



B.L.D.E.Association's
hana Pitamaha Dr. P.G. Halakatti College of Engineering & Technology, Bijapur.
Program Outcomes
Department: Civil Engineering

List of Program Outcomes (POs)

Engineering Graduates will be able to:

1.Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2.Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3.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.

4.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.

5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.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.

7.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.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.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.Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.



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List of Program Specific Outcomes (PSO)

By the time of graduation, Civil Engineering students can

1. Apply knowledge of mathematics, science and basics of engineering science in professional career.
2. Practice in the core areas of civil engineering and conduct laboratory and field tests.
3. Analyse and Design a component, system or establish process in civil engineering.
4. Build the managerial and professional skills in executing the engineering projects addressing the social concerns.



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Subject	Code	Course Outcomes	Statement
I Semester			
Mathematics-I for Civil Engineering stream	BMAC101	CO1	apply the knowledge of calculus to solve problems related to polar curves
		CO2	learn the notion of partial differentiation to compute rate of change of multivariate functions.
		CO3	analyze the solution of linear and nonlinear ordinary differential equations.
		CO4	make use of matrix theory for solving the system of linear equations and compute eigenvalues and eigenvectors.
		CO5	familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB
Applied Physics for CV Stream	BPHYC102	CO1	Elucidate the concepts in oscillations, waves, elasticity and material failures
		CO2	Summarize concepts of acoustics in buildings and explain the concepts in radiation and photometry
		CO3	Discuss the principles photonic devices and their application relevant to civil engineering.
		CO4	Describe the various natural hazards and safety precautions.
		CO5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements.
ENGINEERING MECHANICS	BCIVC103	CO1	Compute the resultant of a force system and resolution of a force
		CO2	Comprehend the action for forces, moments, and other types of loads on rigid bodies and compute the reactive forces
		CO3	Analyse the frictional resistance offered by different planes



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		CO4	Locate the centroid and compute the moment of inertia of sections
		CO5	Analyze the bodies in motion
Introduction to Electrical Engineering	BESCK104B	CO1	Understand the concepts of various energy sources and Electric circuits.
		CO2	Apply the basic Electrical laws to solve circuits.
		CO3	Discuss the construction and operation of various Electrical Machines.
		CO4	Identify suitable Electrical machine for practical implementation.
		CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.
Introduction to Python Programming	BPLCK105B	CO1	Demonstrate proficiency in handling loops and creation of functions.
		CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
		CO3	Develop programs for string processing and file organization
		CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
Communicative English	BENGK106	CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
		CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
		CO3	To impart basic English grammar and essentials of language skills as per present requirement.



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Subject	Code	Course Outcomes	Statement
		CO4	Understand and use all types of English vocabulary and language proficiency.
		CO5	Adopt the Techniques of Information Transfer through presentation.
Indian Constitution	BICOK107	CO1	Analyse the basic structure of Indian Constitution.
		CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
		CO3	know about our Union Government, political structure & codes, procedures.
		CO4	Understand our State Executive & Elections system of India.
		CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.
INNOVATION and DESIGN THINKING	BIDTK158	CO1	Appreciate various design process procedure
		CO2	Generate and develop design ideas through different technique
		CO3	Identify the significance of reverse Engineering to Understand products
		CO4	Draw technical drawing for design ideas
II Semester			
		CO1	Apply the knowledge of multiple integrals to compute area and volume.
		CO2	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.



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Mathematics-II for Civil Engineering stream	BMATC201	CO3	Demonstrate partial differential equations and their solutions for physical interpretations.
		CO4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
		CO5	Get familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/PYTHON/SCILAB
Applied Chemistry for Civil Engineering stream	BCHEC202	CO1	Explain the concepts of Role of Mechanical Engineering and Energy sources.
		CO2	Describe the Machine Tool Operations and advanced Manufacturing process.
		CO3	Explain the Working Principle of IC engines and EV vehicles.
		CO4	Discuss the Properties of Common Engineering Materials and various Metal Joining Processes.
		CO5	Explain the Concepts of Mechatronics, Robotics and Automation in IoT
Computer Aided Engineering Drawing	BCEDK203	CO1	Draw and communicate the objects with definite shape and dimensions
		CO2	Recognize and Draw the shape and size of objects through different views
		CO3	Develop the lateral surfaces of the object
		CO4	Create a Drawing views using CAD software
		CO5	Identify the interdisciplinary engineering components or systems through its graphical representation.
		CO1	Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts



