



Department of Civil Engineering

Course Outcomes (A. Y. 2021-22)

| Course Name:-Mechanics of Structure (201002) | | |
|--|--------------|-----------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 4 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|--|----------------------|
| C201002.1 | Determine stresses, strains and elongations in axially loaded bar structures; and members subjected to thermal loads. Action: Determine (Apply) Knowledge: Stresses, Strains and Elongations in Bar Structures Condition: Axial Load and Thermal Load | L3 Apply |
| C201002.2 | Analyze and draw shear force and bending moment diagrams for simply supported and cantilever beams of uniform cross-section. Action: Analyze Knowledge: Shear Force and Bending Moment Diagrams Condition: Simply Supported and Cantilever Beams | L4 Analyze |
| C201002.3 | Determine bending stresses, shear stresses and moment resisting capacity of prismatic beams using Euler-Bernoulli beam theory. Action: Determine (Apply) Knowledge: Bending Stresses, Shear Stresses and Moment Resisting Capacity Condition: Euler-Bernoulli beam theory | L3 Apply |
| C201002.4 | Solve problems relating to torsional deformation of bars using torsion theory and Determine concept of Principal stresses and, normal and tangential stresses acting on a structural member. Action: Solve / Determine (Apply) Knowledge: Torsional Deformation of Bars and Principal stresses Condition: Torsion Theory | L3 Apply |
| C201002.5 | Determine critical buckling load of axially and eccentrically loaded columns using Euler's and Rankine's formulae. Action: Determine (Apply) Knowledge: Critical Buckling Load of Axially and Eccentrically Loaded Columns Condition: Euler's and Rankine's Formulae | L3 Apply |
| C201002.6 | Determine slope and deflection of determinate beams by Macaulay's method and Strain energy method, Castigliano's first theorem Action: Determine (Apply) Knowledge: Slope and deflection of determinate beams Condition: Macaulay's method and Strain energy method, Castigliano's first theorem | L3 Apply |

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Course Outcomes

| Course Name:-Fluid Mechanics (201003) | | |
|---------------------------------------|--------------|-----------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|-------------------------|
| C201003.1 | Summarize basic properties of fluid, concept of fluid static, buoyancy & floatation and its application for solving practical problems. Action: Summarize Knowledge: Basic properties of fluid, concept of fluid static, buoyancy & floatation and its application Condition: Solving practical problems. | L2 Understand |
| C201003.2 | Illustrate fluid kinematics and fluid dynamic problems with reference to continuity equation and Bernoulli's equation. Action: Estimate, summarize Knowledge: Fluid kinematics and fluid dynamic problems Condition: Continuity equation and Bernoulli's equation. | L1 Knowledge |
| C201003.3 | Interpret dimensional analysis using Buckingham's pi theorem, similarity & model laws and boundary layer theory. Action: Interpret Knowledge: Dimensional analysis Condition: Buckingham's pi theorem, similarity & model laws and boundary layer theory. | L2 Understand |
| C201003.4 | Acquire knowledge of laminar & turbulent flow, flow through pipes and its application to determine major and minor losses to analyse pipe network using Hardy cross method. Action: Acquire Knowledge: Laminar & turbulent flow, flow through pipes and its application Condition: Pipe network using Hardy cross method. | L3 Apply |
| C201003.5 | Design most economical open channel sections. Action: Design Knowledge: Open channel sections Condition: Most economical. | L6 Create |
| C201003.6 | Acquire knowledge of gradually varied flow in open channel and summarize drag and lift force on fully submerged body Action: Acquire, Summarize Knowledge: Gradually varied flow, drag and lift force Condition: Open channel, fully submerged body | L3 Apply |

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Course Outcomes

| | | |
|--|-------------------|------------------------------------|
| Course Name:- Building Technology and Architectural Planning (201001) | | |
| Class: SE Civil (2019 Pattern) | A.Y. 21-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 4 hrs./week | 01 | End Semester exam: 70 Marks |
| | | Term Work: 50 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|------------------|
| C201001.1 | Identify types of building and basic requirements of building components. Action: Identify Knowledge: types of building. Condition: basic requirements of building components. | L1 Identify |
| C201001.2 | Apply Architectural Principles and Building byelaws for building construction. Action: Apply Knowledge: Architectural Principles and Building byelaws Condition: building construction. | L2 Understand |
| C201001.3 | Plan effectively various types of Residential Building forms according to their utility, functions with reference to National Building Code Action: Plan Knowledge: various types of Residential Building forms according to their utility, functions Condition: with reference to National Building Code | L5 Plan |
| C201001.4 | Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code Action: Plan Knowledge: types of Public Buildings according to their utility functions Condition: with reference to National Building Code. | L5 Plan |
| C201001.5 | Apply Principles of Planning in Town Planning, Different Villages and Safety aspects. Action: Apply Knowledge: Principles of Planning in Town Planning Condition: Different Villages | L3 Apply |
| C201001.6 | Understand different services and safety aspects of buildings Action: Understand Knowledge: services and safety aspects Condition: buildings | L2 Understand |

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Address : A/p. Loni Bk., Tal. Rahata, Dist. Ahmednagar (M.S.) PIN: 413736

Ph No.: (O) +91-2422-273539 / 273459 / (P) 273204

Website: www.pravaraengg.org.in , www.pravara.in | Email: principal.precloni@pravara.in



