Pankaj Laddhad Institute of Technology and Management Studies,

Chikhali Road, Yelgaon, Buldana- 443001(M.S.) India

Department of Civil Engineering

Program Outcomes (PO's):

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, 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 commit to 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 reports and design documentation, make effective presentations, and give and receive 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-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.

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Program Education Outcomes (PEO's):

A graduate of the Civil Engineering Program should:

- **PEO 1:** Students will establish themselves as effective professionals by solving real problems through the use of civil engineering knowledge and with attention to team work, effective communication, critical thinking and problem solving skills.

- **PEO 2:** Students will develop professional skills that prepare them for immediate employment and for life-long learning in advanced areas of Civil Engineering and related fields.

- **PEO 3:** Students will demonstrate their ability to adapt to a rapidly changing environment by having learned and applied new skills and new technologies.

- **PEO 4:** Students will be provided with an educational foundation that prepares them for excellence, leadership roles along diverse career paths with encouragement to professional ethics and active participation needed for a successful career.

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Program Specific Outcomes (PSO's):

- PSO1: The graduates of this programme will be able to meet the needs of public in the design and execution of quality construction work considering the health, safety, cultural, societal and environmental factors.
- PSO2: The graduates will analyze and design regular and complex structures having acquired the knowledge of building analysis software packages.
- PSO3: The graduates will be able to work effectively as an individual or in a team having acquired leadership skills and manage projects in multidisciplinary environments.

Sr.No.	Course code Course name	Course outcome
Civil Engineering Sem III		
1	**Course Code: (3CE01) Course: Engineering Mathematics- III**	To apply the fundamental concepts of Ordinary Linear Differential Equation by different methods.
		To apply Laplace Transform to special functions & solve Differential Equation with constant coefficients.
		To solve first, higher order Homogeneous Partial Differential Equations with constant coefficients.
		To apply numerical methods to obtain approximate solutions of mathematical problems.
		To apply CR equations, Harmonic functions, Milne's method & conformal mapping.
		To apply conditional probability, Baye's Theorem, Probability distribution & Curve fitting for Line & Parabola.
2	**Course Code: (3CE02) Course: Strength of Materials**	To understand the mechanical properties of materials to calculate stresses and strains.
		To calculate and draw S.F, B.M and A.F diagrams.
		To analyze the bending and shear stresses in beam.
		To evaluate stresses in thin cylinders and bars subjected to torsion.
		To find out the principle stresses and strains on plane.
		To calculate slope and deflection of beams and load on long columns
3	**Course Code: (3CE03) Course: Transportation Engineering-I**	To apply fundamentals of road Development plan to understand the properties of aggregate and bituminous material.
		To describe the various types of road with geometrical design by IRC specifications.
		To demonstrate and evaluate pavement design with loading criteria's
		To comprehend the traffic characteristics, rules and regulations.
		To explain Bridge Components, classification, site selection and erection of Bridge Superstructure.
		To Estimate Flood Discharge with different techniques of rating and maintenance of Bridges.
4	**Course Code: (3CE04) Course: Building Construction & Material**	To explain the various types of foundations and structures.
		To classify the types of stone and brick masonry.
		To explain the types of floors, flooring material, roofs and formwork.
		To describe the types and purpose of doors, windows and ventilators
		To explain the function, necessity, types and principles of staircase.
		To explain the different aspects of building constructions.
5	**Course Code: (3CE05) Course: Geology**	To understand the importance of geology and the detailed study of mineralogy and petrology.
		To describe the structural geology, earthquake engineering and importance of geological investigations
		To explain the rocks as construction material

