GANDHI ACADEMY OF TECHNOLOGY AND ENGINEERING
Accredited by NAAC with 'A' Grade(Approved by A.I.C.T.E & Affiliated to B.P.U.T., Rourkela, SCTE & VT, Bhubaneswar,Odisha)Golanthara, Berhampur, Dist-Ganjam – 761008
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COURSE OUTCOME

DEPARTMENT OF CIVIL ENGINEERING- SEMESTER-III

Course Title:-STRUCTURAL MECHANICS

Course Code:-C201

CO1: Outlining and calculate centroids and moments of inertia (MI) for various cross-sectional shapes.

CO2: Describing and compute different types of stresses (tensile, compressive, shear) and strains (longitudinal, lateral, volumetric) in materials.

CO3: Outlining shear stresses in beams with different cross-sections and understand shear stress distribution.

CO4: Carrying out the critical load for long columns using Euler's theory and understand the concept of slenderness ratio and effective length.

CO5: Executing slope and deflection for cantilever and simply supported beams using methods such as double integration and Macaulay's method & analyze trusses using method of joints and the method of sections.

Course Title:-GEOTECHNICAL ENGINEERING

Course Code:-C202

CO1: Explaining the basic properties of soil formation.

CO2: Recognising the index properties of soils.

CO3: Finding the properties and factors of permeability by conducting simple tests.

CO4: Deconstructing the effective stress and seepage through soils.

CO5: Exemplifying the Active earth Pressure, Passive earth Pressure at rest and checking the various stress distribution of soil.

Course Title:-BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY

Course Code:-C203

CO1: Identifying classification, qualities of rock and brick, dressing of stone as well as manufacturing process of brick.

CO2: Describing types of cement, mortar, timber and composition of concrete, paints as well as refractory materials.

CO3: Explaining components and types of building, foundation and site investigation objectives.

CO4: Listing purpose and classification of walls, types of door and window.

CO5: Summarizing types of floor finishes, roofs and stairs along with purpose of damp & termite proofing and aims of energy management.

Course Title:-ESTIMATION & COST EVALUATION –I

Course Code:-C204

CO1: Recognizing and apply different types of estimates, including plinth area, floor area, and carpet area estimates, based on project requirements and available information.

CO2: Executing the units and modes of measurement as per IS 1200 for accurate and standardized measurement in construction projects.

CO3: Making detailed estimates for a single-storey building, including foundations, walls, roofs, staircases by Using the Short Wall-Long Wall Method and Centre Line Method for accurate quantity estimation.

CO4: Justifying the rate for given items of work using rate analysis technique and To carryout valuation of assets.

CO5: Inventing an abstract of cost estimates summarizing material, labor, overheads, profit margins and Identifying the duties and responsibilities of engineers at various levels within these organizations.

Course Title:-ENVIRONMENTAL STUDIES
Course Code:-C205
CO1: Executing about environment and ecosystem.
CO2: Explaining the knowledge about natural resources, its importance and environmental impacts of human activities on natural resource
CO3: Integrating and implement the concept of about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.
CO4: Checking and visualize the concept of conservation of biodiversity and its importance
CO5: Outlining the generation about Social issues and environment and using on introductory idea about increase in population growth and its impact on environment.

Course Title:-CIVIL ENGG. LAB-I
Course Code:-C206
CO1: Identify tools and equipment used and their respective functions.
CO2: Explain different types of materials and their basic properties.
CO3: Use and take measurements with the help of basic measuring tools/equipment.
CO4: Select proper tools for a particular operation.
CO5: Producing Select materials and tools to make a job as per given specification/drawing.

Course Title:-CIVIL ENGG. DRAWING-I
Course Code:-C207
CO1: Outlining accurate and detailed floor plans, elevations, and sections based on provided specifications .
CO2: Evaluating plan, elevation and section views of flat roof buildings.
CO3: Making precise plans showing the layout of the building and the details of the inclined roof **.**
CO4: Designing buildings that fit within a specified budget using plinth area rates and cost estimation techniques **.**
CO5: Outlining efficient line plans for various building types, considering their specific functional requirements**.**

Course Title:-ESTIMATION PRACTICE-I (COMPUTERAIDED)
Course Code:-C208
CO1: Identifying and using various estimate kinds, such as carpet, floor, and plinth area estimations, depending on the information at hand and the project's requirements.
CO2: Implementing IS 1200's units and measurement techniques to ensure precise and consistent measurement in building projects.
CO3: Making precise quantity estimates for a single-story building using the Center Line Method and the Short Wall-Long Wall Method, which include foundations, walls, roofs, and staircases.
CO4: Using the rate analysis technique to justify the fee for the specified elements of work and to do asset valuation.
CO5: creating a cost estimate abstract that summarizes labor, material, overhead, and profit margins, as well as determining the roles and responsibilities of engineers at different organizational levels.

