Program Outcomes
Department: Civil Engineering

List of Program Out comes(POs)

A Graduate of Civil Engineering program will demonstrate

PO1-Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2 - 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.
PO3-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.
PO4-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.
PO5 - 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.
PO6 - 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.
PO7 - 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.
PO8-Ethics:Apply ethical principles and committee professional ethics and responsibilities and norms of the engineering practice.
PO9-Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10 - 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 reportsanddesigndocumentation,makeeffectivepresentations,andgiveandreceive Clear instructions.
PO11 - 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.
PO12-Life-longlearning: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.

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BVV Sangha, Bagalkot
AMRUTA INSTITUTE OF ENGINEERING & MANAGEMENT SCIENCES
Approved by AICTE, New Delhi
Recognized by Government of Karnataka & Affiliated to VTU, Belagavi

AIEMS BENGALURU

Program Specific Outcomes
Department: Civil Engineering

List of Program Specific Outcomes(PSOs)

Graduates will able to:

PSO 1: The graduates will have the ability to plan, analyse, design, execute and maintain cost effective civil engineering structures without overexploitation of natural resources.
PSO 2: The graduates of civil engineering program will have the ability to take up employment, entrepreneurship, research and development for sustainable civil society.
PSO 3: The graduates will be able to pursue opportunities for personal and professional growth, higher studies, demonstrate leadership skills and engage in lifelong learning by active participation in the civil engineering profession.
PSO 4: The graduates will be able to demonstrate professional integrity and an appreciation of ethical, environmental, regulatory and issues related to civil engineering projects.

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Course Outcomes
Department: Civil Engineering

I Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Mathematics-I for Civil Engineering stream	**BMATC101**	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 eigen values and eigenvectors.
		CO5	familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Applied Physics for CV Stream	**BPHYC102/202**	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.

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Course Name	Course Code	Course Outcomes	Statements
ENGINEERING MECHANICS	**BCIVC103/203**	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.
		CO4	Locate the centroid and compute the moment of inertia of sections
		CO5	Analyze the bodies in motion

Course Name	Course Code	Course Outcomes	Statements
Introduction to Electronics Communication	BESCK104C	CO1	To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
		CO2	To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
		CO3	Professionalism &Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication.

Course Name	Course Code	Course Outcomes	Statements
Introduction to C Programming	**BESCK104E/204E**	CO1	Elucidate the basic architecture and functionalities of a Computer
		CO2	Apply programming constructs of C language to solve the real-world problems
		CO3	Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems
		CO4	Design and Develop Solutions to problems using modular programming constructs such as functions and procedures

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Course Outcomes
Department: Civil Engineering

II Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Mathematics -II for Civil Engineering stream	**BMATC201**	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.
		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
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Applied Chemistry for Civil Engineering stream	**BCHEC202 /202**	CO1	Identify the terms And applications processes involved in scientific and engineering
		CO2	Explainthephenomenaofchemistrytodescribethemethodsofengineeringprocesses
		CO3	Solvefortheproblemsinchemistrythatarepertinentinengineeringapplications
		CO4	Applythebasicconceptsofchemistrytoexplainthechemicalpropertiesandprocesses
		CO5	Analyze properties and multi disciplinary situations processes associated with chemical substances in.

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Course Name	Course Code	Course Outcomes	Statements
Computer-Aided Engineering Drawing	BCEDK203	CO1	To understand the basic principles and conventions of engineering drawing
		CO2	To use drawing as a communication mode
		CO3	To generate pictorial views using CAD software
		CO4	To understand the development of surfaces
		CO5	To visualize engineering components
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Introduction to Civil Engineering	BESCK204A	CO1	To make students learn the scope of various specializations of civil engineering.
		CO2	To make students learn the concepts of sustainable infrastructure
		CO3	To develop students' ability to analyse the problems involving forces, moments with their applications.
		CO4	To develop the student's ability to find out the center of gravity and moment of
			Inertia and their applications.
		CO5	To make the students learn about kinematics
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Introduction to Python Programming	BPLCK205B	CO1	Learn the syntax and semantics of the Python programming language.
		CO2	Illustrate the process of structuring the data using lists, tuples
		CO3	Appraise the need for working with various documents like Excel, PDF, Word and Others.
		CO4	Demonstrate the use of built-in functions to navigate the file system.
		CO5	Implement the Object-Oriented Programming concepts in Python.