Sr.No.	Course code Course name	Course outcome
Civil Engineering Sem IV		
6	**Course Code: (4CE01) Course: Geotechnical Engineering-I**	To identify and classify soil based on standard geotechnical practices and the site specific field testing with observation of soil.
		To know the concept of clay mineral and different structures of soil.
		To determine the permeability of soil and its properties by various methods
		To know the concept of seepage, Laplace equation and flow net to estimate the discharge through homogenous earthen embankment.
		To know the stress distribution of laterally confined soil and to determine the pre- consolidation pressure of soil.
		To estimate shear strength parameters in unconfined compressive soil.
7	**Course Code: (4CE02) Course: Fluid Mechanics**	To understand the basic concepts, definition, classification and properties of fluid.
		To describe fluid properties, equilibrium conditions of floating bodies and application of flow.
		To describe Euler's equation, Bernoulli's equation, HGL,EGL, momentum equation and forces on pipe bends.
		To analyze in-depth of fluid measurement devices with Francis equation.
		To illustrate the performance of laminar flow with different pipes and plates with thickness factor.
		To describe flow around immersed bodies and to make aware of different losses in pipes.
8	**Course Code: (4CE03) Course: Theory of Structure**	To classify the types of structure and to analyze the fixed and continuous beam.
		To calculate the slope and deflection in determinate beams by unit load method.
		To draw the influence line diagrams for reaction, bending moment and shear force for determinate beam.
		Also to draw the influence line diagrams for forces in members of trusses.
		To analyze the continuous beam and portal frame by slope deflection method.
		To analyze the continuous beam and portal frame by moment distribution method.
9	**Course Code: (4CE04) Course: Surveying-I**	To understand necessity, purpose, classification of surveying instruments for measuring distance by chaining.
		To measure the angles by Prismatic compass and total station.
		To measure elevation of ground by dumpy and automatic levels.
		To measure the horizontal and vertical angles by Theodolite.
		To understand the principle, various methods and uses of leveling and contouring
		To understand advantages, disadvantages and methods of plane table surveying.
10	**Course Code: (4CE05) Course: Reinforced Cement Concrete- I**	To understand the various properties of Construction materials and fresh concrete.
		To understand the types of hardened concrete and admixtures used in construction.
		To know about the properties, use and concreting techniques of special concretes.
		To design concrete mixes by IS CODE methods of concrete mix design.
		To understand the basic elastic theory and design of singly, doubly r/f beam and one way slab.
		To design the doubly rectangular reinforced beam by working stress method and to understand shear stress in reinforced beam section.

Sr.No.	Course code Course name	Course outcome
Civil Engineering Sem V		
11	**Course Code: 5CE01 Course: Reinforced Cement Concrete – II**	To design structure using working stress method
		To analysis and design of one way single span and continuous slabs using Limit State Method
		To do analysis and design of two way solid slabs.
		Analysis and complete design of beams
		To Analysis and design of columns for axial load, uniaxial and biaxial bending.
		To design grid slab by I.S. code method.
12	**Course Code: 5CE02 Course: Fluid Mechanics-II**	To determine turbulent flow through pipes
		To explain different types of flow
		To explain gradually and rapidly varied flow
		To do dimensional and model analysis
		To explain Hydraulic turbines, Pelton wheel & Francis turbine
		To explain centrifugal pump**,** reciprocating pump, Jet pump, Submersible pump, Hydraulic Ram their main parts & working
13	**Course Code: 5CE03 Course: Building Planning And CAD**	To explain different Abbreviations & graphical symbols and appropriate scale used for various drawings
		To explain line plan & working drawings of the building and concept of site plan, block plan and layout plan
		To explain general principles of planning, climate and design consideration
		To explain Building rules and by laws, for residential buildings, Types of public building and their requirements, planning of public building.
14	**Course Code: 5CE04 Course: Surveying-II**	To perform Tacheometric Survey
		To explain different types of curves their Classification, degree of curve, elements
		To explain Triangulation its principles, classification of triangulation system, triangulation figures, their choice of statio
		To explain hydrographic surveying its necessity, controls, shore line surveys. Underground surveying its surface alignment
		To explain the elements of photo grammetry, terrestrial and aerial photography also to determine scale of vertical photograph
		To explain Field Astronomy its Elements of spherical trigonometry, Components of geographical information system (GIS)
15	**Course Code: 5CE06 Course: Communication**	To correct forms of commonly misspelled words and to Comprehend over an unseen passage
		To do Verbal communication and non- Verbal communication
		To do written communication in specific formats of application, notices, minutes, quotations, orders, enquiries. Also they will be able to do Oral communications at meetings, conferences etc.

