

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)

CIVIL ENGINEERING DEPARTMENT

Flexible Scheme: Course Outcomes (COs)

The course outcomes of the courses of **2020 admitted batch** from 1st year of the undergraduate course of Civil Engineering Program are given below:

Courses	Course Outcome's	
After the completion of this course, students will be able to:		
110211: Building Planning & Design	CO1	Explain basics of building planning & design.
	CO2	Describe sustainability principle, by laws & characteristics of thermal and sound insulation in building planning & design.
	CO3	Apply sustainability concepts & principles in planning & design of buildings.
	CO4	Evaluate environmental, sustainable & safety aspects of a building.
	CO5	Plan different types of buildings as per by laws & codal provisions.
100020: Basic Civil Engineering & Mechanics	CO1	Explain concepts and terminologies of building materials, surveying and mechanics
	CO2	Apply various methods for surveying and mechanics
	CO3	Determine the location, area and volume of objects on ground surface
	CO4	Solve the problems of surveying and mechanics by using various methods
	CO5	Analyse the effects of system of forces on rigid bodies in static conditions
100026: Basic Civil Engineering (P)	CO1	Follow the guidelines for field surveying.
	CO2	Follow the working principles of survey instruments for measurements.
	CO3	Measure the horizontal distances, difference in elevation and angles of various points
	CO4	Interpret survey data and compute areas
	CO5	Determine various properties of cement, concrete & bricks.
110311: Building Materials & Construction	CO1	Explain the basic elements of buildings, engg. materials & construction.
	CO2	Evaluate the properties of various materials like cement, aggregate, concrete, admixture, brick, stone etc.

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	CO3	Distinguish the suitability of building materials in the construction of elements of buildings.
	CO4	Evaluate various types of concrete in building construction accordingly.
	CO5	Apply various techniques for finishing & protection works of various elements of building.
110311 (P): Building Materials & Construction	CO1	Determine the properties of cement, sand & aggregate as per IS code
	CO2	Determine the workability of concrete for suitability of concrete mix in different construction works
	CO3	Evaluate compressive strength of various concrete mixes
	CO4	Determine physical properties of brick by experiment and practice accordingly
	CO5	Examine the properties of the cement mortar for various elements of the buildings
110312: Fluid Mechanics-I	CO1	Define various fluid properties & states of fluid
	CO2	Apply principles of fluid flow & dimensional analysis
	CO3	Solve fluid flow problems
	CO4	Analyze characteristics of fluid at rest, fluid at motion & dimensionless numbers
	CO5	Discriminate different types of fluid flow, measurement techniques & principles
	CO6	Apply the concepts of laminar flow in solving various fluid flow problems
110312: Fluid Mechanics-I (P)	CO1	Differentiate between different flow measurement devices
	CO2	Notice flow through pipes & fall velocity of particle
	CO3	Correct the instrumental errors
	CO4	Apply Stoke's law to calculate terminal velocity
110313: Surveying	CO1	Explain the techniques used for linear & angular measurements in surveying.
	CO2	Analyse different geodetic methods of survey such as triangulation, trigonometric leveling, tachometry, photographic & GIS.
	CO3	Apply methods in control surveys.
	CO4	Apply tachometry in traverse computations.
	CO5	Apply various methods for setting curves, area & volume computations.

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110314: Strength of Materials	CO1	Explain the concepts of stress, strains, bending, deflection, buckling & torsion.
	CO2	Explain various theories for determining stress, buckling of columns & deflections of structures.
	CO3	Apply various theories for determining stress, buckling of columns & deflections of structures.
	CO4	Evaluate the stresses in bending, shear and torsion.
	CO5	Analyze various sections for stresses, strain, bending, torsion, buckling & deflections.
110314(P): Strength of Materials	CO1	Evaluate properties of material by impact test
	CO2	Evaluate properties of material by hardness test
	CO3	Evaluate properties of material by tensile test
	CO4	Determine compressive & flexural strength of materials
110315 (P): Survey Practice Lab	CO1	Follow the guidelines for field surveying
	CO2	Follow the working principles of survey instruments for measurements
	CO3	Measure horizontal & vertical angle by theodolite for traversing and levelling
	CO4	Determine tachometric constants for linear measurements by tachometry
	CO5	Create a simple circular curve by using Rankine's method for alignment
	CO6	Develop contour map by using tachometer & total station.
110316: Self Learning / Presentation	CO1	Analyze contemporary issues in civil engineering & its allied areas through literature survey
	CO2	Distinguish state of art & relevance of the topic in national & international arena
	CO3	Demonstrate good oral & written communication skills
	CO4	Develop poster and power point presentations for effective communication
	CO5	Display lifelong learning
110317: Summer Internship Project - I	CO1	Observe various activities in field
	CO2	Examine the utility of general and specific equipments for construction
	CO3	Differentiate the construction projects individually and in team