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INTRODUCTION TO MECHANICAL ENGINEERING	BESCK204D	CO2	Apply programming constructs of C language to solve the real world problem
		CO3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting
		CO4	Explore user-defined data structures like structures, unions and pointers in implementing solutions
		CO5	Design and Develop Solutions to problems using modular programming constructs using functions
GREEN BUILDINGS	BETCK205B	CO1	Select different building materials for construction
		CO2	Apply effective environmental friendly building technology
		CO3	Analyze global warming due to different materials in construction
		CO4	Analyse buildings for green rating
		CO5	Use alternate source of energy and effective use water
Professional Writing Skills in English	BPWSK206	CO1	To understand and identify the Common Errors in Writing and Speaking.
		CO2	To Achieve better Technical writing and Presentation skills.
		CO3	To read Technical proposals properly and make them to Write good technical reports.
		CO4	Acquire Employment and Workplace communication skills.
		CO5	To learn about Techniques of Information Transfer through presentation in different level.



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Scientific Foundations of Health	BSFHK208	CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset. `
		CO2	Develop the healthy lifestyles for good health for their better future.
		CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
		CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
		CO5	Prevent and fight against harmful diseases for good health through positive mindset.
III Semester			
TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	21MAT 31	CO1	To solve ordinary differential equations using Laplace transform
		CO2	Demonstrate the Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory
		CO3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
		CO4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
		CO5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
Geodetic Engineering	21CV32	CO1	Execute survey using compass and plane table
		CO2	Find the level of ground surface and Calculation of area and volumes
		CO3	Operate theodolite for field execution



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		CO4	Estimate the capacity of reservoir
		CO5	Interpret satellite imageries
STRENGTH OF MATERIALS	21CV33	CO1	Evaluate the behaviour when a solid material is subjected to various types of forces (namely Compressive, Tensile, Thermal, Shear, flexure, Torque, internal fluid pressure) and estimate stresses and corresponding strain developed. (L3)
		CO2	Estimate the forces developed and draw schematic diagram for stresses, forces, moments for simple beams with different types of support and are subjected to various types of loads (L3).
		CO3	Evaluate the behaviour when a solid material is subjected to Torque and internal fluid pressure and estimate stresses and corresponding strain developed. (L3)
		CO4	. Distinguish the behaviour of short and long column and calculate load at failure & explain the behaviour of spring to estimate deflection and stiffness (L3)
		CO5	Examine and Evaluate the mechanical properties of various materials under different loading conditions
Earth Resources and Engineering	21CV34	CO1	Apply geological knowledge in different civil engineering practice
		CO2	Students will acquire knowledge on durability and competence of foundation rocks, and confidence enough to use the best building materials.
		CO3	competent enough to provide services for the safety, stability, economy and life of the structures that they construct
		CO4	Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems
		CO5	Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering for safe and solid construction.
COMPUTER AIDED BUILDING PLANNING AND DRAWING	21CVL35	CO1	Prepare, read and interpret the drawings in a professional set up.
		CO2	Know the procedures of submission of drawings and Develop working and submission drawings for building.



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		CO3	Plan and design of residential or public building as per the given requirements.
Personality Development and Soft skills (AEC)	21CV383	CO1	Develop effective communication skills (spoken and written) and effective presentation skills. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations
		CO2	Conduct effective business correspondence and prepare business reports which produce results
		CO3	Develop an understanding of and practice personal and professional responsibility.
		CO4	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
IV Semester			
Complex Analysis, Probability and Statical methods	21MAT41	CO1	Use the concepts of an analytic function and complex potentials to solve the problems arising in electromagnetic field theory. Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.
		CO2	Obtain the series solutions of ordinary differential equations.
		CO3	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
		CO4	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
		CO5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.
Fluid Mechanics and Hydraulics	21CV42	CO1	Understand fundamental properties of fluids and solve problems on Hydrostatics
		CO2	Apply Principles of Mathematics to represent Kinematics and Bernoulli's principles
		CO3	Compute discharge through pipes, notches and weirs