Sr.No.	Course code Course name	Course outcome
Civil Engineering Sem VI		
16	**Course Code: 6CE01 Course: Numerical Methods And Computer Programming**	To use of library functions of FORTRAN and input and output statements
		To use Control statements declaration statements in programming
		To use Sub – programs, subroutine, Dummy and actual arguments, COMMON statement in programming
		To perform Matrix operations like Addition and substraction, Multiplication and Transpose using FORTRAN 77 programming
		To find Solution of quadratic equation and root of equation using Newton -Raphson, Regula -Falsi and Bisection method by FORTRAN 77 programming
		To apply FORTRAN 77 programming to solve engineering problems
17	**Course Code: 6CE02 Course: Design of Prestressed**	To design interior panel of flat slab by direct design method.
		To design combined footing, Canopies & Parking shed.
		To explain concept of Prestressed concrete, various materials and their characteristics, types of prestressing
		To design rectangular sections for flexure by limit state method, one way single span slabs.
18	**Course Code: 6CE03 Course: Water Resources Engineering – I**	To understand basic concepts of Engineering Hydrology *i.e* . Hydrological Cycle, Hydrologic equation, Precipitation etc.
		To explain Evaporation, Evapotranspiration, Infiltration, Run-off, Factors affecting them and their estimation
		To explain Flood classification, Hydrographs, Typical flood hydrograph, base flow separation.
		To understand basic concepts of Irrigation Engineering, Minor Irrigation Works, Lift Irrigation its Necessity and general layout
		To determine Crop Water Requirements and to understand different irrigation methods
		To explain Water Harvesting, its Need, basic elements Methods of water harvesting
19	**Course Code: 6CE04 Course: Transportation Engineering – II**	To explain basic of Railway engineering, track standard terminology, track sections in embankment & cutting.
		To explain Permanent way its requirement, gauges, coning of wheels, components of permanent way.
		To explain Station and yards its types, function, facilities & equipment, Railway signaling and interlocking system
		To understand basics of Airport Engineering, Agencies controlling national & international aviation
		To explain Airport layout, Terminal area, Airport parking & lighting of runway, taxiway and other areas
		To explain Tunnels necessity, types, tunnel economics, tunnel alignment, tunneling methods in soft soil & hard rock
20	**Course Code: 6FECE05 Course: Environmental Management**	To explain nature, scope and components of environmental management.
		To explain basic of Environmental policy analysis
		To explain components of Environmental Management Plan
		To explain Environmental Legislation and Acts
		To explain various agencies for Environmental Managements in India
		To explain Basics of Data Base Management System
21	**Course Code: 6CE06 Course: Estimating and Costing**	To explain purpose of quantity estimates, Modes of measurement and units of measurement as per IS1200.
		To understand Schedule of rates, market rate analysis of some specific items
		To explain Cost & Quantity Estimate, detailed estimates of Civil Engineering works, Building
		To explain earth work estimates in Roads including hill road
		To explain Purpose of valuation, value and cost, market value, potential value, sentimental value, scrap value, etc
		To explain organization of construction industry specific to Govt. Organization P.W.D.Organisation, Site administration etc.

