arrive at solutions to surveying problems.

2. Analyze spatial data using appropriate computational and analytical techniques.

3. Design proper types of curves for deviating type of alignments.

4. Use the concepts of advanced data capturing methods necessary for engineering practice

TITLE OF THE COURSE: **Fluid Mechanics and Hydraulic Machines Laboratory**

Course Objectives: This course will enable students to

1. Calibrate flow measuring devices

2. Determine the force exerted by jet of water on vanes

3. Measure discharge and head losses in pipes

4. Understand the fluid flow pattern

Title of the Course: **Engineering Geology Laboratory**

Course objectives: This course will enable students

1. To identify the minerals and rocks based on their inherent properties and uses in civil engineering

2. To interpret the geological maps related to civil engineering projects.

3. To learn the dip and strike, borehole problems, thickness of geological formation related to foundation, tunnels, reservoirs and mining.

4. To understand subsurface geological conditions through a geophysical techniques and watershed management.

5. To visit the civil engineering projects like dams, reservoirs, tunnels, quarry sites etc.

Fifth Semester

Course Title: **Design of RC Structural Elements**

Course objectives: This course will enable students to

1. Identify, formulate and solve engineering problems of RC elements subjected to different kinds of loading.

2. Follow a procedural knowledge in designing various structural RC elements.

3. Impart the culture of following the codes for strength, serviceability and durability as an ethics.

4. Provide knowledge in analysis and design of RC elements for the success in competitive examinations.

Course Title: **Analysis of Indeterminate Structures**

Course objectives: This course will enable students to

1. Ability to apply knowledge of mathematics and engineering in calculating slope, deflection, bending moment and shear force using slope deflection, moment distribution method and Kani's method.

2. Ability to identify, formulate and solve problems in structural analysis.

3. Ability to analyze structural system and interpret data.

4. Ability to use the techniques, such as stiffness and flexibility methods to solve engineering problems

5. Ability to communicate effectively in design of structural elements

Course Title: **Applied Geotechnical Engineering**

Course objectives: This course will enable students to

1. Appreciate basic concepts of soil mechanics as an integral part in the knowledge of Civil Engineering. Also to become familiar with foundation engineering terminology and understand how the principles of Geotechnology are applied in the design of foundations

2. Learn introductory concepts of Geotechnical investigations required for civil engineering projects emphasizing insitu investigations

3. Conceptually learn various theories related to bearing capacity of soil and their application in the design of shallow foundations and estimation of load carrying capacity of pile foundation

4. Estimate internal stresses in the soil mass and application of this knowledge in proportioning of shallow and deep foundation fulfilling settlement criteria

5. Study about assessing stability of slopes and earth pressure on rigid retaining structures

Course Title: **Computer Aided Building Planning and Drawing**

Course objectives: Provide students with a basic understanding

1. Achieve skill sets to prepare computer aided engineering drawings

2 Understand the details of construction of different building elements.

3 Visualize the completed form of the building and the intricacies of construction based on the engineering drawings.

Course Title: **Air Pollution and Control (**Professional Elective-1)

Course Objectives: This course will enable students to

1. Study the sources and effects of air pollution

2. Learn the meteorological factors influencing air pollution.

3. Analyze air pollutant dispersion models

4. Illustrate particular and gaseous pollution control methods

Course Title: **Railways, Harbor, Tunneling and Airports (**Professional Elective-1)

Course Objectives: This course will enable students to 1

1. Understand the history and development, role of railways, railway planning and development based on essential criteria's.

2. Learn different types of structural components, engineering properties of the materials, to calculate the material quantities required for construction

3. Understand various aspects of geometric elements, points and crossings, significance of maintenance of tracks.

4. Design and plan airport layout, design facilities required for runway, taxiway and impart knowledge about visual aids

5. Apply design features of tunnels, harbours, and dock and necessary navigational aids; also expose them to various methods of tunneling and tunnel accessories.

Course Title: **Masonry Structures (**Professional Elective-1)

Course Objectives: This course will enable students to

1. Understand properties of masonry units, strength and factors affecting strength.

2. Understand design criteria of various types of wall subjected to different load system.

3. Impart the culture of following the codes for strength, serviceability and durability as an ethics.

4. Provide knowledge in analysis and design of masonry elements for the success in competitive examinations.

Course Title**: Theory of Elasticity (**Professional Elective-1)

Course Objectives: This course will enable students to

1. This course advances students from the one-dimensional and linear problems conventionally treated in courses of strength of materials into more general, two and three-dimensional problems.

