

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 **2017 admitted batch** from 1st year to 4th year of the undergraduate course of Civil Engineering Program are given below:

Courses	Course Outcomes	
After the completion of this course, students will be able to:		
100205: 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
100205: Basic Civil Engineering & Mechanics		
100205: Basic Civil Engineering & Mechanics (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	Detect measurement errors and accordingly suggest corrections
	CO5	Interpret survey data and compute areas
100205 (P) - Basic Civil Engineering And Mechanics Lab		
110302: Building Planning & Design	CO1	Explain basics of building planning & design.
	CO2	Illustrate 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.
110302: Building Planning & Design		

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110303: 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.
	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.
		110303: Building Materials & Construction
110303 (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
		110303 (P): Building Materials & Construction
110304: Surveying	CO1	Explain the techniques used for linear & angular measurements in surveying.
	CO2	Analyse different geodetic methods of survey such as triangulation, trigonometric levelling, 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.
		110304: Surveying
110304 (P): Surveying	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

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	CO4	Determine tachometric constants for linear measurements by tacheometry
	CO5	Create a simple circular curve by using Rankine's method for alignment
		110304 (P): Surveying
110305: 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.
		110305: Strength of Materials
110305(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
		110305(P): Strength of Materials
110306: Software Lab	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, commercial etc
		110306: Software Lab
110307: 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
		110307: Self Learning / Presentation

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110308: 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
	CO4	Develop the writing and communication skills for various engineering problems
	CO5	Adapt lifelong learning for benefit of society
110308: Summer Internship Project - I		
110402: Geotechnical Engineering	CO1	Evaluate different properties of soil, types of foundations and its classifications
	CO2	Examine flow and shear parameters & their effects on various types of soil
	CO3	Determine the stress distribution & shear strength parameter of soil by various methods
	CO4	Analyse the stability of slopes, earth pressures & retaining walls using analytical methods
	CO5	Evaluate suitable foundation system for various site conditions.
110402: Geotechnical Engineering – I		
110402 (P): Geotechnical Engineering	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
110402 (P): Geotechnical Engineering – I		
110403: 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

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		110403: Fluid Mechanics – I
110403 (P): Fluid Mechanics – I	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
		110403 (P): Fluid Mechanics – I
110404: Structural Analysis	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
		110404: Structural Analysis
110405: Engineering Hydrology	CO1	Explain the basics of surface, subsurface flow, floods & hydrograph.
	CO2	Describe various methods of hydrological studies.
	CO3	Apply basic principles for measurement & forecasting of rainfall & runoff.
	CO4	Analyse runoff hydrograph by various methods.
	CO5	Evaluate various hydrological analysis methods.
	CO6	Formulate the solutions to complex hydrological problems.
		110405: Engineering Hydrology
110407: Survey Practice Lab	CO1	Observe topographical characteristics
	CO2	Differentiate methods to perform ground survey
	CO3	Prepare longitudinal & cross section profiles
	CO4	Develop contour map by using tachometer & total station
	CO5	Prepare the details of features using Plane table surveying
	CO6	Produce a simple circular curve by using Rankine's method for alignment
		110407: Survey Practice Lab
110501: Estimating Costing & Contracting	CO1	Explain the fundamentals of quantity estimation, costing & contracting.
	CO2	Apply methods to estimate area, volume & cost.

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	CO3	Evaluate mathematical & numerical models for rate & quantity estimation
	CO4	Determine rates & value
	CO5	Classify different rates of items, contracts & measurement techniques
		110501: Estimating Costing & Contracting
110502: Structural Design & Drawing (R.C.C.)	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	Analyze 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.
		110502: Structural Design & Drawing (R.C.C.)
110503: Fluid Mechanics – II	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.
		110503: Fluid Mechanics – II
110503: Fluid Mechanics – II (P)	CO1	Differentiate between turbines & pumps
	CO2	Select the efficient turbines by studying the performance characteristics of various turbines
	CO3	Distinguish the performance characteristics of various pumps
		110503: Fluid Mechanics – II (P)
110504: Environmental Engineering	CO1	Explain the concepts of water supply engineering.
	CO2	Determine the requirements for safe supply of water.

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	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.
110509: Environmental Engineering-I		
110504: Environmental Engineering (P)	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.
110509: Environmental Engineering-I (P)		
110505: Transportation Engineering	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.
110505: Transportation Engineering		
110505: Transportation Engineering (P)	CO1	Select suitable aggregate material by testing the physical properties
	CO2	Determine properties of bitumen and its grade
	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.
110505: Transportation Engineering (P)		
110506: Minor Project – I	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.

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	CO4	Develop the writing and communication skills for various engineering problems.
	CO5	Display lifelong learning.
		110506: Minor Project – I
110507: Summer Internship Project - II	CO1	Develop the writing and communication skills for various engineering problems.
	CO2	Adapt lifelong learning for benefit of society.
		110507: Summer Internship Project - II
110508: 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
		110508: Self Learning Presentation
110602: Structural Design & Drawing (Steel)	CO1	Explain the principles of steel structural design using relevant IS Codes
	CO2	Evaluate structural behaviour of different steel structural elements
	CO3	Analyse a given section of steel structural element using IS codes
	CO4	Design different elements of steel structure under various loading conditions using relevant IS codes
	CO5	Design a structure/ component to meet desired needs within realistic constraints such as economy, safety, viable construction & its sustainability as per codal provisions
		110602: Structural Design & Drawing (Steel)
110607: 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
	CO5	Display lifelong learning
		110607: Minor Project – II

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100007: Disaster Management	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.
100007: Disaster Management		
110611:Wastewater 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
110611:Wastewater Engineering		
110612: Solid Waste Management	CO1	Explain the principles & concepts of waste management.
	CO2	Apply various techniques in collecting the waste.
	CO3	Apply various techniques of reducing the waste.
	CO4	Apply various techniques in disposal of waste.
	CO5	Plan an effective & efficient waste management system
110612: Solid Waste Management		
110613: Construction Planning & Management	CO1	Explain the concepts of construction planning & management process.
	CO2	Describe various techniques used in construction planning & management.
	CO3	Apply techniques of project planning & management.