Sr.No.	Course code Course name	Course outcome
Civil Engineering Sem VII		
22	**Course Code: 7CE01 Course: Theory of Structure – II**	To study Moment distribution method.
		To undearstand Kani's method
		To explain Castigliano's second theorem
		To study Maxwell's reciprocal theorem, Betty's theorem, Muller -Breslau's principle
		To understandFlexibility method, static redundancy, flexibility coefficients,compatibility condition application to beams.
		To study Stiffness method, kinematic redundancy, stiffness coefficients,direct stiffness approach
23	**Course Code: 7CE02 Course: Geotechnical Engineering – II**	To explain Field exploration, different methods of collecting samples, geophysical methods
		To determine Bearing Capacity of Shallow foundation by different methods and to explain in-situ methods of evaluation of bearing capacity
		To determine Earth pressure by various methods, design of retaining wall, methods of soil stabilization
		To explain concept of Pile foundation and to determine pile capacity, pile group capacity
		To explain soils settlement, concept of differential settlement, factors and causes for differential settlement
		To explain Well foundation its Components & their function, sinking of well
24	**Course Code: 7CE03 Course: Design of Steel Structure**	To understand difference between WSM, LSM & plastic analysis.
		To Design compression & tension member also to Design Industrial shed
		To Design simple & compound columns for axial & eccentric loading.
		To Design simple & compound Beams, welded Plate girder.
25	**Course Code: 7CE04 Course:Environmental Engineering – I**	To determine Quantity Estimation of water and to explain design periods for water supply components.
		To determine Water quality, Impurities in water, their effects and significance
		To explain Aeration, Sedimentation and Design criteria for sedimentation tanks
		To explain Rapid sand and slow sand filters, filter media, Rate of filtration, under drainage system and washing process
		To explain different methods of disinfection
		To explain different types of Distribution system, Type of storage Reservoirs
26	**Course Code: 7CE05 Course: Professional Elective – I (Advance Concrete Technology)**	To explain Admixtures and construction chemicals
		To study Durability of concrete
		To Understand Deformation in concrete
		To study Special concrete and concreting techniques
		To explain Repairs and rehabilitations
		To Study Non-destructive testing of concrete

Sr.No.	Course code Course name	Course outcome
	Civil Engineering Sem VIII	
27	**Course Code: 8CE 01 Course: Water Resources Engineering – II**	To explain Reservoir Planning, different types of Dams, factors governing the selection of types of dam for project
		To explain Gravity Dams, Earthquake and its effect on dams
		To explain Diversion Head Works, Spillways, Types hydraulic jump
		To explain Canal Irrigation and to design unlined and lined Canals
		To explain Canal Masonry Works, Regulation works and Cross drainage works
		To explain Well Irrigation, Water Management, Water shed Management and River Training Works
28	**Course Code: 8CE02 Course: Environmental Engineering – II**	To determine Quantity of storm water
		To explain Waste water characteristic, Preliminary and Primary Treatment
		To explain Biological treatment and Activated sludge process
		To explain Low cost waste treatments
		To explain Characteristics of solid waste methods for Collection of solid waste and Disposal of solid wastes
		To explain Air pollution and measures for prevention of air pollution at source
29	**Course Code: 8CE03 Course: Project Planning & Management**	To explain Project, Project Stakeholders, Project life cycle
		To explain Critical Path Method, concept of Updating Network and its computation.
		To explain concept of PERT, Critical path, slack computation, Probability factor, crash program
		To Concept of resource smoothening and leveling. Also they will be able to schedule project by using MicroSoft Project Planner software
		To explain Safety management Material management
		To explain Equipment Management, Power shovel, Dragline Concrete mixer
30	**Course Code: 8CE04 Course: Professional Elective – II (iv) Dam**	To explain Different classification for dams, geological investigation, subsurface exploration
		To explain Rockfill dam and its characteristics
		To explain Arch dam and Buttress dam its components, types, methods for design.
		To Explain Spillways, Energy Dissipaters
		To explain Head Regulators, energy dissipation, hydraulic design of opening and barrel
		To explain different Instruments used in earth dam and solid gravity dams

Principal
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