Sinhgad Institutes

**Sinhgad Technical Education Society's**
**Sinhgad Academy of Engineering, Kondhwa (Bk), Pune**

**Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.**

| SR NO | Programme Outcomes | Programme Outcomes Statement |
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| 01 | Engineering Knowledge | Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. |
| 02 | Problem Analysis | Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| 03 | Design/Development of Solutions | Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| 04 | Conduct Investigations of Complex Problems | Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. |
| 05 | Modern Tool Usage | Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| 06 | The Engineer and Society | Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| 07 | Environment and Sustainability | Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| 08 | Ethics | Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| 09 | Individual and Team Work | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| 10 | Communication | Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| 11 | Project Management and Finance | Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| 12 | Life-Long Learning | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

## Civil Engineering

| SEM-I | | | | |
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| **Sr.No.** | **Class** | **Subject Code** | **Subject Name** | **Course outcomes** |
| **1** | **SE** | **201001** | **Building Technology and Architectural Planning** | 1. Identify types of building and basic requirements of building components.<br>2. Make use of Architectural Principles and Building byelaws for building construction.<br>3. Plan effectively various types of Residential Building forms according to their utility,<br>functions with reference to National Building Code.<br>4. Plan effectively various types of Public Buildings according to their utility functions with<br>reference to National Building Code.<br>5. Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.<br>6. Understand different services and safety aspects |
| **2** | **SE** | **201002** | **Mechanics of Structures** | 1. Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.<br>2. Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.<br>3. Explain the concept of shear and bending stresses in beams and demonstrate shear and bending<br>stress distribution diagram.<br>4. Use theory of torsion to determine the stresses in circular shaft and understand concept of<br>Principal stresses and strains.<br>5. Analyze axially loaded and eccentrically loaded column.<br>6. Determine the slopes and deflection of determinate beams and trusses. |
| **3** | **SE** | **201003** | **Fluid Mechanics** | 1. Understand the use of Fluid Properties, concept of Fluid statics, basic equation ofHydrostatics, measurement of fluid pressure, buoyancy & floatation and its application forsolving practical problems.<br>2. Understand the concept of fluid kinematics with |

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| | | | | reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow<br>3. Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.<br>4. Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.<br>5. Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow computation and design of most economical channel section.<br>6. Understand the concept of gradually varied flow in open channel and fluid flow around submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body**.** |
| **4** | **SE** | **207001** | **Engineering Mathematics III** | 1. Solve Higher order linear differential equations and its applications to modelling and analysing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems.<br>2. Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems.<br>3. Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.<br>4. Perform Vector differentiation &integration, analyze the vector fields and apply to fluid flow problems.<br>5. Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations. |
| **5** | **SE** | **207003** | **Engineering Geology** | 1. Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineeringconstructions.<br>2. Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and |

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| | | | | its implications on environment andsustainability.<br>3. Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.<br>4. Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.<br>5. Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoirs, and tunnels.<br>6. Explain geological hazards and importance of ground water and uses of common building stones. |
| **6** | **SE** | | **Awareness to Civil Engineering Practices Audit Course I** | **CO1:** Describe functioning/working of different types of industries/sectors in Civil Engineering.<br>**CO2:** Describe drawings and documents required and used in different Civil Engineering works.<br>**CO3:** Understand the importance of Code of Ethics to be practiced by a Civil Engineer and also understand the duties and responsibilities as a Civil Engineer.<br>**CO4:** Understand different health and safety practices on the site. |
| **7** | **SE** | | **Road Safety Management Audit Course I** | **CO1:**Summarize the existing road transport scenario of our country<br>**CO2:**Explain the method of road accident investigation<br>**CO3:**Describe the regulatory provisions needed for road safety<br>**CO4:**Identify the safety issues for a road and make use of IRC's road safety manual for conducting road safety audit. |
| **SEMESTER II** | | | | |
| **1** | **SE** | **201008** | **Geotechnical Engineering** | 1. Identify and classify the soil based on the index properties and its formation process<br>2. Explain permeability and seepage analysis of soil by construction of flow net.<br>3. Illustrate the effect of compaction on soil and understand the basics of stress distribution.<br>4. Express shear strength of soil and its measurement under various drainage conditions.<br>5. Evaluate the earth pressure due to backfill on retaining structures by using different theories.<br>6. Analysis of stability of slopes for different types of soils.<br>**Course Contents** |
| **2** | **SE** | **201009** | **Surveying** | 1. Define and Explain basics of plane surveying and differentiate the instruments used for it**.** |