2. The student will be introduced to rectangular and polar coordinate systems to describe stress and strain of a continuous body.

3. Introduction to the stress – strain relationship, b asic principles and mathematical expressions involved in continuum mechanics. also solution of problems in 2- dimensional linear elasticity

Course Title: **Traffic Engineering (**Open Elective-1)

Course Objectives: This course will enable students to

1. Understand fundamental knowledge of traffic engineering, scope and its importance.

2. describe basic techniques for collecting and analyzing traffic data, diagnosing problems, designing appropriate remedial treatment, and assessing its effectiveness.

3. Apply probabilistic and queuing theory techniques for the analysis of traffic flow situations and emphasis the interaction of flow efficiency and traffic safety.

4. Understand and analyse traffic issues including safety, planning, design, operation and control.

5. Apply intelligent transport system and its applications in the present traffic scenario.

Course Title: **Sustainability Concepts in Engineering (**Open Elective 1)

Course Objectives: This course will enable students to

1. Learn about the principles, indicators and general concept of sustainability.

2. Apprehend the local, regional and global impacts of unsustainable designs, products and processes.

3. Student shall be able to apply the sustainability concepts in engineering

4. Know built environment frameworks and their use

5. Understand how building and design is judged and valued by clients and stakeholders and how to implement sustainability.

Course Title: **Remote Sensing and GIS (**Open Elective 1)

Course Objectives: This course will enable students to

1. Understand the basic concepts of remote sensing

2. Analyze satellite imagery and extract the required units.

3. Extract the GIS data and prepare the thematic maps

4. Use the thematic maps for various applications

Course Title: Occupational Health and Safety (Open Elective 1)

Course Objectives: This course will enable students to

1. Gain an historical, economic, and organizational perspective of occupational safety and health

2. Investigate current occupational safety and health problems and solutions.

3. Identify the forces that influence occupational safety and health.

4. Demonstrate the knowledge and skills needed to identify workplace problems and safe work practice

Course Title: **Geotechnical Engineering Lab**

Course Objectives: Provide students with a basic understanding

1. To carry out laboratory tests and to identify soil as per IS codal procedures

2. To perform laboratory tests to determine index properties of soil

3. To perform tests to determine shear strength and consolidation characteristics of soils

Course Title: Concrete and Highway Materials Laboratory

Course objectives:

1. To learn the principles and procedures of testing Concrete and Highway materials and to get hands on experience by conducting the tests and evolving inferences.

Sixth Semester

Course Title: **Construction Management and Entrepreneurship**

Course Objectives: This course will enable students to

1. Understand the concept of planning, scheduling, cost and quality control, safety during construction, organization and use of project information necessary for construction project.

2. Inculcate Human values to grow as responsible human beings with proper personality.

3. Keep up ethical conduct and discharge professional duties.

Course Title**: Design of Steel Structural Elements**

Course Objectives: This course will enable students to

1. Understand advantages and disadvantages of steel structures, steel code provisions, and plastic behavior of structural steel.

2. Learn Bolted connections and Welded connections.

3. Design of compression members, built-up columns and columns splices.

4. Design of tension members, simple slab base and gusseted base. 5. Design of laterally supported and un-supported steel beams.

Course Title: **Highway Engineering**

Course objectives: This course will enable students to

1. Gain knowledge of different modes of transportation systems, history, development of highways and the organizations associated with research and development of the same in INDIA.

2. Understand Highway planning and development considering the essential criteria's (engineering and financial aspects, regulations and policies, socio economic impact).

3. Get insight to different aspects of geometric elements and train them to design geometric elements of a highway network.

4. Understand pavement and its components, pavement construction activities and its requirements. 5. Gain the skills of evaluating the highway economics by B/C, NPV, IRR methods and also introduce the students to highway financing concepts.

Course Title: **Water Supply and Treatment Engineering**

Course objectives: This course will enable students to

1. Analyze the variation of water demand and to estimate water requirement for a community.

2. Evaluate the sources and conveyance systems for raw and treated water.

3. Study drinking water quality standards and to illustrate qualitative analysis of water.

4. Design physical, chemical and biological treatment methods to ensure safe and potable water Supply

Course Title: **Solid Waste Management**

Course objectives: This course will enable students to

1. Study the present methods of solid waste management system and to analyze their draw backs comparing with statutory rules.