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	CO4	Develop the writing and communication skills for various engineering problems
	CO5	Adapt lifelong learning for benefit of society
Geotechnical Engineering - I (110411)	CO1	Evaluate different properties of rocks & soil and its classification
	CO2	Examine the flow and shear parameters & their effects on various types of soil.
	CO3	Determine the stress distribution & shear failure by various methods.
	CO4	Evaluate the shear strength parameter of soil by various methods
	CO5	Analyse the stability of slopes using various methods.
Geotechnical Engineering – II (Practical) (110411)	CO1	Check physical properties of soil.
	CO2	Check strength properties of soil.
	CO3	Differentiate the flow properties and stresses of soil
	CO4	Check shear strength of soil.
Theory of Structure – I (110412)	CO1	Classify different type of structures based on support conditions
	CO2	Explain various methods & principles for analysis of structures
	CO3	Apply various methods & principles for structural analysis.
	CO4	Analyse various structures using various methods, principles & theorems
	CO5	Evaluate different methods of structural analysis.
Transportation Engineering (110413)	CO1	Explain the principles of highway planning & their geometrical design
	CO2	Evaluate physical properties of suitable highway engineering materials with drainage provisions.
	CO3	Apply the concepts of traffic engineering in transportation planning.
	CO4	Design pavements as per regulations.
	CO5	Formulate the layers of pavement along with provisions of its drainage & maintenance.
Transportation Engineering – Practical (110413)	CO1	Select suitable aggregate material by testing the physical properties.
	CO2	Determine properties of bitumen and its grade.

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	CO3	Determine CBR value of material for subgrade and subsequent layers of pavement.
	CO4	Design job mix formula for bituminous surface using Marshal Stability test
Water Resource Engineering (110414)	CO1	Explain the concept of hydrology and hydrograph
	CO2	Apply basic principles for measurement & forecasting of rainfall & runoff
	CO3	Analyse runoff hydrograph by various methods.
	CO4	Analyse various requirements for an efficient irrigation project
	CO5	Design different components of irrigation system using different theories
	CO6	Plan an efficient, economical & safe irrigation system.
Civil Engineering Drawing (110415)	CO1	Attempt to draw different components of a building.
	CO2	Produce plan, elevation & section of various components of a residential and institutional building.
	CO3	Use AutoCAD software in civil engineering drawing.
	CO4	Prepare drawing sheets of various types of buildings like residential, institutional,
Water Supply Engineering (110511)	CO1	Explain the concepts of water supply engineering.
	CO2	Determine the requirements for safe supply of water.
	CO3	Apply suitable water treatment technique based upon the available data.
	CO4	Analyse a given water supply scheme.
	CO5	Design a water supply system based upon the needs of society.
Water Supply Engineering (P) (110511)	CO1	Follow sampling procedure & other guidelines for sampling & analysis of water samples.
	CO2	Check various water quality parameters.
	CO3	Improve the water quality by suggesting suitable corrective measures.
	CO4	Train others on various ways of improving the quality of water.
Theory of Structure	CO1	Explain various methods for analysis of structures and frames.

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– II (110512)	CO2	Analyse various loads on framed structures using codal provisions.
	CO3	Analyse different type of structures for various load conditions by different methods.
	CO4	Draw influence line diagrams for statically determinate & indeterminate structure.
	CO5	Analyse beams & frames using plastic analysis..
Structural Design & Drawing (R.C.C.) (110513)	CO1	Apply the concepts of different design philosophies for deriving basic expressions used in RC design
	CO2	Determine the capacity of RC elements using IS456 guidelines.
	CO3	Analyse the RC elements for determining design variables as per IS456 & IS 875
	CO4	Design the RC elements as per IS 456 provisions.
	CO5	Develop the design sketches for RC elements as per IS456; IS13920 and SP34 provisions.
Fluid Mechanics – II (110514)	CO1	Differentiate different types of fluid flow & fluid machinery.
	CO2	Describe principles of analysis of fluid flow problem.
	CO3	Explain basic principles for measurement of different forces acting on fluid body.
	CO4	Analyse pipe flow, open channel flow problems & various characteristics of hydraulic machines.
	CO5	Design open & closed conduit systems.
Minor Project – I (110515)	CO1	Recognize various engineering problems and techniques to solve them.
	CO2	Reproduce the solution of the problems upon the need of society.
	CO3	Cooperate to work within group.
	CO4	Develop the writing and communication skills for various engineering problems.
	CO5	Display lifelong learning.
Self Learning/ Presentation (110516)	CO1	Analyse contemporary issues in civil engineering & its allied areas through literature survey
	CO2	Distinguish state of art & relevance of the topic in national & international arena
	CO3	Demonstrate good oral & written communication skills
	CO4	Develop poster and power point presentations for effective communication