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| | | | | 2. Express proficiency in handling surveying equipment and analyse the surveying data from these equipment.<br>3. Describe different methods of surveying and find relative positions of points on the surface of earth.<br>4. Execute curve setting for civil engineering projects such as roads, railways etc.<br>5. Articulate advancements in surveying such as space based positioning systems<br>6. Differentiate map and aerial photographs, also interpret aerial photographs. |
| **3** | **SE** | **201010** | **Concrete Technology** | 1. Able to select the various ingredients of concrete and its suitable proportion to achieved desired strength.<br>2. Able to check the properties of concrete in fresh and hardened state.<br>3. Get acquainted to concreting equipments, techniques and different types of special concrete.<br>4. Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques. |
| **4** | **SE** | **201011** | **Structural Analysis** | 1. Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.<br>2. Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.<br>3. Implement application of the slope deflection method to beams and portal frames.<br>4. Analyze beams and portal frames using moment distribution method.<br>5. Determine response of beams and portal frames using structure approach of stiffness matrix method.<br>6. Apply the concepts of plastic analysis in the analysis of steel structures. |
| **5** | **SE** | **201012** | **Project Management** | 1. **Describe** project life cycle and the domains of Project Management.<br>**2. Explain** networking methods and their applications in planning and management<br>3. **Categorize** the materials as per their annual usage and also **Calculate** production rate of construction equipment<br>4. **Demonstrates** resource allocation techniques and **apply** it for manpower planning.<br>5. **Understand** economical terms and different laws associated with project management<br>6. **Apply** the methods of project selection and |

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| | | | | **recommend** the best economical project. |
| **6** | **SE** | **201017** | **Project Based Learning** | 1. Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.<br>2. Analyse and design the physical/ mathematical/ ICT model in order to solve identified problem/project.<br>3. Create, work in team and applying the solution in practical way to specific problem. |

**HOD**

## TE

## SEM-I

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| **1** | **TE** | **301001** | **Hydrology and water resource engineering.** | 01 Understand government organizations, apply & analyze precipitation & its abstractions.<br>02 Understand, apply & analyze runoff, runoff hydrographs and gauging of streams.<br>03 Understand, apply & analyze floods, hydrologic routing & Q-GIS software in hydrology.<br>04 Understand, apply & analyze reservoir planning, capacity of reservoir & reservoir economics.<br>05 Understand water logging & water management, apply & analyze ground water hydrology<br>06 Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement. |
| **2** | **TE** | **301002** | **Infrastructure Engineering and Construction Techniques** | 01 Define identify, describe reliability of water sources, estimate water requirement for various sectors<br>02 Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics<br>03 Design various components of water treatment plant and distribution system.<br>04 Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.<br>05 Design elevated service reservoir capacity and understand the rainwater harvesting.<br>06 Understand the requirement of water treatment plant for infrastructure and Government scheme. |
| **3** | **TE** | **301003** | **Structural Design-I** | 01 Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force.<br>02 Determine the adequate steel section subjected to compression load and design of built up columns along with lacing and battening.<br>03 Design eccentrically loaded column for section strength and column bases for axial load |

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| | | | | and uniaxial bending.<br>04 Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section.<br>05 Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load.<br>06 Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections. |
| **4** | **TE** | **301004** | **Engineering Economics and Financial Management** | 01 Understand basics of construction economics.<br>02 Develop an understanding of financial management in civil engineering projects.<br>03 Prepare and analyze the contract account.<br>04 Decide on right source of fund for construction projects.<br>05 Understand working capital and its estimation for civil engineering projects.<br>06 Illustrate the importance of tax planning & understand role of financial regulatory bodies |
| **5** | **TE** | **301005 a** | **Elective I: Advanced Fluid Mechanics and Hydraulic Machines** | 01 Determine discharge using notches and weirs, and energy loss in hydraulic jump in open channel flow.<br>02 Describe simple superpositions of basic ideal fluid flows; and determine velocity and shear stress distribution for laminar flow between parallel plates.<br>03 Understand flow through openings under varying head, and determine rise in pressure due to water hammer effect in pipe flow.<br>04 Calculate force exerted by free jet on stationary and moving, flat and curved vanes using impulse momentum principle. |