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		CO4	Design of open channels of various cross sections
		CO5	Design of turbines for the given data and understand their operation characteristics
PUBLIC HEALTH ENGINEERING	21CV43	CO1	Estimate average and peak water demand for a community.
		CO2	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
		CO3	Design the different units of water treatment plant
		CO4	Understand and design the various units of wastewater treatment plant
		CO5	Acquire capability to conduct experiments and estimate the concentration of different parameters and compare the obtained results with the concerned guidelines and regulations..
ANALYSIS OF STRUCTURES	21CV44	CO1	Evaluate slope and deflections in beams using geometrical methods.
		CO2	Determine deflections in trusses and frames using energy principles.
		CO3	Analyse arches and cables for stress resultants
		CO4	Apply slope deflection method in analysing indeterminate structures and construct bending moment diagram.
		CO5	Analyse continuous beams, frames and trusses using stiffness matrix method of analysis.
		CO1	Comprehend the relations between minerals and rocks based on their physical properties
		CO2	Assess the suitability of materials used in building construction



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Earth Resources and Engineering Laboratory	21CVL46	CO3	Differentiate geological investigations necessary for the construction of dams, bridges, and tunnels
		CO4	Describe the groundwater investigation using resistivity methods
		CO5	Understand the applications of Geospatial technology in Civil Engineering.
Biology For Engineers	AEC 21BE45	CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
		CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects
		CO3	Corroborate the concepts of biometrics for specific requirements.
		CO4	Think critically towards exploring innovative bio-based solutions for socially relevant problems.
Constitution of India and Professional Ethics	21CIP47	CO1	Have constitutional knowledge and legal literacy.
		CO2	Understand Engineering and Professional ethics and responsibilities of Engineers
GREEN BUILDINGS	21CV485	CO1	Select different building materials for construction
		CO2	Apply effective environmental friendly building technology
		CO3	Analyze global warming due to different materials in construction
		CO4	Analyse buildings for green rating
		CO5	Use alternate source of energy and effective use water



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VII Semester			
1.CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP	18CV51	C01	Prepare a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence.
		C02	Understand labour output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety.
		C03	Analyze the economics of alternatives and evaluate benefits and profits of a construction activity based on monetary value and time value.
		C04	Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies.
2.ANALYSIS OF INDETERMINATE STRUCTURES	18CV52	C01	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection method
		C02	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
		C03	Construct the bending moment diagram for beams and frames by Kani's method.
		C04	Construct the bending moment diagram for beams and frames using flexibility method
		C05	Analyze the beams and indeterminate frames by system stiffness method.
3.DESIGN OF RC STRUCTURAL ELEMENTS	18CV53	C01	Understand the design philosophy and principles.
		C02	Solve engineering problems of RC elements subjected to flexure, shear and torsion.
		C03	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings.
		C04	Owns professional and ethical responsibility.



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4.BASIC GEOTECHNICAL ENGINEERING	18CV54	CO1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
		CO2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
		CO3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
			Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
		CO4	Capable of estimating load carrying capacity of single and group of piles
5.MUNICIPAL WASTEWATER ENGINEERING	18CV55	CO1	Select the appropriate sewer appurtenances and materials in sewer network.
		CO2	Design the sewers network and understand the self purification process in flowing water.
		CO3	Deisgn the varies physic- chemical treatment units
		CO4	Design the various biological treatment units
		CO5	Design various AOPs and low cost treatment units.
6.HIGHWAY ENGINEERING	18CV56	CO1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
		CO2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
		CO3	Design road geometrics, structural components of pavement and drainage.
		CO4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.



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7.SURVEYING PRACTICE	18CVL56	C01	Apply the basic principles of engineering surveying and for linear and angular measurements.
		C02	Comprehend effectively field procedures required for a professional surveyor.
		C03	Use techniques, skills and conventional surveying instruments necessary for engineering practice.
8.CONCRETE AND HIGHWAY MATERIALS LABORATORY	18CVL57	C01	Able to interpret the experimental results of concrete and highway materials based on laboratory tests.
		C02	Determine the quality and suitability of cement.
		C03	Design appropriate concrete mix Using Professional codes.
		C04	Determine strength and quality of concrete.
		C05	Evaluate the strength of structural elements using NDT techniques.
		C06	Test the soil for its suitability as sub grade soil for pavements.
VI Semester			
1.DESIGN OF STEEL STRUCTURAL ELEMENTS	18CV61	C01	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.
		C02	Understand the Concept of Bolted and Welded connections.
		C03	Understand the Concept of Design of compression members, built-up columns and columns splices.
		C04	Understand the Concept of Design of tension members, simple slab base and gusseted base.