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Course Outcomes
Department: Civil Engineering

III Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
STRENGTH OF MATERIALS	**BCV301**	CO1	Evaluate the simple stresses, strains and compound stresses
		CO2	Calculate the Bending moments, shear force and draw BMD, SFD for various types of beams and loadings
		CO3	Analyse the bending stress, shear stress and torsional stress in beams and shafts with different cross sections.
		CO4	Evaluate the deflection in beams and determine the stability of the columns
		CO5	Evaluate the behaviour and strength of structural elements under the action of compound stresses and stresses in thin and thick cylinders..
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Engineering Survey	BCV302	CO1	Ability to understand principles of both traditional and modern surveying applying knowledge of mathematics.
		CO2	Ability to handle surveying equipment's and software tools to carry out field surveying, plot topographical Drawings and construction drawing
		CO3	Ability to use Total station for data capture, data storage, data transfer
		CO4	Ability to prepare construction drawing and setting out.
Course Name	**Course Code**	**Course Outcomes**	**Statements**
ENGINEERING GEOLOGY	BCV303	CO1	Apply geological knowledge in different civil engineering practice.
		CO2	Acquire knowledge on durability and competence of foundation rocks, and will be able to use the best building materials
		CO3	Students will become competent enough 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

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Course Name	Course Code	Course Outcomes	Statements
WATER SUPPLY AND WASTEWATER ENGINEERING	**BCV304**	CO1	Estimate the 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	Design the various units of wastewater treatment plant.
		CO5	Design of various AOPs and low cost treatment units
Course Name	**Course Code**	**Course Outcomes**	**Statements**
COMPUTER AIDED BUILDING PLANNING AND DRAWING	**BCV305**	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
		CO3	Plan of residential or public building as per the given requirements
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Fire Safety in Buildings	**BCV306D**	CO1	Understand types of fire, combustion process and fire resistance
		CO2	Plan for fire safety and design of lifts.
		CO3	Design flow network in buildings.
		CO4	Design of electrical systems and maintenance
		CO5	Perform health evaluation of buildings and suggest remedies
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Smart Urban Infrastructure	BCV358B	CO1	Understand the concept of smart city
		CO2	Play the role of a civil engineer in providing smart infrastructure
		CO3	Design efficient energy system for smart city.
		CO4	Analyse and design efficient transport system..

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IV Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Analysis of Structures	**BCV401**	CO1	identify the different forms of structural systems and analyse the trusses.
		CO2	Evaluate the slope and deflections in beams, frames and trusses by using moment area method and energy principle.
		CO3	Analyse and determine the stress resultants inarches and cables.
		CO4	Analyse the indeterminate structures and construct BMD AND SFD using slope deflection methods
		CO5	Analyse the indeterminate structures and construct BMD AND SFD using Moment Distribution Method
Course Name	**Course Code**	**Course Outcomes**	**Statements**
FLUID MECHANICS AND HYDRAULICS	**BCV402**	CO1	Explain the fundamental properties of fluids and solve problems on fluid pressure and hydrostatics.
		CO2	Apply the principles of kinematics and dynamics of fluid flow to solve problems on velocity and pressure
		CO3	Compute the discharge through pipes, notches and weirs.
		CO4	Design the turbines and open channels of different sections and to estimate the energy loss in hydraulic jump
		CO5	Able to interpret the experimental results of discharge, efficiency based on the test conducted in the laboratory.