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| | | | | 05 Design Pelton wheel and Francis turbines and predict their performance characteristics.<br><br>06 Estimate performance characteristics of Centrifugal pump |
| **6** | **TE** | **301005 b** | **Elective I: Research Methodology and IPR** | 01 Understand a research problem for civil engineering domain.<br><br>02 Analyze the available literature for given research problem and illustrate different techniques of literature survey thereby gap identification.<br><br>03 Recognize the importance of data collection and investigate the statistical and reliability methods of preliminary data analysis.<br><br>04 Explain the important concept of interpretation and develop technical writing and presentation skills.<br><br>05 Comprehend the various forms of the intellectual property, its relevance and business impact in the changing global business environment.<br><br>06 Realize the importance of patents, trademark and copyright and follow research ethics. |
| **7** | **TE** | **301005 c** | **Elective I: Construction Management** | 01 Understand the overview of construction sector.<br><br>02 Illustrate construction scheduling, work study and work measurement.<br><br>03 Acquaint various labor laws and financial aspects of construction projects.<br><br>04 Explain elements of risk management and value engineering.<br><br>05 State material and human resource management techniques in construction.<br><br>06 Understand basics of artificial intelligence |

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| | | | | techniques in civil engineering. |
| **8** | **TE** | **301005 d** | **Elective I: Advanced Concrete Technology** | 01 Understand the chemistry of cement and its effect on properties of concrete<br><br>02 Apply the knowledge of supplementary cementations materials to produce sustainable concretes<br><br>03 Understand the mechanism of working of admixtures and their effect on properties of concrete<br><br>04 Evaluate the characteristic properties of fiber reinforced concrete<br><br>05 Understand the durability properties of concrete<br><br>06 Interpret the properties of concrete through advance testing methods |
| **9** | **TE** | **301005 e** | **Elective I: Matrix Methods of Structural Analysis** | 01 To understand the structural behavior of bars and trusses and analyze it by using flexibility method of analysis.<br><br>02 To understand the structural behavior of beams and plane frames and analyze it by using flexibility method of analysis.<br><br>03 To analyze bars, springs and truss by member approach of stiffness matrix method.<br><br>04 To analyze beams by member approach of stiffness matrix method and to develop transformation matrix and global/structure stiffness matrix for plane frame and thereby analyze it by member approach of stiffness matrix method.<br><br>05 To develop transformation matrix and global/structure stiffness matrix for grid and analyze the grid by structure and member approach of stiffness matrix method.<br><br>06 To develop the member stiffness matrix of space truss and space frame and develop the flow chart /algorithm to write the program for analysis of |

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| | | | | skeletal structures with reference to computer application. |
| **10** | **TE** | **301005 f** | **Elective I: Advanced Mechanics of Structures** | 01 Apply moment area and conjugate method to find slope and deflection.<br>02 Evaluate stresses and strain in thin and thick cylinder.<br>03 Analyze the beam and trusses by influence line diagram.<br>04 Analyze the beam for moving load by influence line diagram.<br>05 Understand and analyze beam curved in plan and elevation.<br>06 Analyze three and two hinged arches for axial thrust, shear and moment. |
| **11** | **TE** | **301006** | **Seminar** | 01 Appraise the current civil engineering research / techniques / developments / interdisciplinary areas.<br>02 Review and organize literature survey utilizing technical resources, journals etc.<br>03 Evaluate and draw conclusions related to technical content studied.<br>04 Demonstrate the ability to perform critical writing by preparing a technical report.<br>05 Develop technical writing and presentation skills. |
| **12** | **TE** | **301011 a** | **Audit Course I: Professional Ethics and Etiquettes** | 01 Understand the basic perception of profession, professional ethics, various moral issues<br>and uses of ethical theories<br>02 Understand various social issues, industrial standards, code o ethics and role of professional ethics in engineering field. |

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| | | | | 03 Follow ethics as an engineering professional and adopt good standards and norms of engineering practice.<br><br>04 Apply ethical principles to resolve situations that arise in their professional lives |
| **SEM II** | | | | |
| **1** | **TE** | **301012** | **Waste Water Engineering** | 01 Recall sanitation infrastructure, quantification and characterization of wastewater,<br><br>natural purification of streams<br><br>02 Design preliminary and primary unit operations in waste water treatment plant<br><br>03 Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process<br><br>04 Understand and design suspended and attached growth wastewater treatment systems<br><br>05 Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems<br><br>06 Compare various sludge management systems and explain the potential of recycle and<br><br>reuse of wastewater treatment |
| **2** | **TE** | **301013** | **Design of Reinforced Concrete Structures** | 01 Apply relevant IS provisions to ensure safety and serviceability of structures, understand<br><br>the design philosophies and behavior of materials: steel & concrete.<br><br>02 Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.<br><br>03 Design & detailing of rectangular one way and |