2. Understand different elements of solid waste management from generation of solid waste to disposal.

3. Analyze different processing technologies and to study conversion of municipal solid waste to compost or biogas.

4. Evaluate landfill site and to study the sanitary landfill reactions.

Course Title: **Matrix Method of Structural Analysis**

Course objectives: This course will enable students to

1. Gain basic knowledge of structural systems and application of concepts of flexibility and stiffness matrices for simple elements.

2. Understand flexibility and stiffness matrices to solve problems in beams, frames and trusses.

3. Gain knowledge of direct stiffness method to solve problems in beams, frames and trusses.

4. Gain knowledge of solving problems involving temperature changes and lack of fit.

Course Title: **Alternative Building Materials**

Course objectives: This Course will enable students to:

1. Understand environmental issues due to building materials and the energy consumption in manufacturing building materials

2. Study the various masonry blocks, masonry mortar and structural behavior of masonry under compression.

3. Study the alternative building materials in the present context.

4. Understand the alternative building technologies which are followed in present construction field

Course Title: **Ground Improvement Techniques**

Course objectives: This course will enable students to

1. Understand the fundamental concepts of ground improvement techniques

2. Apply knowledge of mathematics, Science and Geotechnical Engineering to solve problems in the field of modification of ground required for construction of civil engineering structures.

3. Understand the concepts of chemical compaction, grouting and other miscellaneous methods.

4. Impart the knowledge of geosynthetics, vibration, grouting and Injection

Course Title: **Water Resources Management**

Course objectives: This course will enable students to

1. Judge surface and ground water resources.

2. Address the issues of water resources management.

3. Learn the principles of integrated water resources management.

4. Understand the legal framework of water policy.

5. Know the different methods of water harvesting.

Course Title**: Environmental Protection and Management**

Course objectives: This course will enable students to gain knowledge in Environmental protection and Management systems

Course Title: **Numerical Methods and Applications**

Course objectives: This course aims at providing the necessary basic concepts of a few numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology

Course Title: **Finite Element Method of Analysis**

Course objectives: This course will enable students to

1. Develop analytical skills.

2. Learn principles of analysis of stress and strain.

3. Develop problem solving skills.

4. Understand the principles of FEM for one and two dimensional problems.

Course Title: **Software Application Lab**

Course objectives: This course will enable students to

1. Use industry standard software in a professional set up.

2. Understand the elements of finite element modeling, specification of loads and boundary condition, performing analysis and interpretation of results for final design

3. Develop customized automation tools

Course Title: **Extensive Survey Project /Camp**

Course objectives: This course will enable students to

1. Understand the practical applications of Surveying.

2. Use Total station and other Measurement Equipments.

3. Work in teams and learn time management, communication and presentation skills

Course Title: **Municipal and Industrial Waste Water Engineering**

Course objectives: This course will enable students to

1. Understand sewerage network and influencing parameters.

2. Understand and design different unit operations involved in conventional and biological treatment process.

3. Apply the principles of Industrial effluent treatment process for different industrial wastes.

4. Evaluate self purification of streams depending on hydraulic and organic loading of sewage into receiving waters.

Course Title**: Design of RCC and Steel Structures**

Course objectives: This course will enable students to

1. Provide basic knowledge in the areas of limit state method and concept of design of RC and Steel structures

2. Identify, formulate and solve engineering problems in RC and Steel Structures

3. Give procedural knowledge to design a system, component or process as per needs and specifications of RC Structures like Retaining wall, Footing, Water tanks, Portal Frames and Steel Structures like Roof Truss, Plate Girder and Gantry Girder.

4. Imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design of RC and Steel Structures.

5. Provide factual knowledge on analysis and design of RC Structural elements, who can participate and succeed in competitive examinations.

Course Title: **Hydrology and Irrigation Engineering**

Course Objectives: This course will enable students to

1. Understand the concept of hydrology and components of hydrologic cycle such as pricipitation, infiltration, evaporation and transpiration.

2. Quantify runoff and use concept of unit hydrograph.

3. Demonstrate different methods of irrigation, methods of application of water and irrigation procedure.

4. Design canals and canal network based on the water requirement of various crops.

5. Determine the reservoir capacity.

Seventh Semester

Course Title: **Design of Bridges**

Course objectives: This course will enable students to understand the analysis and design of concrete Bridges.