Course Outcomes

| Course Name: Engineering Geology (207003) | | |
|--|---------------------|------------------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester-I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|--|-------------------------|
| 207003.1 | Acquire basic knowledge of different types of rocks and minerals occurring at construction sites and foundation. Action: Acquire Knowledge: basic knowledge of different types of rocks and minerals Condition: occurring at construction sites and foundation | L2 Acquire |
| 207003.2 | Interpret nature of various landforms created by natural processes and their importance in civil engineering activities Action: Interpret Knowledge: nature of various landforms Condition: created by natural processes | L2 Interpret |
| 207003.3 | Identify structural features occurring in the rocks and can determine whether these features are favorable or unfavorable at the foundation of civil engineering structures Action: Identify Knowledge: structural features Condition: occurring in the rocks | L3 Identify |
| 207003.4 | Determine importance of geological investigation and remote sensing in selection of proper sites for major civil engineering structures Action: Determine Knowledge: geological investigation Condition: major civil engineering structures | L3 Determine |
| 207003.5 | Acquire knowledge of site selection for construction of dams and excavation of tunnels Action: Acquire Knowledge: knowledge of site selection Condition: for construction of dams and excavation of tunnels | L2 Acquire |
| 207003.6 | Determine effects of various natural hazards on civil engineering structures and can suggest remedial measures Action: Determine Knowledge: Effects of Natural hazards Condition: on civil engineering structures | L3 Determine |

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Course Outcomes

| Course Name:- Engineering Mathematics III (207001) | | |
|---|---------------------|------------------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester-I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Tutorial: 1 hrs./week | | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|--|--------------------|
| C207001.1 | Solve Higher order linear differential equations and its applications to modelling and analyzing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems | L3 Apply |
| C207001.2 | Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems | L3 Apply |
| C207001.3 | Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering. | L3 Apply |
| C207001.4 | Perform Vector differentiation & integration, analyze the vector fields and apply to fluid flow problems | L3 Apply |
| C207001.5 | Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations. | L3 Apply |

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Course Outcomes

| Course Name:- Water Supply Engineering (301002) | | |
|---|--------------|-----------------------------|
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|-------------------------|
| C301002.1 | Identify and describe reliability of water sources, estimate water requirement for various sectors(Domestic and Public Sector) Action: Identify and Describe Knowledge: water sources, water requirement Condition: various sectors(Domestic and Public Sector) | L2 Knowledge |
| C301002.2 | Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics Action: Ascertain and interpret Knowledge: Water treatment method Condition: Source and raw water characteristics | L2 Understand |
| C301002.3 | Design various treatment units of water treatment plant. Action: Design Knowledge: various treatment units Condition: - Water treatment plant | L6 Create |
| C301002.4 | Comprehend and compare contemporary issues and advanced treatment operations and process available in the market. Action: Comprehend and compare Knowledge: advanced treatment operations and process Condition: contemporary issues | L2 Understand |
| C301002.5 | Comprehend the knowledge of water distribution system for water supply, use of GIS and drone technology in water management. And design elevated service reservoir capacity and rainwater harvesting system. Action: Comprehend and Design Knowledge: water distribution system, rainwater harvesting Condition: water supply. Water management | L6 Create |
| C301002.6 | Interpret the requirement of water treatment plant for infrastructure and Government scheme. Action: Interpret Knowledge: water treatment plant Condition: infrastructure and Government scheme. | L2 Understand |

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Course Outcomes

| Course Name:- Design of Steel Structure (301003) | | |
|---|--------------|-----------------------------|
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 4 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|--------------------------|
| C301003.1 | Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force. Action: Demonstrate Knowledge: Types of steel structures Condition: Steel section subjected to tensile force. | L3 Demonstrate |
| C301003.2 | Design of axially loaded rolled and built-up compression member along with lacing and battening as per Limit state method. Action: Design Knowledge: Rolled and built-up compression member Condition: Limit state method | L6 Create |
| C301003.3 | Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending as per Limit state method. Action: Design Knowledge: eccentrically loaded column, column bases Condition: Limit state method | L6 Create |
| C301003.4 | Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section as per Limit state method Action: Design Knowledge: laterally restrained and unrestrained beam Condition: Limit state method | L6 Create |
| C301003.5 | Analyze and design the industrial truss for dead, live and wind load and design of gantry girder for moving load as per Limit state Method. Action: Analyze & Design Knowledge: industrial truss, gantry girder Condition: Limit state Method. | L6 Create |
| C301003.6 | Design cross section for welded plate girder including stiffeners and its connections as per Limit state design. Action: Design Knowledge: welded plate girder Condition: Limit state Method. | L6 Create |