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Course Name	Course Code	Course Outcomes	Statements
TRANSPORTATION ENGINEERING	**BCV403**	CO1	Explain the basic principles of geometric design in the context of transportation engineering and planning.
		CO2	Select the appropriate pavement materials for construction and design the pavement as per standard practices.
		CO3	Conduct traffic studies and analyse traffic data for practical applications
		CO4	Identify the Components parts of Railway Track and design the suitable runway for an Airport.
		CO5	Able to interpret the experimental results of highway materials based on laboratory tests and design the pavement as per IRC guidelines..
BUILDING MATERIALS TESTING LABORATORY	**BCVL404**	CO1	Analyze the physical characteristics, and behavior of common building materials.
		CO2	Reproducethebasicknowledgeofmathematicsandengineeringinfindingthestrengthintension,c
		CO3	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures
		CO4	Recognize the importance of ethical conduct, integrity, and accuracy in materials testing and reporting
Concreting Techniques and Practices	**BCV405C**	CO1	Evaluate the properties of concrete by conducting test on cement, aggregate and concrete (with & without admixtures) for using the data for Mix design procedures
		CO2	Understand to Select and proportionate different materials used in a concrete mix including admixtures
		CO3	Design a concrete mix as per requirement of construction project
		CO4	Apply the best practices in concrete construction from industry's requirement, thumb rules, mitigation of concreting issues at Sites.

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Course Name	Course Code	Course Outcomes	Statements
Electronic Waste Management - Issues and Challenges	**BCV456C**	CO1	Explain the concept of e-waste and its significance in the context of environmental sustainability.
		CO2	Identify and classify different types of e-waste and describe their components
		CO3	Recognize the potential health and environmental hazards associated with improper e-waste management.
		CO4	Evaluate and apply appropriate methods for the collection, recycling, and disposal of e-waste.
		C05	Demonstrate knowledge of the existing policies, regulations, and frameworks for e-waste management in India.

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Course Outcomes
Department: Civil Engineering

V Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Hydrology and Water Resource Engineering	**21CV51**	CO1	Provide a background in the theory of hydrological processes and their measurement
		CO2	Estimate runoff and develop unit hydrographs.
		CO3	Find the water requirement and frequency of irrigation for various crops.
		CO4	Find the canal capacity and compute the reservoir capacity
		CO5	Analyse floods and droughts. Emphasise on the importance of conservation of water and water bodies
TRANSPORTATION ENGINEERING	**21CV52**	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
DESIGN OF RC STRUCTURAL ELEMENTS	**21CV53**	CO1	Understand the design philosophy and principles.
		CO2	Solve engineering problems of RC elements subjected to flexure, shear and torsion.
		CO3	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings
		CO4	Owns professional and ethical responsibility.

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Course Name	Course Code	Course Outcomes	Statements
GEOTECHNICAL ENGINEERING	**21CV54**	CO1	Determine the index properties of soil and hence classify the soil.
		CO2	Assess the compaction and consolidation characteristics of soil
		CO3	Determine the permeability of soils and assess the seepage in hydraulic structures
		CO4	Evaluate shear parameters of the soil using shear tests
		CO5	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
Course Name	**Course Code**	**Course Outcomes**	**Statements**
GEOTECHNICAL ENGINEERING LABORATORY	**21CVL55**	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.
		CO5	In-situ shear strength characteristics(SPT-Demonstration
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Environmental Studies	**21CIV57**	CO1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale
		CO2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
		CO3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components
		CO4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues..

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Course Name	**Course Code**	**Course Outcomes**	**Statements**
Quality Control and Quality Assurance	**21CV584**	CO1	Realize the importance of quality in construction
		CO2	Apply SQC techniques in different aspects of construction
		CO3	Implement QMS programs at different levels of construction

