KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
SE (Sem-I)	Building Technology and Architectural Planning (201001)	CO201001.1	Identify types of building and basic requirements of building components.
		CO201001.2	Make use of Architectural Principles and Building byelaws for building construction.
		CO201001.3	Plan effectively various types of Residential Building forms according to their utility, functions with reference to National Building Code.
		CO201001.4	Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
		CO201001.5	Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.
		CO201001.6	Understand different services and safety aspects.
SE (Sem-I)	Mechanics of structure (201002)	CO201002.1	Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
		CO201002.2	Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.
		CO201002.3	Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
		CO201002.4	Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.
		CO201002.5	Analyze axially loaded and eccentrically loaded column.
		CO201002.6	Determine the slopes and deflection of determinate beams and trusses.

KCT`s

Sapkal Knowledge Hub

Late G. N. Sapkal College of Engineering Nashik

Department of Civil Engineering

Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
SE (Sem-I)	Fluid Mechanics (201003)	CO201003.1	Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation, and its application for solving practical problems.
		CO201003.2	Understand the concept of fluid kinematics with reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow
		CO201003.3	Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.
		CO201003.4	Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.
		CO201003.5	Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow computation and design of most economical channel section.
		CO201003.6	Understand the concept of gradually varied flow in open channel and fluid flow around submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body.

KCT`s

Sapkal Knowledge Hub

Late G. N. Sapkal College of Engineering Nashik

Department of Civil Engineering

Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
SE (Sem-I)	Engineering Mathematics III (207001)	CO207001.1	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.
		CO207001.2	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.
		CO207001.3	Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.
		CO207001.4	Perform Vector differentiation &integration, analyze the vector fields and apply to fluid flow problems. 5
		CO207001.5	Solve Partial differential equations such as wave equation, one- and two-dimensional heat flow equations
SE (Sem-I)	Engineering Geology (207003)	CO207003.1	Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineering constructions.
		CO207003.2	Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and sustainability.
		CO207003.3	Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.
		CO207003.4	Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.
		CO207003.5	Assess the Importance of geological nature of the site, precautions, and treatments to improve the site conditions for dams, reservoirs, and tunnels.
		CO207003.6	Explain geological hazards and importance of ground water and uses of common building stones.

KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
SE (Sem-II)	Geotechnical Engineering (201008)	CO201008.1	Identify and classify the soil based on the index properties and its formation process
		CO201008.2	Explain permeability and seepage analysis of soil by construction of flow net.
		CO201008.3	Illustrate the effect of compaction on soil and understand the basics of stress distribution.
		CO201008.4	Express shear strength of soil and its measurement under various drainage conditions.
		CO201008.5	Evaluate the earth pressure due to backfill on retaining structures by using different theories.
		CO201008.6	Analysis of stability of slopes for different types of soils.
SE (Sem-II)	Surveying (201009)	CO201009.1	Define and Explain basics of plane surveying and differentiate the instruments used for it.
		CO201009.2	Express proficiency in handling surveying equipment and analyses the surveying data from this equipment.
		CO201009.3	Describe different methods of surveying and find relative positions of points on the surface of earth.
		CO201009.4	Execute curve setting for civil engineering projects such as roads, railways etc.
		CO201009.5	Articulate advancements in surveying such as space-based positioning systems
		CO201009.6	Differentiate map and aerial photographs, also interpret aerial photographs
SE (Sem-II)	Concrete Technology (201010)	CO201010.1	Able to select the various ingredients of concrete and its suitable proportion to achieved desired strength.
		CO201010.2	Able to check the properties of concrete in fresh and hardened state.
		CO201010.3	Get acquainted to concreting equipment's, techniques, and different types of special concrete.
		CO201010.4	Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques
		CO201010.5	Able to make mixed design of concrete.
		CO201010.6	Able to identify different nondestructive testing for concrete.

KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
SE (Sem-II)	Structural Analysis (201011)	CO201011.1	Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams
		CO201011.2	Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.
		CO201011.3	Implement application of the slope deflection method to beams and portal frames.
		CO201011.4	Analyze beams and portal frames using moment distribution method.
		CO201011.5	Determine response of beams and portal frames using structure approach of stiffness matrix method.
		CO201011.6	Apply the concepts of plastic analysis in the analysis of steel structures.
SE (Sem-II)	Project management (201012)	CO201012.1	Describe project life cycle and the domains of Project Management.
		CO201012.2	Explain networking methods and their applications in planning and management
		CO201012.3	Categorize the materials as per their annual usage and also Calculate production rate of construction equipment
		CO201012.4	Demonstrates resource allocation techniques and apply it for manpower planning.
		CO201012.5	Understand economical terms and different laws associated with project management
		CO201012.6	Apply the methods of project selection and recommend the best economical project.
TE (Sem-I)	Hydrology and Water Resources Engineering (301001)	CO301001.1	Understand government organizations, apply & analyze precipitation & its abstractions.
		CO301001.2	Understand, apply & analyze runoff, runoff hydrographs and gauging of streams.
		CO301001.3	Understand, apply & analyze floods, hydrologic routing & Q-GIS software in hydrology.
		CO301001.4	Understand, apply & analyze reservoir planning, capacity of reservoir & reservoir economics.
		CO301001.5	Understand water logging & water management, apply & analyze ground water hydrology.
		CO301001.6	Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement.