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| | | | | two-way slab with different boundary<br><br>conditions<br><br>04 Design & detailing of dog legged and open well staircase<br><br>05 Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.<br><br>06 Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings. |
| **3** | **TE** | **301014** | **Remote Sensing and Geographic Information System** | 01 Articulate fundamentals and principles of RS techniques.<br><br>02 Demonstrate the knowledge of remote sensing and sensor characteristics.<br><br>03 Distinguish working of various spaces-based positioning systems.<br><br>04 Analyze the RS data and image processing to utilize in civil engineering<br><br>05 Explain fundamentals and applications of RS and GIS<br><br>06 Acquire skills of data processing and its applications using GIS |
| **4** | **TE** | **301015 a:** | **Elective II: Advanced Engineering Geology with Rock Mechanics** | 01 Illustrate seismic zones, plate tectonics and civil engineering significance of major rock formations of India with their characteristics.<br><br>02 Explain soil profile, geo-hydrological characters of various rock formations and necessity of geological studies in water conservation.<br><br>03 Apply knowledge of geology in Infrastructural, Urban development and demonstrate importance of national wealth. |

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| | | | | 04 Validate the suitability of rocks based on mechanical properties, R.Q.D. and geophysical exploration.<br><br>05 Explore subsurface Geology for civil engineering projects to suggest foundation treatments for various geological defects and channel erosion.<br><br>06 Illustrate the suitability of proposed alignments for tunnels and bridges on the basis of Geological investigations. |
| **5** | **TE** | **301015 b** | **Elective II: Soft Computing Techniques** | 01 Understand AI techniques, soft computing techniques and basic concepts Artificial Neural Network<br><br>02 Understand components of ANN, training algorithms and implement the back propagation algorithm<br><br>03 Design the feed forward back propagation neural network.<br><br>04 Understand types of neural networks and their applications<br><br>05 Understand working of genetic algorithm, support vector regressions, model tree and<br><br>random forest along with their applications<br><br>06 Develop models for time series applications using support vector regressions, model tree and random forest. |
| **6** | | **301015 c** | **Elective II: Advanced Surveying** | 01 Recognize the concept of triangulation for fixing the ground control points.<br><br>02 Differentiate most probable values for different measurement and adjust those in a given figure.<br><br>03 Summarize the concepts of astronomical and hydrographic surveying.<br><br>04 Demonstrate the use of aerial photographs for |

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| | | | | mapping.<br><br>05 Analyze use of modern surveying instruments in the field.<br><br>06 Execute GPS and the associated software for different applications in civil engineering. |
| **7** | | **301015 d:** | **Elective II: Advanced Geotechnical Engineering** | 01 Classify the soil and understand the soil structure and role of water in clay.<br><br>02 Calculate lateral pressure on retaining structures and carry out design the retaining structures.<br><br>03 Interpret the results of triaxial tests under different drainage conditions.<br><br>04 Draw the stress paths for different conditions.<br><br>05 Select and implement soil stabilization techniques based on field conditions.<br><br>06 Explain different ground improvement techniques. |
| **8** | | **301015 e:** | **Elective II: Architecture and Town Planning** | 01 Apply the principles of architectural planning and landscaping for improving quality of life<br><br>02 Understand the confronting issues of the area and apply the acts.<br><br>03 Evaluate and defend the proposals.<br><br>04 Appraise the existing condition and to develop the area for betterment. |
| **9** | | **301015 f** | **Elective II: Solid Waste Management** | 01 Outline solid waste management systems with respect to its generation rate (quantity), sampling, characteristics and regulatory/legal requirements.<br><br>02 Explain and suggest relevant method of storage, collection and transportation of solid waste for the given site condition with justification.<br><br>03 Develop understanding of technological applications for processing and material recovery from solid waste with its economics and design |

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| | | | | composting system for organic waste.<br><br>04 Describe the fundamental and technological aspects of waste to energy systems from solid waste and to design anaerobic digester and incineration system.<br><br>05 Outline the design, operation, and maintenance of sanitary landfill and management of legacy waste.<br><br>06 Explain the functional element for management of special waste and suggest the relevant method of reuse and recycling for the given type of waste in the given situation. |
| **10** | | **301016:** | **Internship** | 01 To develop professional competence through industry internship<br><br>02 To apply academic knowledge in a personal and professional environment<br><br>03 To build the professional network and expose students to future employees<br><br>04 Apply professional and societal ethics in their day to day life<br><br>05 To become a responsible professional having social, economic and administrative considerations<br><br>06 To make own career goals and personal aspirations |