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	CO4	Analyze various problems of time & cost optimization using network techniques like CPM & PERT.
	CO5	Plan effectively for manpower & material management in a project along with suitable safety measures.
		110613: Construction Planning & Management
Building Physics	CO1	Explain the significance of saving energy while deigning and planning the building.
	CO2	Apply the principles of day lighting while designing a building
	CO3	Analyse different types of energy efficient and eco-friendly materials available in building construction to reduce the energy consumption
	CO4	Analyse the thermal impact on buildings due to changing environment and their remedial measures
	CO5	Apply the concept of acoustics while design a building
		Building Physics
Prefabricated Construction Technology	CO1	Explain the concepts of prefabricated construction.
	CO2	Apply the concepts of prefabrication in various components of building construction.
	CO3	Explain the concept of modular coordination.
	CO4	Analyze joints in structural members.
	CO5	Apply the concept of pre-engineered construction
		Prefabricated Construction Technology
110701- Software Application for Solving Civil Engineering Problems	CO1	Design various beams, slabs & multistorey building's using various software's.
	CO2	Design water supply & sewer networks using various software's.
	CO3	Practice MS Excel in estimation works.
	CO4	Produce land use land cover maps and geo contour maps using various software's.
	CO5	Practice Primavera and MS-Project softwares.
		110701- Software Application for Solving Civil Engineering Problems

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110702 - Summer Internship Project – III	CO1	Observe various activities of civil construction works.
	CO2	Examine the utility of general and specific equipments for construction.
	CO3	Differentiate the construction projects individually and in team.
	CO4	Develop the writing and communication skills for various engineering problems.
	CO5	Adapt lifelong learning for benefit of society.
		110702 - Summer Internship Project – III
110703 - Creative Problem Solving	CO1	Identify various on field problems.
	CO2	Practice various methods to solve problems.
	CO3	Produce solutions to various problems.
	CO4	Demonstrate various problems solving skills.
		110703 - Creative Problem Solving
110711: Irrigation Engineering	CO1	Explain the concepts for planning an irrigation project.
	CO2	Differentiate various theories used in planning of an irrigation project.
	CO3	Analyse various requirements for an efficient irrigation project.
	CO4	Design different components of irrigation system using different theories.
	CO5	Plan an efficient, economical & safe irrigation system.
		110711: Irrigation Engineering
110712: Industrial Waste Treatment (DE-3)	CO1	Evaluate the effects of waste on streams as per the standards.
	CO2	Determine the requirements for safe disposal of sewage.
	CO3	Apply suitable techniques for sewage treatment & disposal based upon the available data.
	CO4	Apply municipal regulations in operation & maintenance of waste water treatment plant.
	CO5	Explain waste management methods of different industries.
		110712: Industrial Waste Treatment (DE-3)
110713: Advanced Structural Design- I (RCC)	CO1	Explain behaviour of RCC and Prestressed concrete structures under loads.
	CO2	Determine forces developed in RCC and Prestressed concrete structures under loads.
	CO3	Compare designs of RCC and Prestressed concrete structures for given loadings.

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	CO4	Develop economic and safe designs of RCC and Prestressed concrete structures.
		110713: Advanced Structural Design- I (RCC)
100008: Intellectual Property rights (IPR)	CO1	Imbibe the knowledge of Intellectual Property and its protection through various laws
	CO2	Apply the knowledge of IPR for professional development
	CO3	Develop a platform for protection and compliance of Intellectual Property Rights & knowledge
	CO4	Create awareness amidst academia and industry of IPR and Copyright compliance
	CO5	Deliver the purpose and function of IPR and patenting.
		100008: Intellectual Property rights (IPR)
900201- Integrated Waste Management for Smart City (OC - 2)	CO1	Explain the principles & concepts of waste management.
	CO2	Apply various techniques of handling the waste.
	CO3	Apply various techniques of energy recovery from waste.
	CO4	Plan an effective & efficient waste management system.
		900201- Integrated Waste Management for Smart City (OC - 2)
900202 - Project Planning & Control (OC - 2)	CO1	Know the project planning and project network.
	CO2	Analyze the network by CPM & PERT.
	CO3	Analyze the project using precedence network.
	CO4	Analyze the effect of resource planning on project.
	CO5	Evaluate the cost of project during planning.
		900202 - Project Planning & Control (OC - 2)
900213 - Urban Planning & Transportation Systems (OC - 3)	CO1	Explain the concepts for planning a city and land-use patterns.
	CO2	Differentiate various theories used in urban planning.
	CO3	Analyse various requirements for transportation systems.
	CO4	Design approaches in addressing the issues and concerns of urban environment through planning.
	CO5	Plan strategies for any project with an urban planning perspective as a member and/or leader in a team of planning projects.
		900213 - Urban Planning & Transportation Systems

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		(OC - 3)
110801: Internship/ Project	CO1	Observe various activities of civil engineering works.
	CO2	Recognize various engineering problems and techniques to solve them.
	CO3	Reproduce to solution of the problems upon the need of society.
	CO4	Develop the writing and communication skills for various engineering problems.
	CO5	Adapt lifelong learning for benefit of society.
		110801: Internship/ Project