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Course Outcomes

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|--|---------------------|------------------------------------|
| Course Name: Hydrology and Water Resources Engineering (301001) | | |
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester-I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|-------------------------|
| C301001.1 | Recognize the components of hydrological cycle for computing precipitation Action: Recognize Knowledge: components of hydrological cycle Condition: compute precipitation | L1 Knowledge |
| C301001.2 | Describe the basic requirements of irrigation , various irrigation techniques for determining water requirements of the crops Action: Describe Knowledge: basic requirements of irrigation , various irrigation techniques Condition: water requirements of the crops | L1 Knowledge |
| C301001.3 | Discuss the key components of a functioning groundwater for determining the main aquifer properties – permeability, transmissivity and storage. Also Compute the discharge of well Action: Discuss Knowledge: key components of a functioning groundwater Condition: determine the main aquifer properties – permeability, transmissivity and storage. Also Compute the discharge of well. | L2 Understand |
| C301001.4 | Compute unit hydrograph, flood hydrograph, synthetic unit hydrograph for Perform flood frequency analysis Action: Compute Knowledge: unit hydrograph, flood hydrograph, synthetic unit hydrograph Condition: unit hydrograph, flood hydrograph, synthetic unit hydrograph | L3 Apply |
| C301001.5 | Apply of mass curve and demand curves for Fixation of reservoir capacity from annual inflow and outflow Action: Apply Knowledge: mass curve and demand Condition: Fixation of reservoir capacity from annual inflow and outflow | L3 Apply |
| C301001.6 | Apply science and engineering fundamentals to solve current problems and to anticipate, mitigate and prevent future problems in the area of water resources management Action: Apply Knowledge: science and engineering fundamentals Condition: anticipate, mitigate and prevent future problems in the area of water resources management | L3 Apply |

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Course Outcomes

| | | |
|--|---------------------|------------------------------------|
| Course Name:- Engineering Economics & Financial management(301004) | | |
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: ----- | ---- | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes(COs): | BT Level |
|---------------|---|--------------------------|
| C301004.1 | Describe basics of construction economics. Action: Describe (Understand) Knowledge: basics Condition: of construction economics. | L2 Understand |
| C301004.2 | Illustrate financial management in civil engineering projects. Action: Illustrate (Understand) Knowledge: financial management Condition: In civil engineering projects. | L2 Understand |
| C301004.3 | Prepare and analyze the contract account. Action: Analyze (Analysis) Knowledge: contract account Condition: | L4 Analysis |
| C301008.4 | Decide on right source of fund for construction projects. Action: Decide (Analysis) Knowledge: right source of fund Condition: for construction projects. | L4 Analysis |
| C301004.5 | Summarize working capital and its estimation for civil engineering projects.. Action: Summarize (Understand) Knowledge: working capital and its estimation Condition: for civil engineering projects. | L2 Understand |
| C301004.6 | Illustrate the importance of tax planning & summarize role of financial regulatory bodies. Action: Illustrate (Application) Knowledge: importance of tax planning Condition: | L3 Application |

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Course Outcomes

| Course Name:- Advanced Concrete Technology (301005d) | | |
|---|---------------------|------------------------------------|
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |
| | | Term Work: 25 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|-------------------------|
| C301005.1 | Understand the chemistry of cement and its effect on properties of concrete. Action: Understand Knowledge: Chemistry, properties and classification of ingredients Condition: IS Specifications | L2 Understand |
| C301005.2 | Apply the knowledge of supplementary cementitious materials to produce sustainable concretes Action: Prepare and test Knowledge: properties of fresh concrete Condition: Sustainability | L3 Apply |
| C301005.3 | Illustrate the Mechanism of working of admixtures and their effects on properties of concrete Action: Investigate Knowledge: hardened concrete properties Condition: IS procedures | L3 Apply |
| C301005.4 | Discuss the characteristic properties of fiber reinforced concrete Action: Evaluate Knowledge: characteristic properties Condition: IS Specifications | L2 Understand |
| C301005.5 | Evaluate the durability properties of concrete Action: Evaluate Knowledge: Durability Properties Condition: Specifications | L5 Evaluate |
| C301005.6 | Interpret the properties of concrete through advance testing methods Action: Interpret Knowledge: Properties of concrete Condition: Advance testing methods | L5 Evaluate |

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Course Outcomes

| Course Name:- Environmental Engineering II (401001) | | |
|---|--------------|-----------------------------|
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|------------------------|
| C401001.1 | Identify Physical, chemical and biological characteristics of sewage and effluent discharge standards as per CPCB norms. Action: Identify Knowledge: characteristics of sewage Condition: CPCB norms | L1 Knowledge |
| C401001.2 | Analyzing wastewater characteristics, explain preliminary and primary treatment processes and its design along with effluent standards. Action: Analyze Knowledge: wastewater characteristics Condition: effluent standards. | L4 Analyze |
| C401001.3 | Design of secondary treatment units for waste water treatment systems. Action: Design Knowledge: wastewater characteristics Condition: waste water treatment | L6 Create |
| C401001.4 | Apply different low cost treatment methods for wastewater treatment. Action: Apply Knowledge: low cost treatment methods Condition: wastewater treatment. | L3 Apply |
| C401001.5 | Plan onsite sanitation treatment systems & anaerobic treatments. Action: Plan Knowledge: sanitation treatment systems & anaerobic treatments. Condition: None | L5 Evaluate |
| C401001.6 | Apply preliminary, primary and secondary treatment for industrial wastewater as per the CPCB norms. Action: Apply Knowledge: preliminary, primary and secondary treatment methods Condition: industrial wastewater as per the CPCB norms. | L3 Apply |

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Course Outcomes

| Course Name:- Transportation Engineering (401002) | | |
|--|-----------------------|------------------------------------|
| Class: BE Civil (2015 Pattern) | A.Y. 2021-2022 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practicals:2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|-------------------------|
| C401002.1 | Interpret highway development & planning. Action: Interpret Knowledge: Highway development and planning Condition: None | L2 Understand |
| C401002.2 | Analyze geometric design of highways. Action: Analyze Knowledge: Geometric design Condition: Highways | L4 Analyze |
| C401002.3 | Apply knowledge in traffic engineering & control. Action: Apply Knowledge: Traffic engineering & control. Condition: None. | L3 Apply |
| C401002.4 | Computation of design traffic, pavement materials, testing procedure, construction & maintenance. Action: Computation Knowledge: Pavement materials, testing procedure, construction and maintenance Condition: None. | L3 Apply |