KCT`s

Sapkal Knowledge Hub

Late G. N. Sapkal College of Engineering Nashik

Department of Civil Engineering

Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
TE (Sem-I)	Water Supply Engineering (301002)	CO301002.1	Define identify, describe reliability of water sources, estimate water requirement for various sectors.
		CO301002.2	Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics.
		CO301002.3	Design various components of water treatment plant and distribution system.
		CO301002.4	Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.
		CO301002.5	Design elevated service reservoir capacity and understand the rainwater harvesting.
		CO301002.6	Understand the requirement of water treatment plant for infrastructure and Government scheme.
TE (Sem-I)	Design of Steel Structures (301003)	CO301003.1	Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force.
		CO301003.2	Determine the adequate steel section subjected to compression load and design of built-up columns along with lacing and battening.
		CO301003.3	Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending.
		CO301003.4	Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section.
		CO301003.5	Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load.
		CO301003.6	Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections.

KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
TE (Sem-I)	Engineering Economics and Financial Management (301004)	CO301004.1	Understand basics of construction economics.
		CO301004.2	Develop an understanding of financial management in civil engineering projects.
		CO301004.3	Prepare and analyze the contract account.
		CO301004.4	Decide on right source of fund for construction projects.
		CO301004.5	Understand working capital and its estimation for civil engineering projects.
		CO301004.6	Illustrate the importance of tax planning & understand role of financial regulatory bodies
TE (Sem-I)	Elective I: Advanced Concrete Technology (301005)	CO301005.1	Understand the chemistry of cement and its effect on properties of concrete.
		CO301005.2	Apply the knowledge of supplementary cementitious materials to produce sustainable concretes.
		CO301005.3	Understand the mechanism of working of admixtures and their effect on properties of concrete.
		CO301005.4	Evaluate the characteristic properties of fiber reinforced concrete.
		CO301005.5	Understand the durability properties of concrete.
		CO301005.6	Interpret the properties of concrete through advance testing methods
TE (Sem-II)	Waste Water Engineering (301012)	CO301012.1	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams.
		CO301012.2	Design preliminary and primary unit operations in waste water treatment plant.
		CO301012.3	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process.
		CO301012.4	Understand and design suspended and attached growth wastewater treatment systems.
		CO301012.5	Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems.
		CO301012.6	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment.

KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
TE (Sem-II)	Design of Reinforced Concrete Structures (301013)	CO301013.1	Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.
		CO301013.2	Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.
		CO301013.3	Design & detailing of rectangular one way and two-way slab with different boundary conditions.
		CO301013.4	Design & detailing of dog legged and open well staircase.
		CO301013.5	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
		CO301013.6	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings.
TE (Sem-II)	Remote Sensing and Geographic Information System (301014)	CO301014.1	Articulate fundamentals and principles of RS techniques.
		CO301014.2	Demonstrate the knowledge of remote sensing and sensor characteristics.
		CO301014.3	Distinguish working of various spaces-based positioning systems.
		CO301014.4	Analyze the RS data and image processing to utilize in civil engineering.
		CO301014.5	Explain fundamentals and applications of RS and GIS.
		CO301014.6	Acquire skills of data processing and its applications using GIS.
TE (Sem-II)	Elective II: Architecture and Town Planning (301015)	CO301015.1	Apply the principles of architectural planning and landscaping for improving quality of life
		CO301015.2	Understand the confronting issues of the area and apply the acts.
		CO301015.3	Evaluate and defend the proposals.
		CO301015.4	Appraise the existing condition and to develop the area for betterment
		CO301015.5	To understand and demonstrate planning strategy with reference to different acts, guidelines, norms.
		CO301015.6	To appraise multifaceted zones like SEZ, CRZ and Special township, understand applications of modern Tools like GIS / GPS / RS in town planning and need of Rural Planning

KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
BE (Sem-I)	Foundation Engineering (401001)	CO401001.1	Perform subsurface investigations for foundations using different methods.
		CO401001.2	Estimate the bearing capacity of shallow foundations.
		CO401001.3	Calculate immediate and primary consolidation settlement of shallow foundations.
		CO401001.4	Decide the capacity of a pile and pile group.
		CO401001.5	Understand the steps in geotechnical design of shallow foundations and well foundations.
		CO401001.6	Analyze problems related to expansive soil and overcome them using design principles, construction techniques in black cotton soil.
BE (Sem-I)	Transportation Engineering (401002)	CO401002.1	Understand principles and practices of transportation planning.
		CO401002.2	Demonstrate knowledge of traffic studies, analysis and their interpretation.
		CO401002.3	Design Geometric Elements of road pavement.
		CO401002.4	Evaluate properties of highway materials as a part of road pavement.
		CO401002.5	Appraise different types of pavements and their design.
		CO401002.6	Understand the fundamentals of Bridge Engineering and Railway Engineering.