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DEPARTMENT OF CIVIL ENGINEERING- SEMESTER-IV

Course Title:-STRUCTURAL DESIGN-I
Course Code:-C209
CO1: Finding and apply the design concepts of Working stress method to flexural members and sketch the detailing.
CO2: Recognising the various design concepts of singly, doubly RC structures and design a beam under flexure and draw the reinforcement details.(LSM)
CO3: Designing the beam under shear and torsion & Calculate the anchorage and development length and check the serviceability requirements for RC structural elements.
CO4: Structuring and design of various T beams using (LSM)method
CO5: Classifying the various types of slab & staircase and draw the reinforcement details and outlining the design concept of short long columns &footings

Course Title:-HYDRAULIC AND IRRIGATION ENGINEERING
Course Code:-C210
CO1: Determining the fluid pressure and use various devices for measuring fluid pressure.
CO2: Structuring kinematic problems, concepts of equations and various type of paths , stream lines and flows
CO3: Outlining the performance characteristics of hydraulic turbines and pumps and concept of hydrologic cycle, rainfall, runoff, duty, delta, base and their relationship.
CO4: Understanding of flow irrigation, classification of canals, causes of water logging and necessity of diversion headwork's and regulatory structures.
CO5: Attributing and design the different types of Cross drainage works and necessity of gravity dam and earthen dam and spillways.

Course Title:-LAND SURVEY-I
Course Code:-C211
CO1: Deconstructing of horizontal and vertical distance as well as angles.
CO2: Outlining horizontal curves, types of curves, purpose and the use of curves.
CO3: Executing and prepare different kinds of maps, recognize basic themes of map making, development and observation skill.
CO4: Explaining advance surveying techniques over conventional method in field of civil engineering.
CO5: Producing a basic understanding on geo-spatial acquisition and its process use of modern electronic surveying instruments for its different applications.

Course Title:-HIGHWAY ENGINEERING
Course Code:-C212
CO1: Carrying out the types of road as per IRC recommendations & developments in India from different periods
CO2: Implementing the geometrical design features of different highways
CO3: Outlining different tests on road materials & Types of pavements required for highway construction using IRC standards
CO4: Planning the highway drainage, roadside development, concepts of hill road.
CO5: Executing the parameters related to traffic studies as well as maintenance of bituminous and concrete road and proper selection, application, utilization, and productivity of heavy equipment.

Course Title:-LAND SURVEY PRACTICE-I
Course Code:-C213
CO1: Apply the fundamental of surveying and measurement of distances to real world problem.
CO2: Recognize legal principles in land surveying, including boundary laws and professional ethics.
CO3: Establish control points and plot topographical maps.
CO4: Compute area and volume from ground data and maps.
CO5: Set out horizontal and vertical curves on the ground.

Course Title:-CIVIL ENGG. DRAWING-II

Course Code:-C214

CO1: Demonstrate the ability to create detailed and advanced technical drawings for complex civil engineering structures, including multi-storey buildings, bridges, and highways.
CO2: Prepare accurate and detailed reinforcement drawings for structural elements such as slabs, beams, columns, foundations, retaining walls, and staircases as per industry standards.
CO3: Design and draft plumbing layouts, water supply systems, and drainage networks, considering efficient and sustainable practices.
CO4: Analyze and resolve design challenges through modifications and optimization in detailed engineering drawings.
CO5: Exhibit ethical responsibility, precision, and professionalism in creating and managing engineering drawings for real-world applications.

Course Title:-TECHNICAL SEMINAR

Course Code:-C316

CO1: Identify and use to their academic study relevant well-practiced note-taking interactivity and time management tactics.
CO2: Understand design aspect and analyze solutions to engineering problems.
CO3: Qualitatively evaluate the solutions on sustainable and ethical aspects.
CO4: Write technical documents and give oral presentations related to the work completed and improves personality development and communication skills.
CO5: Create audience-centered presentations that meet specific professional goals and include ethical and legal visual aids.