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Course Outcomes

| | | |
|---|---------------------|------------------------------------|
| Course Name:- Structural Design And Drawing-III (401003) | | |
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 4 hrs./week | 04 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|---------------------|
| C401003.1 | Application of various basic concepts, specifications given in IS 1343-2012 for design and determination of losses in prestressed concrete structures Action: Apply Knowledge: Losses in prestressed concrete structures Condition: IS 1343-2012 | L3 Apply |
| C401003.2 | Design post tensioned prestressed concrete S.S. rectangular and flanged sections, one way and two way slab Action: Design Knowledge: Post tensioned prestressed concrete sections, one way and two way slab Condition: Simply Supported, Rectangular and flanged sections | L6 Design |
| C401003.3 | Design of Flat slab by direct design method and seismic coefficient method Action:- Design Knowledge: Flat slab Condition: Direct design method | L6 Design |
| C401003.4 | Analysis and design of RCC cantilever type retaining wall for various types of backfill conditions Action: Design Knowledge: RCC cantilever type retaining wall Condition: Backfill conditions | L6 Design |
| C401003.5 | Design of Liquid retaining structures (Water tanks) resting on ground by working stress method Action: Design Knowledge: Different liquid retaining structures Condition: Working stress method | L6 Design |
| C401003.6 | Analyze and design multistoried building for earthquake load along with dead and live load and estimating of earthquake forces by seismic coefficient method Action: Analysis and Design Knowledge: Multistoried buildings Condition: Seismic coefficient method | L6 Design |



Course Outcomes

| Course Name:- Advanced Concrete Technology (401004-3) | | |
|---|--------------|-----------------------------|
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |
| | | Term Work: 50 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|--|------------------|
| C401004.1 | Understand Properties and types of cement, artificial aggregates and Hydration of cement in concrete as per IS specifications and exposure conditions Action: Understand Knowledge: Properties and types of cement, artificial aggregates and Hydration of cement in concrete. Condition: IS specifications and exposure conditions | L2 Understand |
| C401004.2 | Learn composition, properties and applications of special concrete types as per IS specifications and field exposure Action: Learn Knowledge: composition, properties and applications Condition: IS specifications and field exposure | L2 Understand |
| C401004.3 | Design Concrete mix for special Concretes with desired material properties as per IS code and to understand advance non-destructive testing methods. Action: Design & understand Knowledge: concrete mix design of special concretes & advanced NDT Condition: As per IS code procedures | L6 Create |
| C401004.4 | Interpret history of FRC and different types of fibers and its properties in uncracked and cracked matrix. Action: Discuss Knowledge: History of FRC and different types of fibers and its properties. Condition: Uncracked and cracked matrix. | L2 Understand |
| C401004.5 | Investigate Properties and behavior of FRC under Loading Conditions. Action: Investigate Knowledge: Properties and behavior of FRC Condition: Loading Conditions. | L3 Apply |
| C401004.6 | Analysis and design of prefabricated concrete structural elements, manufacturing process and assembly techniques as per IS specifications and requirements. Action: Analysis and Design Knowledge: prefabricated concrete structural elements, manufacturing process and assembly techniques. Condition: IS specifications and requirements. | L6 Create |



Course Outcomes

| | | |
|---|---------------------|------------------------------------|
| Course Name:-Advanced Engineering Geology with Rock Mechanics (401004) | | |
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes(COs): | BT Level |
|---------------|---|----------------------------|
| C401004.1 | Identify various Seismic zones and Physiographic divisions of India Action: Identify Knowledge: Seismic zones and Physiographic divisions Condition: divisions of India | L1 Identify |
| C401004.2 | Demonstrate relationship of effects of soil erosion on Engineering projects Action: Demonstrate Knowledge: Effects of soil erosion Condition: Engineering projects | L3 Demonstrate |
| C401004.3 | Demonstrate role of Engineering Geology for resource planning and sustainable development of the region Action: Demonstrate Knowledge: Role of Engineering Geology Condition: Sustainable development of the region | L3 Demonstrate |
| C401004.4 | Interpret field data with reference to core recovery, RQD, RMR, RSR Action: Interpret Knowledge: Core recovery, RQD, RMR, RSR Condition: field data | L2 Interpret |
| C401004.5 | Recognize Tail channel erosion and suggest appropriate remedial measures Action: Recognize and Suggest Knowledge: Remedial measures Condition: Tail Channel erosion. | L5 Recognize suggest |
| C401004.6 | Apply Rock Mechanics systems for evaluating Tunnels, Bridges and Dams Action: Apply, Evaluate Knowledge: Rock Mechanics systems Condition: Tunnels, Bridges and Dams | L5 Evaluate Apply |