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VI Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
CONSTRUCTION MANAGEMENT AND ENTRPRENERSHIP	**21CV61**	CO1	Understand various management principles of construction industry (L2)
		CO2	Use planning, organizing, scheduling, monitoring and controlling techniques for managing construction activity (L4)
		CO3	Understand importance of quality control and safety in construction.(L2)
		CO4	Understand managing data pertaining to construction project. (L4)
		CO5	Evaluate alternatives and develop capital budget for different scenario
CONCRETE TECHNOLOGY	**21CV62**	CO1	Assess and infer various properties of cement, cementitious materials, Fine and coarse aggregate as per codal provision and specifications.
		CO2	Design the concrete mix for the given materials as per IS:10262-2019 provisions
		CO3	Understand the manufacturing process and asses the quality of green.
		CO4	Describe the properties of fresh and hardened concrete – Strength and Durability aspects.
		CO5	Examine and Evaluate properties of Cement and Concrete
DESIGN OF STEEL STRUCTURAL ELEMENTS	**21CV63**	CO1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.
		CO2	Understand the Concept of Bolted and Welded connections.
		CO3	Understand the Concept of Design of compression members, built-up columns and columns splices
		CO4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
		CO5	Understand the Concept of Design of laterally supported and un-supported steel beams.

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Course Name	Course Code	Course Outcomes	Statements
APPLIED GEOTECHNICAL ENGINEERING	**21CV642**	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 slope sand to compute lateral pressure distribution behind earth Retaining structures
		CO4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings form bearing pressure
		CO5	Capable of estimating load carrying capacity of single and group of piles.
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Occupational Health and Safety	**21CV653**	CO1	Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
		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
		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 health and safety.

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Course Outcomes
Department: Civil Engineering

VII Semester			
Course Name	**Course Code**	**Course Outcomes**	**Statements**
QUALITY 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	Prepare valuation reports of buildings.
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
AIR POLLUTION AND CONTROL	18CV732	CO1	Identify the major sources of air pollution and understand their effects on health and environment.
		CO2	To study about business functions 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.
PAVEMENT MATERIALS AND CONSTRUCTION	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 specification
		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.

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Course Name	Course Code	Course Outcomes	Statements
URBAN TRANSPORT PLANNING	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.
Course Name	**Course Code**	**Course Outcomes**	**Statements**
ENVIRONMENTAL PROTECTION AND MANAGEMENT	18CV753	CO1	Appreciate the elements of Corporate Environmental Management systems complying to international environmental management system standards.
		CO2	Lead pollution prevention assessment team and implement waste minimization options.
		CO3	Develop, Implement, maintain and Audit Environmental Management systems for Organizations
Course Name	**Course Code**	**Course Outcomes**	**Statements**
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	Shearstrengthandconsolidationparameterstoassessstrengthanddeformationcharacteristics
		CO5	In-situ shear strength characteristics(SPT-Demonstration)

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VIII Semester

Course Name	Course Code	Course Outcomes	Statements
DESIGN OF PRE-STRESSE CONCRETE	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.
REHABILITATION AND RETROFITTING	18CV824	CO1	Identify the causes for structural (Concrete) deterioration.
		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.
		CO4	Select suitable material and suggest an appropriate method for repair and rehabilitation
Project Work Phase – 2	18CVP83	CO1	Describe the project and be able to defend it. Develop critical thinking and problem solving skills.
		CO2	Learn to use modern tools and techniques. Communicate effectively and to present ideas clearly and coherently both in written and oral forms.
		CO3	Develop skills to work in a team to achieve common goal. Develop skills of project management and finance.
		CO4	Develop skills of self learning, evaluate their learning and take appropriate actions to improve it.

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Course Name	Course Code	Course Outcomes	Statements
Technical Seminar	18CVS84	CO1	Develop knowledge in the field of Civil Engineering and other disciplines through independent learning and collaborative study.
		CO2	Identify and discuss the current, real-time issues and challenges in engineering & technology
		CO3	Develop written and oral communication skills.
		CO4	Explore concepts in larger diverse social and academic contexts
		CO5	Apply principles of ethics and respect in interaction with others. Develop the skills to enable life-long learning.
Course Name	**Course Code**	**Course Outcomes**	**Statements**
Internship	18CVI85	CO1	This course will enable students to get the field exposure and experience.

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