DEPARTMENT OF CIVIL ENGINEERING- SEMESTER-V

Course Title:-ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY

Course Code:-C301

CO1: Identifying &classification of entrepreneur and characteristics, types. Forms of business ownership, Role of banks. Identifying business plans, opportunity and selection of product.
CO2: Formulate Project planning and preparation of project report, feasibility study
CO3: Understanding principles and functions of management, learning the qualities required to be a good leader, importance of motivation for an individual.
CO4: Understanding the different areas of management.
CO5: Description of work culture and uses of IOT, overview of patent rights and trade marks

Course Title:-STRUCTURAL DESIGN –II

Course Code:-C302

CO1: Outlining the types, properties, and advantages/disadvantages of steel and masonry structures.
CO2: Making the various steel members and connections, including bolted and welded joints.
CO3: Implementing principles of limit state design to ensure safety, serviceability, and durability in structural design.
CO4: Structuring and design steel tension, compression members, and beams, considering factors such as buckling and deflection.
CO5: Designing tubular steel structures and masonry elements, understanding their specific requirements and considerations on masonry structure walls &columns, slenderness ratio, effective length, height & thickness.

Course Title:-RAILWAY & BRIDGE ENGINEERING
Course Code:-C303
CO1: Identifying and explain railway-related terms and concepts, explain the various elements that make up the permanent way, including their functions and materials used.
CO2: Explaining the various elements that make up the permanent way, including their functions and materials used, Describe the functions, types, and requirements of rails, rail joints, and welding practices
CO3: Finding and explain the necessity of points and crossings, and describe different types along with their tie diagrams, describe the methods for laying and maintaining track.
CO4: Locating the various components, classifications, and requirements of bridges
CO5: Recognizing the function and types of coffer dams used in bridge construction and their role in creating a dry work environment, Listing different types of culverts, including pipe, box, arch, slotted, and drain/ditch culverts.
Course Title:-WATER SUPPLY & WASTE WATER ENGINEERING
Course Code:-C304
CO1: Explaining qualities, source of water and water demand.
CO2: Listing Water Treatment Processes.
CO3: Summarizing plumbing system & its valve types, features and uses.
CO4: Deconstructing Design and Operation of Sewage Treatment Facilities.
CO5: Exemplifying lamp holes, manholes, and sewage disposal locations, sanitary plumbing arrangement and sanitary fixtures.
Course Title:-ESTIMATING & COST EVALUATION –II
Course Code:-C305
CO1: Interpreting for a Slab culvert with right angled/ Splayed wing wall.
CO2: Interpreting for a Hume pipe Culvert.
CO3: Interpreting of a flexible pavement in cutting / filling.
CO4: Attributing and design pile foundations.
CO5: Exemplifying the specifications of different Items of works.
Course Title:-CIVIL ENGINEERING. LAB-II
Course Code:-C306
CO1: Identify and classify soil based on standard geotechnical experimental methods.
CO2: Interpret engineering behavior of soils based on test results.
CO3: Demonstrate Bernoulli equation and its application to measurement of flow using different equipments
CO4: Analyze the properties of various bituminous mixes.
CO5: Determine chemical properties of water and ensure quality by performing tests.
Course Title:-ESTIMATING PRACTICE-II (COMPUTER AIDED)
Course Code:-C307
CO1: Assessing an RCC slab culvert with a splayed wing wall, right angle, and bar bending schedule (manual)
CO2: Executing a thorough vertical fall and drainage siphon estimation according to the specifications provided.
CO3: Estimating a flexible pavement for cutting and filling a WBM road according to the specifications provided.
CO4: Design and attribution of integrated footing, piles, and tube wells.
CO5: Creating a summary of public works accounting and the functions and duties of different Public Works Department (PWD) officers.

Course Title:-PROJECT PHASE-I

Course Code:-C308

CO1: Identify the issue, undertake a literature review, and then formalize it.

CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes

CO3: Implement the design and demonstrate the functionality of developed model

CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.

CO5: Prepare report as per the standard guidelines.

DEPARTMENT OF CIVIL ENGINEERING- SEMESTER-VI

Course Title:-LAND SURVEY –II

Course Code:-C309

CO1: Organizing of horizontal and vertical distance as well as angles.

CO2: Outlining horizontal curves, types of curves, purpose and the use of curves.

CO3: Carrying out and prepare different kinds of maps, recognize basic themes of map making, development and observation skill.