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Course Outcomes

| | | |
|--|---------------------|------------------------------------|
| Course Name:-TQM & MIS in Civil Engineering (Elective-II)(401005) | | |
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- I |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: ----- | ---- | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes(COs): | BT Level |
|---------------|---|-------------------------|
| C401005.1 | Summarise quality and contribution of quality gurus for evaluation of best practices. Action: Summarise (Understand) Knowledge: quality and contribution of quality gurus Condition: for evaluation of best practices. | L2 Understand |
| C401005.2 | Relate the functioning and application of TQM & Six Sigma in the domain of construction sector Action: Relate (Analysis) Knowledge: functioning and application of TQM & Six Sigma Condition: domain of construction sector | L4 Analysis |
| C401005.3 | Refer ISO 9001 principles in preparation of quality manual to construction field. Action: Refer (Synthesis) Knowledge: ISO 9001 principles in preparation of quality manual Condition: to construction business. | L5 Synthesis |
| C401005.4 | Apply management control & certification systems for construction industry. Action: Apply (Apply) Knowledge: management control & certification systems Condition: for construction industry. | L3 Apply |
| C401009.5 | Select TQM process implementation and various quality awards for construction sector. Action: Select (Analysis) Knowledge: TQM process implementation, various quality awards Condition: for construction sector. . | L4 Analysis |
| C401005.6 | Refer MIS for allied fields in construction sector. Action: Refer (Synthesis) Knowledge: MIS Condition: for allied fields in construction sector | L5 Synthesis |

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Course Outcomes

| Course Name:-Surveying (201006) | | |
|---------------------------------|--------------|-----------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 4 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|--|-------------------------|
| C201006.1 | Define and explain the basics of plane surveying and differentiate the instruments used for it. Action: Define and Explain Knowledge: Plane surveying and surveying instruments. Condition: Plane surveying | L1 Knowledge |
| C201006.2 | Express proficiency in handling surveying equipment and analyzing the surveying data from this equipment. Action: Express & Analyze Knowledge: hands-on in operating surveying instruments. Condition: Plane surveying | L2 Understand |
| C201006.3 | Describe different methods of surveying and find relative positions of points on the surface of the earth. Action: Describe and Determine Knowledge: Methods of surveying Condition: Plane surveying | L2 Understand |
| C201006.4 | Execute curve setting for civil engineering projects such as roads, railways, etc. Action: Execute/Perform Knowledge: Setting of curves Condition: Plane surveying | L3 Apply |
| C201006.5 | Establish advancements in surveying such as space-based positioning systems. Action: Establish Knowledge: Space-based positioning systems, GPS. Condition: Geodetic and space survey | L3 Apply |
| C201006.6 | Differentiate map and aerial photographs, and also interpret aerial photographs. Action: Differentiate & Interpret Knowledge: Map and Aerial photographs Condition: Geodetic surveying | L4 Analyze |

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Course Outcomes

| Course Name:- Concrete Technology (201010) | | |
|--|--------------|-----------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |
| | | Term Work: 25 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|-------------------------|
| C201010.1 | Understand chemistry of cement and properties of other ingredients of concrete as per their IS specifications. Action: Understand Knowledge: Chemistry, properties and classification of ingredients Condition: IS Specifications | L2 Understand |
| C201010.2 | Prepare and test the properties of fresh concrete as per exposure conditions. Action: Prepare and test Knowledge: properties of fresh concrete Condition: Exposure conditions | L3 Apply |
| C201010.3 | Investigate hardened concrete with destructive and nondestructive testing instruments using IS code procedures. Action: Investigate Knowledge: hardened concrete properties Condition: IS procedures | L4 Analyze |
| C201010.4 | Design concrete mix for desired material properties and strength by using IS code/DOE method Action: Design Knowledge: concrete mix for desired material properties and strength Condition: IS code/DOE method | L6 Create |
| C201010.5 | Get acquainted to concreting equipments, techniques and different types special concrete types as per specifications Action: Get acquainted Knowledge: Concreting equipments, techniques and different types of special concrete types. Condition: Specifications | L2 Understand |
| C201010.6 | Predict deteriorations in concrete and get acquainted to various repairing methods and techniques as per exposure condition and type of damage Action: Predict Knowledge: deteriorations in concrete and its repairing methods Condition: exposure condition and type of damage | L5 Evaluate |

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Course Outcomes

| Course Name:- Geotechnical Engineering (201008) | | |
|--|-----------------------|------------------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-2022 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |
| | | Oral: 50 Marks |

Course Outcomes (Cos): At the end of this course, students will be able to,

| CO No. | Course Outcomes (Cos): | BT Level |
|---------------|---|-------------------------|
| C201008.1 | Identify and determine index properties of soil by IS and Unified classification system. Action: Identify and Determine (Apply) Knowledge: Index properties of soil Condition: IS and Unified classification system | L1 Knowledge |
| C201008.2 | Determine the soil properties in laboratory and develop a proficiency in handling experimental data Action: Determine Knowledge: proficiency in handling experimental data Condition: In laboratory | L1 Knowledge |
| C201008.3 | Understand the concept of effective stress and its influence on soil behavior. Action: Understand Knowledge: concept of effective stress Condition: Soil behavior | L2 Understand |
| C201008.4 | Develop and understand the influence of water flow on the engineering behavior of soils. Action: Develop and understand Knowledge: Engineering behavior of soils. Condition: Influence of water | L6 Create |
| C201008.5 | Evaluate the lateral earth pressure on the retaining walls using different theories. Action: Evaluate Knowledge: Lateral earth pressure on retaining wall. Condition: Using Different theories | L3 Apply |
| C201008.6 | Analysis of stability of slopes for different types of soils. Action: Analyse Knowledge: Stability of slopes Condition: Different types of soils | L4 Apply |