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Subject	Code	Course Outcomes	Statement
		C05	Understand the Concept of Design of laterally supported and un-supported steel beams.
2.APPLIED GEOTECHNICAL ENGINEERING	18CV62	C01	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
		C02	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
		C03	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
		C04	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
		C05	Capable of estimating load carrying capacity of single and group of piles
3.HYDROLOGY AND IRRIGATION ENGINEERING	18CV63	C01	Understand the importance of hydrology and its components.
		C02	Measure precipitation and analyze the data and analyze the losses in precipitation.
		C03	Estimate runoff and develop unit hydrographs.
		C04	Find the benefits and ill-effects of irrigation.
		C05	Find the quantity of irrigation water and frequency of irrigation for various crops.
		C06	Find the canal capacity, design the canal and compute the reservoir capacity.
4.MATRIX METHOD OF STRUCTURAL ANALYSIS	18CV641	C01	Evaluate the structural systems to application of concepts of flexibility and stiffness matrices for simple problems.
		C02	Identify, formulate and solve engineering problems with respect to flexibility and stiffness matrices as applied to continuous beams, rigid frames and trusses.



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STRUCTURAL ANALYSIS (Elective)	18CV641	C03	Identify, formulate and solve engineering problems by application of concepts of direct stiffness method as applied to continuous beams and trusses.
		C04	Evaluate secondary stresses.
5.SOLID WASTE MANAGEMENT (Elective)	18CV642	C01	Analyse existing solid waste management system and to identify their drawbacks.
		C02	Evaluate different elements of solid waste management system.
		C03	Suggest suitable scientific methods for solid waste management elements.
		C04	Design suitable processing system and evaluate disposal sites.
6.ALTERNATE BUILDING MATERIALS (Elective)	18CV643	C01	Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
		C02	Select appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.
		C03	Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.
		C04	Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.
7.GROUND IMPROVEMENT TECHNIQUES (Elective)	18CV644	C01	Give solutions to solve various problems associated with soil formations having less strength.
		C02	Use effectively the various methods of ground improvement techniques depending upon the requirements.
		C03	utilize properly the locally available materials and techniques for ground improvement so that economy in the design of foundations of various civil engineering structures
		C01	Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway.



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8.RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS (Elective)	18CV645	CO2	Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive.
		CO3	Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same.
		CO4	Apply the knowledge gained to conduct surveying, understand the tunneling activities.
9.REMOTE SENSING AND GIS (Elective)	18CV651	CO1	Collect data and delineate various elements from the satellite imagery using their spectral signature.
		CO2	Analyze different features of ground information to create raster or vector data.
		CO3	Perform digital classification and create different the maticmaps for solving specific problems
		CO4	Make decision based on the GIS analysis on thematic maps.
10.TRAFFIC ENGINEERING(Elective)	18CV652	CO1	Understand the human factors and vehicular factors in traffic engineering design.
		CO2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
		CO3	Use anappropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
		CO4	Understand the basic knowledge of Intelligent Transportation System.
11.OCCUPATIONAL HEALTH AND SAFETY (Elective)	18CV653	CO1	Identify hazards in the work place that poseadangeror threat to their safety or health,orthatofothers.
		CO2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.
		CO3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.



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		CO4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors.
		CO5	Identify the decisions required to maintain protection of the environment, workplace as well as personal
12.SUSTAINABILITY CONCEPTS IN CIVIL ENGINEERING (Elective)	18CV654	CO1	Learn the sustainability concepts; understand the role and responsibility of engineers in sustainable development.
		CO2	Quantify sustainability, and resource availability, Rationalize the sustainability based on scientific merits.
		CO3	Understand and apply sustainability concepts in construction practices, designs, product developments and processes across various engineering disciplines.
		CO4	Make a decision in applying green engineering concepts and become a lifelong advocate of sustainability in society.
13. SOFTWARE APPLICATION LABORATORY	18CVL66	CO1	Use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work
14. ENVIRONMENTAL ENGINEERING LABORATORY	18CVL67	CO1	Acquire capability to conduct experiments and estimate the concentration of different parameters.
		CO2	Compare the result with standards and discuss based on the purpose of analysis.
		CO3	Determine type of treatment, degree of treatment for water and waste water.
		CO4	Identify the parameter to be analyzed for the student project work in environmental stream.
15. EXTENSIVE SURVEY	18CVL68	CO1	Apply Surveying knowledge and tools effectively for the projects
		CO2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
		CO3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.