**HOD**

**BE**

**SEM I**

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| **1** | **BE** | **401001** | **Environmental Engineering II** | Define objectives, explain collection and conveyance and to estimate quantity of wastewater.<br><br>Describe wastewater characteristics; explain preliminary and primary treatment processes and its design along with effluent standards.<br><br>Explain the processes of biological treatment units for wastewater<br><br>Describe low cost treatments, disposal methods and self-purification capacity of the stream<br><br>Explain air pollution sources, effects and control measures.<br><br>Define Environmental Impact Assessment, explain its methods and understand latest trend |
| **2** | **BE** | **401002** | **Transportation Engineering** | To comprehend the concepts of road development, road alignment and preparation of highway project.<br><br>To design cross section elements, sight distance, horizontal and vertical alignment. Study, analysis and design of curves and grades.<br><br>To implement traffic studies, traffic regulations and control, and intersection design<br><br>To be aware of pavement materials and their properties.<br><br>To become familiar with Design flexible and rigid pavements.<br><br>To Understand the principles of construction and maintenance of highways |
| **3** | **BE** | **401 003** | **Structural Design and Drawing III** | Application of different specification of IS-1343:2012 for prestressed concrete<br><br>Able to differentiate between pretensioning and post |

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| | | | | tensioning systems<br><br>Safely achieved by varying the sections that is proving thin slabs and avoiding beams.<br><br>Understand and designing of soil retaining structures.<br><br>Understand and design of liquid retaining structures.<br><br>Able to analyse and design framed structures, Application of IS 1893 for earthquake resistant design of structures. |
| **4** | **BE** | **401004** | **ARCHITECTURE AND TOWN PLANNING** | Graduates should gain and understand basic concepts of town planning.<br><br>Graduates should be able to understand landscape architecture.<br><br>Graduates should be able to understand the concept of urban design, sustainable development and city development.<br><br>Graduates should able to understand the planning agencies and traffic transportation system.<br><br>Graduates should be able to understand smart city approach |
| **5** | **BE** | **401004** | **Advanced Concrete Technology** | To understand the basic concepts of Cement & Concrete.<br><br>To understand and study the various types of special Concrete.<br><br>To understand and study the Mix design of special concrete.<br><br>To study the basic concept of fibre reinforced concrete<br><br>To study the various special fibre reinforced concrete. |

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| | | | | To know and understand the various properties of Ferrocement. |
| **6** | **BE** | **401 005** | **Total Quality Management** | To understand the concept of Quality<br><br>To understand the Implication of Quality on Business<br><br>To Implement Quality Implementation Programs<br><br>To have exposure to challenges in Quality Improvement Programs |
| **SEM II** | | | | |
| **1** | **BE** | **401007** | **Dams and Hydroulic structure** | Graduate should understand importance of dam, social issue, climatic effects and health monitoring of dams.<br><br>Student should able to design, analyze gravity dam, spillways and design the same, operation of gates.<br><br>Student should gain the field knowledge of spillway and operation of gates and design.<br><br>Student should understand the necessarily of earthen dams and its design.<br><br>Student should get knowledge with various hydraulic structures such as canals, river training works. |
| **2** | **BE** | **401008** | **Quantity Surveying, Contracts and tenders** | Student should able to understand the purpose of estimating and mode of measurements.<br><br>Student should able to understand the methods of taking out quantities using IS 1200 rules.<br><br>Student should able to understand the specifications and analysis of rates.<br><br>Student should able to evaluate values of building.<br><br>Student should able to understand and fill tenders. |

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| | | | | Student should able to understand the contracts and conditions of contracts. |
| **3** | **BE** | **401 009** | **Air Pollution and Pollution** | Introduction of major problems in indoor air pollution and control, regulations<br><br>Familiar with regulations pertinent to air pollutions<br><br>Describe general air pollution problems, meteorological definitions, air transport equations and pollution control matters and devices<br><br>The contents involved the knowledge of causes of air pollution.<br><br>The contents involved the knowledge of health related to air pollution.<br><br>To develop skills relevant to control of air pollution. |
| **4** | **BE** | **401 010** | **Construction Management** | To apply business and management skills in positions within the construction industry.<br><br>To apply technical skills and knowledge in mathematics, science, construction, and technology in support of planning, analyzing, and solving construction problems.<br><br>To use industry resources including associations and organizations, professional publications, and governmental data to analyze, evaluate, and apply current trends within the industry.<br><br>To manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements..<br><br>To analyze, evaluate, and select computer applications for the purpose of efficient and effective project management. |

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