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Course Outcomes

| Course Name:-Structural Analysis (201011) | | |
|---|--------------|-----------------------------------|
| Class: SE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In-semester Evaluation: 30 Marks |
| Tutorial: 1hr / week | | End semester Evaluation: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|--|----------------------|
| C201011.1 | Illustrate the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams. Action: Illustrate Knowledge: Static and Kinematic indeterminacy of beams, trusses and frames. Condition: Static and Kinematic indeterminacy | L4 Analyze |
| C201011.2 | Analyse redundant trusses and able to perform approximate analysis of multi-story multi-bay frames. Action: Analyse Knowledge: Redundant trusses and multi-story multi-bay frames. Condition: Approximate analysis of multi-story multi-bay frames. | L4 Analyze |
| C201011.3 | Implement application of the slope deflection method to beams and portal frames. Action: Implement (Apply) Knowledge: Beams and portal frames Condition: Slope deflection method | L3 Apply |
| C201011.4 | Analyse beams and portal frames using moment distribution method. Action: Analyze Knowledge: Beams and portal frames Condition: Moment distribution method. | L4 Analyze |
| C201011.5 | Determine response of beams and portal frames using structure approach of stiffness matrix method. Action: Determine (Apply) Knowledge: Beams and portal frames Condition: Stiffness matrix method. | L3 Apply |
| C201011.6 | Apply the concepts of plastic analysis in the analysis of steel structures. Action: Apply Knowledge: Steel structures Condition: Plastic analysis | L3 Apply |

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Mapping of COs with POs/PSOs:

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 |
|--------------|------|------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 2 | 1 | - | - | - | - | 1 | - | - | 1 | 3 | 1 |
| CO2 | 3 | 3 | 2 | 1 | - | - | - | - | 1 | - | - | 1 | 3 | 1 |
| CO3 | 3 | 3 | 2 | 1 | - | - | - | - | 1 | - | - | 1 | 3 | 1 |
| CO4 | 3 | 3 | 2 | 1 | - | - | - | - | 1 | - | - | 1 | 3 | 1 |
| CO5 | 3 | 3 | 2 | 1 | - | - | - | - | 1 | - | - | 1 | 3 | 1 |
| CO6 | 3 | 3 | 2 | 1 | - | - | - | - | 1 | - | - | 1 | 3 | 1 |
| Total | 18 | 18 | 12 | 6 | - | - | - | - | 6 | - | - | 6 | 18 | 6 |
| Total Weight | 18 | 18 | 18 | 18 | - | - | - | - | 18 | - | - | 18 | 18 | 18 |
| % of Mapping | 100 | 100 | 66.66 | 66.67 | - | - | - | - | 33.33 | - | - | 33.33 | 100 | 33.33 |

Mrs. Jamdade P. K.
Course Teacher

Dr. Kolase P. K.
H. O. D



Course Outcomes

| Course Name:- Project Management (201012) | | |
|--|---------------------|------------------------------------|
| Class: SE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: ----- | ---- | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes(COs): | BT Level |
|---------------|---|--------------------------|
| C201012.1 | Describe project life cycle and the domains of Project Management. Action: Describe (Understand) Knowledge: life cycle and the domains Condition: Of Project Management. | L2 Understand |
| C201012.2 | Explain networking methods and their applications in planning and management. Action: Explain (Understand) Knowledge: networking methods and their applications Condition: In planning and management. | L2 Understand |
| C201012.3 | Categorize the materials as per their annual usage and also Calculate production rate of construction equipment. Action: Categorize (Analysis) Knowledge: materials as per their annual usage Condition: as per their annual usage. | L4 Analysis |
| C201012.4 | Demonstrates resource allocation techniques and apply it for manpower planning. Action: Demonstrates (Application) Knowledge: resource allocation techniques Condition: apply it for manpower planning. | L3 Application |
| C201012.5 | Summarize economical terms and different laws associated with project management. Action: Summarize (Understand) Knowledge: economical terms and different laws associated Condition: associated with project management. | L2 Understand |
| C201012.6 | Apply the methods of project selection and recommend the best economical project. Action: Apply (Application) Knowledge: methods of project selection Condition: economical project. | L3 Application |

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Course Outcomes

| Course Name:- Waste Water Engineering (301012) | | |
|---|---------------------|------------------------------------|
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|-------------------------|
| C301012.1 | Identify and understand sanitation infrastructure, quantification and characterization of wastewater and effluent discharge standards as per CPCB norms Action: Identify and understand Knowledge: characterization of wastewater Condition: CPCB norms | L2 Understand |
| C301012.2 | Design preliminary and primary unit operations in waste water treatment plant. Action: Design Knowledge: preliminary and primary unit Condition: water treatment plant | L6 Create |
| C301012.3 | Apply the theory and mechanism of aerobic biological treatment system to design activated sludge process Action: Apply Knowledge: aerobic biological treatment system Condition: activated sludge process | L3 Apply |
| C301012.4 | Design suspended growth and attached growth wastewater design system. Action: Design Knowledge: suspended and attached growth Condition: wastewater treatment systems | L6 Create |
| C301012.5 | Apply and understand concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems Action: Apply and understand Knowledge: anaerobic and tertiary methods Condition: wastewater treatment systems | L3 Apply |
| C301012.6 | Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment Action: Compare Knowledge: sludge management systems Condition: recycle and reuse of wastewater treatment | L2 Understand |