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PROJECT	18CVL08	CO4	Professional etiquettes at workplace, meeting and general
		CO5	Establishing trust based relationships in teams & organizational environment
		CO6	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques
VII Semester			
1. QUANTITY SURVEYING AND CONTRACT MANAGEMENT	18CV71	CO1	Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works.
		CO2	Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works.
		CO3	Prepare the specifications and analyze the rates for various items of work.
		CO4	Assess contract and tender documents for various construction works.
		CO5	Determine the externals of functional and solve the simple problem of the calculus of variations.
2. DESIGN OF RCC AND STEEL STRUCTURES	18CV72	CO1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
		CO2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.
3. THEORY OF ELASTICITY (Elective-1)	18CV731	CO1	Ability to apply knowledge of mechanics and mathematics to model elastic bodies as continuum.
		CO2	Ability to formulate boundary value problems; and calculate stresses and strains.
		CO3	Ability to comprehend constitutive relations for elastic solids and compatibility constraints.



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Subject	Code	Course Outcomes	Statement
		CO4	Ability to solve two-dimensional problems (plane stress and plane strain) using the concept of stress function
4. AIR POLLUTION AND CONTROL (Elective-1)	18CV732	CO1	Identify the major sources of air pollution and understand their effects on health and environment.
		CO2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
		CO3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
		CO4	Choose and design control techniques for particulate and gaseous emissions.
5. PAVEMENT MATERIALS AND CONSTRUCTION (Elective-1)	18CV733	CO1	Students will be able to evaluate and assess the suitability of any pavement material to be used in various components of pavement by conducting required tests as per IS,IRC specifications
		CO2	Students will be able to formulate the proportions of different sizes of aggregates to suit gradation criteria for various mixes as per MORTH and also design bituminous mixes.
		CO3	Students will be competent to adapt suitable modern technique and equipment for speedy and economic construction.
		CO4	Student will be able to execute the construction of embankment, flexible, rigid pavement and perform required quality control tests at different stages of pavement construction.
6. GROUND WATER HYDRAULICS (Elective-1)	18CV734	CO1	Find the characteristics of aquifers
		CO2	Estimate the quantity of ground water by various methods.
		CO3	Locate the zones of ground water resources.
		CO4	Select particular type of well and augment the ground water storage.
		CO1	Select suitable material for masonry construction by understanding engineering properties.



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Subject	Code	Course Outcomes	Statement
7. MASONRY STRUCTURES (Elective-1)	18CV735	CO2	Compute loads, load combinations and analyze the stresses in masonry.
		CO3	Design masonry under compression (Axial load) for various requirements and conditions.
		CO4	Design masonry under bending (Eccentric, lateral, transverse load) for various requirements and conditions.
		CO5	Assess the behavior of shear wall and reinforced masonry.
8. EARTHQUAKE ENGINEERING (Elective-2)	18CV741	CO1	Acquire basic knowledge of engineering seismology.
		CO2	Develop response spectra for a given earthquake time history and its implementation to estimate response of a given structure.
		CO3	Understanding of causes and types of damages to civil engineering structures during different earthquake scenarios.
		CO4	Analyze multi-storied structures modeled as shear frames and determine lateral force distribution due to earthquake input motion using IS-1893 procedures.
		CO5	Comprehend planning and design requirements of earthquake resistant features of RCC and Masonry structures through exposure to different IS-codes of practices.
9. DESIGN CONCEPT OF BUILDING SERVICES (Elective-2)	18CV742	CO1	Describe the basics of house plumbing and waste water collection and disposal.
		CO2	Discuss the safety and guidelines with respect to fire safety.
		CO3	Describe the issues with respect to quantity of water, rain water harvesting and roof top harvesting.
		CO4	Understand and implement the requirements of thermal comfort in buildings.
		CO1	Identify, formulate reinforced earth techniques that are suitable for different soils and in different structures;



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10. REINFORCED EARTH STRUCTURES (Elective-2)	18CV743	CO2	Understand the laboratory testing concepts of Geo synthetics
		CO3	Design RE retaining structures and Soil Nailing concepts
		CO4	Determine the load carrying capacity of Foundations resting on RE soil bed.
11. DESIGN OF HYDRAULIC STRUCTURES (Elective-2)	18CV744	CO1	Check the stability of gravity dams and design the dam.
		CO2	Estimate the quantity of seepage through earth dams.
		CO3	. Design spillways and aprons for various diversion works.
		CO4	Select particular type of canal regulation work for canal network.
12. URBAN TRANSPORT PLANNING (Elective-2)	18CV745	CO1	Design, conduct and administer surveys to provide the data required for transportation planning.
		CO2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.
		CO3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
		CO4	Adopt the steps that are necessary to complete a long-term transportation plan.
13. FINITE ELEMENT METHOD (Elective-3)	18CV751	CO1	The student will have the knowledge on advanced methods of analysis of structures.
14. NUMERICAL METHODS AND APPLICATIONS (Elective-3)	18CV752	CO1	The students will have a clear perception of the power of numerical techniques, ideas and would be able to demonstrate the applications of these techniques to problems drawn from Industry, management and other engineering fields.
15. ENVIRONMENTAL		CO1	Appreciate the elements of Corporate Environmental Management systems complying to international environmental management system standards.