KCT`s

Sapkal Knowledge Hub

Late G. N. Sapkal College of Engineering Nashik

Department of Civil Engineering

Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
BE (Sem-I)	Elective III: Integrated Water Resources Planning and Management (401003)	CO401003.1	Understand concerned organizations, IWRP & M objectives, principles, challenges, application & analysis of IWRP&M approaches & principles in a case study.
		CO401003.2	Understand PIM, WDS, WALMI, agriculture in the concept of integrated water resources, apply and analyse water requirements for food production.
		CO401003.3	Understand assessment of surface and ground water quality, EIA, CPCB regulations, application & analysis of effluent quality standards as per CPCB.
		CO401003.4	Understand water economics and funding, application & analysis of planning for a sustainable water future.
		CO401003.5	Understand legal regulatory settings of IWRP & M, application & analysis of inter-basin water transfers and IWRP & M.
		CO401003.6	Understand flood control & power generation for IWRP & M, application QIGIS for analysis of a basin for IWRP & M.
BE (Sem-I)	Elective III: Operation Research (401003)	CO401003.1	Correlate applications of Operations Research in Civil Engineering field.
		CO401003.2	Solve the problems related to stochastic programming.
		CO401003.3	Optimize transportation and assignment problems.
		CO401003.4	Optimize linear problems.
		CO401003.5	Optimize non-linear problems.
		CO401003.6	Suggest solution for the problems related to dynamic models, games theory and replacement of items.

KCT`s
Sapkal Knowledge Hub
Late G. N. Sapkal College of Engineering Nashik
Department of Civil Engineering
Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
BE (Sem-I)	Elective IV: Airport and Bridge Engineering (401004)	CO401004.1	Understand the fundamental of airport.
		CO401004.2	Understand and design the runway and taxiway and drainage systems.
		CO401004.3	Understand the BIM, AR and VR in airport planning and pavement design.
		CO401004.4	Plan the lighting and marking of airport and heliport.
		CO401004.5	Estimate various components of bridge and loads on bridges.
		CO401004.6	Study and design of bridge structures.
BE (Sem-II)	Dams and Hydraulics Structures (401011)	CO401011.1	Understand types of dams and instrumentation working.
		CO401011.2	Execute stability analysis of Gravity Dam.
		CO401011.3	Understand types of spillways & Design of Ogee spillway.
		CO401011.4	Illustrate the failures and analyze stability of earthen dam.
		CO401011.5	Design Canals and understand the canal structures.
		CO401011.6	Analysis of the Diversion headwork and Cross Drainage work.
BE (Sem-II)	Quantity Surveying, Contracts and Tenders (401012)	CO401012.1	Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works.
		CO401012.2	Describe tendering process, construction contracts, and aspects of Arbitration and prepare tender documents.
		CO401012.3	Prepare detailed estimate of various items of work by different methods and calculate quantity of steel from Bar bending schedule.
		CO401012.4	Apply engineering knowledge to prepare estimate for roads, culverts, and water tank (Elevated storage tank)
		CO401012.5	Apply concepts of specification to draft brief specification, detailed specification and prepare detailed rate analysis report.
		CO401012.6	Evaluate depreciation and valuation of property on the basis of present condition, specifications and market trend.

KCT`s

Sapkal Knowledge Hub

Late G. N. Sapkal College of Engineering Nashik

Department of Civil Engineering

Course Outcomes (UG)

Year	Course Name	Course Outcome No.	Course Outcome
BE (Sem-II)	Elective V: Hydropower Engineering (401013)	CO401013.1	Understand the classification of power resources & trends in energy use patterns.
		CO401013.2	Identify the components of hydro power plant.
		CO401013.3	Analyze the load assessment for turbines.
		CO401013.4	Prepare the layout of power house based on the various structures need for it.
		CO401013.5	Design the turbines and surge tanks.
		CO401013.6	Understand the laws and regulatory aspects of hydroelectric power.
BE (Sem-II)	Elective VI: TQM and MIS (401014)	CO401014.1	Recognize quality and contribution of quality gurus for evaluation of best practices.
		CO401014.2	Relate the functioning and application of TQM & Six Sigma in the domain of construction sector.
		CO401014.3	Recommend ISO 9001 principles in preparation of quality manual to construction business.
		CO401014.4	Apply management control & certification systems for construction industry.
		CO401014.5	Choose TQM process implementation and various quality awards for construction sector.
		CO401014.6	Propose MIS for allied fields in construction sector.