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Course Outcomes

| Course Name:- Design of Reinforced Concrete Structures (301013) | | |
|--|---------------------|------------------------------------|
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester-II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 4 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|---------------------|
| C301013.1 | Apply relevant IS provisions and determine moment of resistance for Singly, Doubly rectangular and Flanged sections using Limit State Method and Working Stress Method Action: Apply Knowledge: Moment of resistance, Singly, Doubly and Flanged sections Condition: Limit State Method and Working Stress Method | L3 Apply |
| C301013.2 | Design and Detailing of Rectangular One way and Two way slab with different boundary conditions Action: Design Knowledge: One way and Two way slab Condition: Boundary conditions | L6 Design |
| C301013.3 | Design and Detailing of Dog ledged and Open well staircase using Limit state method Action: Design Knowledge: Dog ledged and Open well staircase Condition: Limit state method | L6 Design |
| C301013.4 | Design and Detailing of rectangular and flanged continuous beams by using IS code coefficients and moment redistribution method. Action: Design Knowledge: Rectangular and flanged continuous beams Condition: IS code coefficients and moment redistribution method | L6 Design |
| C301013.5 | Design and Detailing of short column for axial, combined axial and uni-axial bending . Action: Design Knowledge: Short column Condition: Axial, combined axial and uni-axial bending. | L6 Design |
| C301013.6 | Design and Detailing of combined footing for two columns and Isolated column footing for axial, combined axial and uni-axial bending . Action: Design Knowledge: Combined footing and Isolated column footing Condition: Axial, combined axial and uni-axial bending. | L6 Design |



Course Outcomes

| Course Name: Remote Sensing and GIS (301014) | | |
|--|--------------|-----------------------------|
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester-II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|-------------------------|
| T301014.1 | Articulate fundamentals and principles of Remote Sensing techniques for applications in Civil Engineering Action: Articulate Knowledge: Fundamentals and principles of Remote Sensing Condition: Applications in Civil Engineering | L3 Apply |
| T301014.2 | Demonstrate the knowledge of remote sensing and sensor characteristics to understand the satellite operations Action: Demonstrate Knowledge: knowledge of remote sensing and sensor characteristics Condition: understand the satellite operations | L3 Apply |
| T301014.3 | Distinguish working of various spaces-based positioning systems towards effective navigation and mapping Action: Distinguish Knowledge: working of various spaces-based positioning systems Condition: navigation and mapping | L2 Understand |
| T301014.4 | Analyze the RS data and image processing towards applications in Civil Engineering Action: Analyze Knowledge: RS data and image processing Condition: applications in Civil Engineering | L4 Analyze |
| T301014.5 | Explain fundamentals and applications of GIS towards applications in Civil Engineering Action: Explain Knowledge: fundamentals and applications of GIS Condition: Applications in Civil Engineering | L2 Understand |
| T301014.6 | Acquire skills of data processing and its applications using GIS Action: Acquire Knowledge: skills of data processing Condition: applications using GIS | L3 Apply |

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Course Outcomes

| | | |
|--|---------------------|------------------------------------|
| Course Name:-Advanced Engineering Geology with Rock Mechanics (301015a) | | |
| Class: TE Civil (2019 Pattern) | A.Y. 2021-22 | Semester-II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: --- | | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes(COs): | BT Level |
|---------------|---|----------------------------|
| C301015.1 | Identify various Seismic zones and Physiographic divisions of India Action: Identify Knowledge: Seismic zones and Physiographic divisions Condition: divisions of India | L1 Identify |
| C301015.2 | Demonstrate relationship of effects of soil erosion on Engineering projects Action: Demonstrate Knowledge: Effects of soil erosion Condition: Engineering projects | L3 Demonstrate |
| C301015.3 | Demonstrate role of Engineering Geology for resource planning and sustainable development of the region Action: Demonstrate Knowledge: Role of Engineering Geology Condition: Sustainable development of the region | L3 Demonstrate |
| C301015.4 | Interpret field data with reference to core recovery, RQD, RMR, RSR Action: Interpret Knowledge: Core recovery, RQD, RMR, RSR Condition: field data | L2 Interpret |
| C301015.5 | Recognize Tail channel erosion and suggest appropriate remedial measures Action: Recognize and Suggest Knowledge: Remedial measures Condition: Tail Channel erosion. | L5 Recognize suggest |
| C301015.6 | Apply Rock Mechanics systems for evaluating Tunnels, Bridges and Dams Action: Apply, Evaluate Knowledge: Rock Mechanics systems Condition: Tunnels, Bridges and Dams | L5 Evaluate Apply |

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Course Outcomes

| | | |
|--|---------------------|------------------------------------|
| Course Name:-Quantity Surveying, Contracts and Tenders (401008) | | |
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|---|-------------------------|
| C401008.1 | Interpret estimates and related terms for the civil engineering projects. Action: Interpret Knowledge: Estimates and related terms Condition: Civil Engineering Projects | L2 Understand |
| C401008.2 | Estimate civil engineering projects by taking out quantities and summarize bar bending schedule. Action: Estimate, summarize Knowledge: Civil engineering projects, bar bending schedule Condition: Taking out quantities | L5 Evaluate |
| C401008.3 | Prepare rate analysis for the various items of work with detailed specification. Action: Prepare Knowledge: rate analysis Condition: Various items of work with detailed specification. | L3 Apply |
| C401008.4 | Prepare valuation of building by using various methods of valuation of building Action: Prepare Knowledge: Valuation Condition: Various methods of valuation of building. | L3 Apply |
| C401008.5 | Compare various methods of inviting tenders in construction practices Action: Compare Knowledge: Various methods of inviting tenders Condition: Construction practices. | L4 Analyze |
| C401008.6 | Categorized various types of contract in construction practices Action: Categorized Knowledge: Various types of contract Condition: Construction practices | L4 Analyze |