CO4: Implementing advance surveying techniques over conventional method in field of civil engineering.

CO5: Making a basic understanding on geo-spatial acquisition and its process use of modern electronic surveying instruments for its different applications.

Course Title:-CONSTRUCTION MANAGEMENT

Course Code:-C310

CO1: Making a construction project safety plan and construction project schedules.

CO2: Structuring professional decisions based on ethical principles and construction planning and management of construction processes.

CO3: Executing the concept of warehouse and storage activities and its importance in the Supply Chain.

CO4: Organizing the quality of a project scope, time and cost.

CO5: Executing the knowledge and understanding of construction works and its management on the field and protect the public in the surroundings and keep the job on track and schedule.

Course Title:-ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT

Course Code:-C311

CO1: Organising between various types of fibres, plastic, artitifical timbers, miscellaneous materials and their structural requirements.

CO2: Checking with joining techniques used for prefabrication and to know the procedure of prefabrication.

CO3: Executing a good structural configuration for seismic resistance and implement various rehabilitation and retrofitting techniques using various innovative materials in structures.

CO4: Deconstructing the factors impacting building performance such as cold & hot water, sanitation, electrical services, lighting, ventilation and mechanical services.

CO5: Using basic knowledge about Construction equipment and machinery functions and applications of Geo synthetics.

Course Title:-CONCRETE TECHNOLOGY

Course Code:-C312

CO1: Explaining physical and chemical properties of concrete, grade, advantages and disadvantages of concrete.

CO2: Carrying out the elements of concrete, characteristics of course aggregate and fine aggregate, composition of cement, quality of water mixing and curing.

CO3: Checking the workability of concrete.

CO4: Attributing of concrete mix design, properties of concrete.

CO5: Comparing various stages of manufacturer of concrete and inspection of deterioration of concrete and repair technology for concrete structures. And testing as per IS: 456.

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Course Title:-CONSTRUCTION WORKSHOP PRACTICE & MS PROJECT

Course Code:-C313

CO1: Gain knowledge of various construction materials like wood, concrete, steel, and bricks.

CO2: Apply theoretical knowledge to practical tasks, enhancing problem-solving skills.

CO3: Understand the importance of quality control in construction work.

CO4: Understand how to create a project plan and define tasks, milestones, and timelines.

CO5: Maintain accurate documentation for project tracking and post-completion review.

Course Title:-LAND SURVEY PRACTICE -II

Course Code:-C313

CO1: Students will demonstrate a strong understanding of the fundamental principles of land surveying, including the use of various surveying instruments, measurement techniques, and methods for accurate data collection.

CO2: Develop skills in using Total Station & advanced surveying instruments and analyse data.

CO3: Analysing land surveying software and technology to process and interpret data, generate maps, and create land models for real-world applications.

CO4: Developing skills to conduct traverse survey & to find the area.

CO5: Enhance the skills to set out Curves in the field using both Total Station and Theodolite.

Course Title:-CADD LAB AND DESIGN & DETAILING PRACTICE

Course Code:-C314

CO1: Detailing of reinforcement in Cantilever, Simply supported and Continuous Beams (Both Singly & Doubly Reinforced Beams), Detailing of reinforcement in canopy & columns (both uniaxial & biaxial).

CO2: Detailing of reinforcement in RC isolated footings square, rectangular, circular and combined footings. Detailing of reinforcement in RC one-way, two-way slabs and dog-legged staircases.

CO3: Drawing of Steel bolted and welded connections. Drawing of steel compression and tension members.

CO4: Drafting of steel beams-built-up sections. Drafting of steel plate girder, Drafting of steel roof truss.

CO5: Preparation of approval drawing of a double storied residential building from given specifications with its 3D view using above commands.

Course Title:-PROJECT PHASE-II

Course Code:-C315

CO1: Determine the issue by conducting an industry visit or literature review.

CO2: Apply basic engineering fundamental in the domain of practical applications.

CO3: Attempt a problem solution in a right approach.

CO4: Correlate the theoretical and experimental/simulations results and draw the proper inferences.

CO5: Prepare report as per the standard guidelines.

Course Title:-LIFE SKILL

Course Code:-C316

CO1: Understanding personal strengths, weaknesses, values, and goals.

CO2: Enhancing verbal and non-verbal communication.

CO3: Developing awareness of global issues and sustainable practices.

CO4: Avoiding debt and managing financial emergencies.

CO5: Building healthy relationships through empathy and collaboration.