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	CO5	Display lifelong learning
Summer Internship Project – II (110517)	CO1	Develop the writing and communication skills for various engineering problems.
	CO2	Adapt lifelong learning for benefit of society.
Data Science (110520)	CO1	Define different Data Science techniques.
	CO2	Illustrate various tools used for Data Science technique.
	CO3	Apply data visualization techniques to solve real world problems.
	CO4	Build exploratory data analysis for Data Science methods.
	CO5	Apply Data Science techniques for solving real world problems.
	CO6	Evaluate the performance of algorithms in data science.
Project Management and Financing (100005)	CO1	Know the attributes of project and its different phases.
	CO2	Develop the project network based on work breakdown structure and estimation of activity durations
	CO3	Analyze the project network and make decide the various alternates.
	CO4	Evaluate the optimum cost of project for assigned deadlines.
	CO5	Understand the different options to arrange the finances to complete it within stipulated time
Disaster Management (100006)	CO1	Identify disaster prevention and mitigation approaches.
	CO2	Classify global and national disasters, their trends and profiles.
	CO3	Determine the impacts of various disasters.
	CO4	Apply Disaster Risk Reduction in management.
	CO5	Infer the linkage between disasters, environment and development.
110620 Artificial Intelligence & Machine Learning	CO1	Define basic concepts of Artificial Intelligence & Machine Learning
	CO2	Illustrate various techniques for search and processing.
	CO3	Identify various types of machine learning problems and techniques.
	CO4	Analysis various techniques in Artificial Intelligence, ANN & Machine Learning
	CO5	Apply AI and ML techniques to solve real world problems.
	CO6	Build AI enabled intelligent systems for solving real world problems.

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110621: Waste Water Engineering	CO1	Explain the concepts of waste water engineering.
	CO2	Determine the requirements for safe disposal of sewage
	CO3	Apply suitable techniques for sewage treatment & disposal based upon the available data.
	CO4	Analyse a given sewerage system.
	CO5	Design sewage system for safe disposal of sewage
110622: Structural Design & Drawing (Steel)	CO1	Design the steel connections using relevant IS codes
	CO2	Design tension members using relevant IS codes.
	CO3	Design simple and built up compression member using relevant IS codes.
	CO4	Design flexural members using relevant IS codes.
	CO5	Design plate girder section and column bases.
110623: Estimating Costing & Contracting	CO1	Explain the fundamentals of quantity estimation, costing & contracting.
	CO2	Apply methods to estimate area, volume & cost.
	CO3	Evaluate mathematical & numerical models for rate & quantity estimation
	CO4	Determine rates & value
	CO5	Classify different rates of items, contracts & measurement techniques
110614: Minor Project – II	CO1	Recognize various engineering problems and techniques to solve them
	CO2	Reproduce the solution of the problems upon the need of society
	CO3	Cooperate to work within group
	CO4	Develop the writing and communication skills for various engineering problems

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	CO5	Display lifelong learning
900120: Building Services & Maintenance	CO1	Identify various services required in a building.
	CO2	Carry out planning of fire fighting system for a building
	CO3	Develop a management strategy for maintenance of building services in a building
	CO4	Design a sustainable building services plan for a building.
900121: Sustainable Materials & Green Buildings	CO1	Apply the concepts of sustainability in the context of building and conventional
	CO2	Explain the Concepts of VOC and indoor air quality
	CO3	Apply the concepts of embodied, Operational and Life Cycle Energy, Minimizing Energy consumption by optimal design, use of BIPV.
	CO4	Apply the guidelines of ECBC, LEED, GRIHA while planning a building.
	CO5	Use renewable energy sources in buildings.