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Course Outcomes

| Course Name:- Dams and Hydraulic Structures (401007) | | |
|--|--------------|-----------------------------|
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester-II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 02 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|-----------|---|-------------------------|
| C401007.1 | Recognise various types of dams and instrumentation in dam safety monitoring. Action: Recognise Knowledge: Types of dams and their suitability and Various instrumentations used Condition: Dam Safety | L1 Knowledge |
| C401007.2 | Interpret the design loading and stresses upon gravity dam towards stability Conditions Action: Interpret Knowledge: Loading combinations and related stresses upon Gravity Dams Condition: Stability Conditions | L2 Understand |
| C401007.3 | Design the profile of spillway and energy dissipater to safeguard dam site Action: Design Knowledge: Spillway classifications and Ener Condition: Safeguard dam site | L6 Create |
| C401007.4 | Analyze case studies for zoned earthen dam and diversion head works to effectively channelize the water Action: Analyze Knowledge: Earthen dam components and its design Condition: effectively channelize the water | L4 Analyze |
| C401007.5 | Design of canal and its components to develop irrigation systems Action: Design Knowledge: canal, spillways Condition: Irrigation systems | L6 Create |
| C401007.6 | Develop cross drainage works and river training structures towards Civil Engineering applications Action: Develop Knowledge: Canal and natural drain, Classification of river training Condition: Civil Engineering Applications | L6 Create |



Course Outcomes

| Course Name:-Air Pollution and Control (Elective-III)(401009) | | |
|--|---------------------|------------------------------------|
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester- II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes(COs): | BT Level |
|---------------|---|----------------------|
| C401009.1 | Compute minimum required stack height, determine concentration of pollutants by application of Gaussian plume model and summarise meteorological aspects in concern with air pollution. Action: Determine (Apply) Knowledge: Concentration of pollutants Condition: By application Gaussian plume model | L3 Apply |
| C401009.2 | Select the best suitable method of Air sampling, analysis after summarizing them. Also summarize Air Quality Standards. Action: Select(Apply) Knowledge: Method of Air sampling, analysis Condition: Best suitable | L3 Apply |
| C401009.3 | Infer control methods of Indoor pollution and odor pollution, after identifying its sources Action: Infer (Analyse) Knowledge: Control methods for Indoor and odor pollution Condition: After identifying its sources. | L3 Apply |
| C401009.4 | Design Air Pollution control equipment for specified conditions and recommend best suitable one. Action: Design(Apply) Knowledge: Air Pollution control equipment Condition: Specified conditions. | L3 Apply |
| C401009.5 | Illustrate land use planning. Summarize Air Pollution, Environment Acts and Emission standards. Action: Illustrate Knowledge: land use planning Condition: Based on Air Pollution. | L3 Apply |
| C401009.6 | Predict the environmental impacts of proposed project and infer suitable mitigation methods. Action: infer (Analyse) Knowledge: suitable mitigation methods Condition: Predict the environmental impacts of proposed project | L4 Analyze |

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Course Outcomes

| Course Name:- Ferrocement Technology [Elective IV] (401010) | | |
|--|---------------------|------------------------------------|
| Class: BE Civil (2015 Pattern) | A.Y. 2021-22 | Semester-II |
| Teaching Scheme | Credit | Examination Scheme |
| Lectures: 3 hrs./week | 03 | In Semester exam: 30 Marks |
| Practical: 2 hrs./week | 01 | End Semester exam: 70 Marks |

Course Outcomes (COs): At the end of this course, students will be able to,

| CO No. | Course Outcomes (COs): | BT Level |
|---------------|--|------------------------|
| C401010.1 | Illustrate and discuss the concepts behind Ferrocement technology Action: Illustrate Knowledge: Concepts of Ferrocement Condition: | L1 Knowledge |
| C401010.2 | Identify the application and construction methods of Ferrocement elements. Action: Identify Knowledge: Application and construction methods Condition: | L1 Knowledge |
| C401010.3 | Design, Analysis and methods used in Ferrocement structures Action: Design, Analysis Knowledge: Strength through shape, Equivalent area method Condition: | L4 Analyze |
| C401010.4 | Application and use of Ferrocement in complex structure Action: Application and use Knowledge: complex structure Condition: | L3 Apply |
| C401010.5 | Application of Ferrocement in large size special purpose structures and precast elements Action: Application Knowledge: special purpose structures and precast elements Condition: | L3 Apply |

Approved by AICTE, New Delhi vide Letter No. F-27-29/91-AICTE/US (PG)/6717 Dt. 20/09/1993

Address : A/p. Loni Bk., Tal. Rahata, Dist. Ahmednagar (M.S.) PIN: 413736

Ph No.: (O) +91-2422-273539 / 273459 / (P) 273204

Website: www.pravaraengg.org.in , www.pravara.in | Email: principal.precloni@pravara.in