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15. ENVIRONMENTAL PROTECTION AND MANAGEMENT (Elective-3)	18CV753	CO2	Lead pollution prevention assessment team and implement waste minimization options.
		CO3	Develop, Implement, maintain and Audit Environmental Management systems for Organizations.
16. COMPUTER AIDED DETAILING OF STRUCTURES	18CVL76	CO1	Prepare detailed working drawings of Steel Structures
		CO2	Prepare detailed working drawings of RCC Structures
17. GEOTECHNICAL ENGINEERING LABORATORY	18CVL77	CO1	Physical and index properties of the soil
		CO2	Classify based on index properties and field identification
		CO3	To determine OMC and MDD, plan and assess field compaction program
		CO4	Shear strength and consolidation parameters to assess strength and deformation characteristics
VIII Semester			
1. DESIGN OF PRE-STRESSEDCONCRETE	18CV81	CO1	Understand the requirement of PSC members for present scenario.
		CO2	Analyse the stresses encountered in PSC element during transfer and at working.
		CO3	Understand the effectiveness of the design of PSC after studying losses
		CO4	Capable of analyzing the PSC element and finding its efficiency
		CO5	Design PSC beam for different requirements.



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2. BRIDGE ENGINEERING (Elective-2)	18CV821	C01	Understand the load distribution and IRC standards.
		CO2	Design the slab and T beam bridges.
		CO3	Design Box culvert, pipe culvert
		CO4	Use bearings, hinges and expansion joints
		CO5	Design Piers and abutments.
3. PREFABRICATED STRUCTURES (Elective-2)	18CV822	C01	Use modular construction, industrialized construction
		CO2	Design prefabricated elements
		CO3	Design some of the prefabricated elements
		CO4	Use the knowledge of the construction methods and prefabricated elements in buildings
4. ADVANCED FOUNDATION ENGINEERING (Elective-2)	18CV823	C01	Estimate the size of isolated and combined foundations to satisfy bearing capacity and settlement criteria.
		CO2	Estimate the load carrying capacity and settlement of single piles and pile groups including laterally loaded piles.
		CO3	Understand the basics of analysis and design principles of well foundation, drilled piers and caissons.
		CO4	Understand basics of analysis and design principles of machine foundations.
		C01	Identify the causes for structural (Concrete) deterioration.



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5. REHABILITATION AND RETROFITTING (Elective-2)	18CV824	CO2	. Assess the type and extent of damage and carry out damage assessment of structures through various types of tests.
		CO3	Recommend maintenance requirements of the buildings and preventive measures against influencing factors.
6. PAVEMENT DESIGN (Elective-2)	18CV825	CO1	Systematically generate and compile required data's for design of pavement (Highway & Airfield).
		CO2	Analyze stress, strain and deflection by boussinesq's, bur mister's and westergaard's theory.
		CO3	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001
		CO4	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements
7. PROJECT WORK PHASE-2	18CVP83	CO1	Describe the project and be able to defend it.
		CO2	Develop critical thinking and problem solving skills.
		CO3	Learn to use modern tools and techniques.
		CO4	Communicate effectively and to present ideas clearly and coherently both in written and oral forms.
		CO5	Develop skills to work in a team to achieve common goal.
		CO6	Develop skills of project management and finance.
		CO7	Develop skills of self learning, evaluate their learning and take appropriate actions to improve it.
		CO8	Prepare them for life-long learning to face the challenges and support the technological changes to meet the societal needs.



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8. TECHNICAL SEMINAR	18CVS84	C01	Develop knowledge in the field of Civil Engineering and other disciplines through independent learning and collaborative study
		C02	Identify and discuss the current, real-time issues and challenges in engineering & technology.
		C03	Develop written and oral communication skills.
		C04	Explore concepts in larger diverse social and academic contexts.
		C05	Apply principles of ethics and respect in interaction with others.
		C06	Develop the skills to enable life-long learning.
9. INTERNSHIP /PROFESSIONAL PRACTICE	18CVI85	C01	Students will get the field exposure and experience