Course Title: **Ground Water & Hydraulics**

Course objectives: This course will enable students

1. To characterize the properties of ground water and aquifers.

2. To quantify the ground water flow.

3. To locate occurrence of ground water and augment ground water resources.

4. To synthesize ground water development methods

Course Title**: Design Concept of Building Services**

Course Objectives: This course will enable students to

1. Learn the importance of sanitation, domestic water supply, and plumbing and fire services

2. Understand the concepts of heat, ventilation and air conditioning

3. Develop technical and practical knowledge in Building Services.

Course Title: **Structural Dynamics**

Course Objectives: This course will enable students to

1. Understand the behavior of structure especially building to various dynamic loads: such as wind, earthquake, machine vibration and ambient vibration

2. Basic understanding of structural analysis and knowledge of engineering mathematics.

3. Understand response of a single degree of freedom system to dynamic excitation and Vibration Control Techniques.

Course Title: **Urban Transportation and Planning**

Course Objectives: This course will enable students to

1. Understand and apply basic concepts and methods of urban transportation planning.

2. Apprise about the methods of designing, conducting and administering surveys to provide the data required for transportation planning.

3. Understand the process of developing an organized mathematical modelling approach to solve select urban transportation planning problem.

4. Excel in use of various types of models used for travel forecasting, prediction of future travel patterns.

Course Title: **Prefabricated Structures**

Course objectives: This course will enable students to

1. Understand modular construction, industrialized construction

2. Design prefabricated elements

3. Understand construction methods.

Course Title: **Rehabilitation and Retrofitting of Structures**

Course Objectives: This course will enable students to

1. Investigate the cause of deterioration of concrete structures.

2. Strategies different repair and rehabilitation of structures.

3. Evaluate the performance of the materials for repair

Course Title: **Reinforced Earth Structures**

Course Objectives: This course will enable students to

1. Create an understanding of the latest technique such as reinforcing the soil

2. Analyze the concept of RE so as to ascertain stability of RE structures

3. Understand the different reinforcing materials that can be used efficiently in soils.

4. Understand design concepts of different RE structures including introductory concepts of Foundations resting of RE soil bed.

Course Title: **Environmental Engineering Laboratory**

Course objectives: This course will enable students,

1. To learn different methods of water & waste water quality

2. To conduct experiments to determine the concentrations of water and waste water

3. To determine the degree and type of treatment

4. To understand the environmental significance and application in environmental engineering practice

Course Title**: Computer Aided Detailing of Structures**

Course objectives: This course will enable students to

1. Be aware of the Scale Factors, Sections of drawings,

2. Draft the detailing of RC and Steel Structural member

EIGHTH Semester

Course Title**: Quantity Surveying and Contracts Management**

Course objectives: This course will enable students to

1. Estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project

2. Understand and apply the concept of Valuation for Properties

3. Understand, Apply and Create the Tender and Contract document.

Course Title: **Design of Pre Stressed Concrete Elements**

Course objectives: This course will enable students to learn Design of Pre Stressed Concrete Elements

Course Title: **Earthquake Resistant Design of Structures**

Course Objectives: This course will enable students to learn about

1. Fundamentals of engineering seismology

2. Irregularities in building which are detrimental to its earthquake performance

3. Different methods of computation seismic lateral forces for framed and masonry structures

4. Earthquake resistant design requirements for RCC and Masonry structures

5. Relevant clauses of IS codes of practice pertinent to earthquake resistant design of structures

Course Title: **Hydraulic Structures**

Course objectives: This course will enable students to

1. Analyze and design gravity dams.

2. Find the cross-section of earth dam and estimate the seepage loss.

3. Design spillways and aprons for diversion works.

4. Design CD works and chose appropriate canal regulation works

Course Title: **Pavement Design**

Course objectives: This course will enable students to

1. Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.

2. Excel in the path of analysis of stress, strain and deflection in pavement.

3. Understand design concepts of flexible pavement by various methods (CBR, IRC 37-2001, Mcleods, Kansas) and also the same of rigid pavement by IRC 58-2002

4. Understand the various causes leading to failure of pavement and remedies for the same.

5. Develop skills to perform functional and structural evaluation of pavement by suitable methods.

Course Title**: Advanced Foundation Design**

Course objectives: This course will enable students to

1. Gain knowledge of about advanced topics of foundation design and analyses, supplementing their comprehensive knowledge acquired in basic foundation engineering course (15CV53)

2. Develop profound understanding of shallow and deep foundation analyses

3. Develop understanding of choice of foundation design parameters

4. Learn about cause and effect of dynamic loads on foundation

Course Title**: Internship /Professional Practice**

Course objectives: This course will enable students to get the field exposure and experience