



Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited with A+ Grade

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)



Program: B.Tech. Civil Engineering

Semester V

BCE3501: Reinforced Cement Concrete Structures

	Course Outcomes	CL	Class Sessions
BCE3501.1	Explain the basic concepts of Working stress method of reinforced concrete design & concept of pre-stress concrete.	4	9
BCE3501.2	Illustrate the concept of Limit State Design for structures	3	8
BCE3501.3	Analyze the singly reinforced rectangular sections, doubly reinforced rectangular sections	4	9
BCE3501.4	Analyze flexural and compression members by Limit State Design	4	9
BCE3501.5	Evaluate the design and detailing of RCC structural elements required for buildings and design of one-way and two-way slab.	5	10

BCE3502: Advanced Structural Analysis

	Course Outcomes	CL	Class Sessions
BCE3502.1	Analyze beam curved in plan and elevation.	4	9
BCE3502.2	Analyze two hinged arches for axial thrust, shear and moment	4	9
BCE3502.3	Analyze three hinged arches for axial thrust, shear and moment	4	9
BCE3502.4	Analyze the stresses & tensions in cables	3	9
BCE3502.5	Evaluate prismatic / non-prismatic displacement-based bar element using finite Element method and Rayleigh Ritz method	5	9

BCE3503: Advanced Surveying

	Course Outcomes	CL	Class Sessions
BCE3503.1	Understand the concepts of basic surveying techniques	2	8
BCE3503.2	Apply the knowledge to operate survey instruments effectively with precision	3	8
BCE3503.3	Classify geodetic & triangulation surveys and conduct field work using surveying instruments	4	9
BCE3503.4	Apply the concepts of modern surveying techniques & instrumentation	3	11
BCE3503.5	Construct mini project using surveying techniques and concept of Photographic & Hydrographic Surveying.	4	9

BCE3504: Rural Water Supply & Sanitation (PE-I)

	Course Outcomes	CL	Class Sessions
BCE3504.1	Understand concept & magnitude of problem of rural water supply & sanitation	2	8
BCE3504.2	Evaluate the approaches for planning of water supply systems in rural areas	5	9
BCE3504.3	Analyze improvised methods & compact system of treatment of surface and ground waters	4	9
BCE3504.4	Understand planning of distribution system in rural areas on special occasions & emergencies	2	9
BCE3504.5	Analyze sanitation & simple wastewater treatment system for rural areas and small communities	4	10

BCE3505: Environmental Laws & Policy (PE-I)

	Course Outcomes	CL	Class Sessions
BCE3505.1	Use basic knowledge of environment, pollution, legislations & Acts	3	8
BCE3505.2	Understand & learn about the legal provisions of water pollution & air pollution	2	10
BCE3505.3	Apply the knowledge of Constitutional provisions for the Protection of environment & forests	3	9
BCE3505.4	Interpret the knowledge of Municipal solid waste & Hazardous waste management Acts	3	8
BCE3505.5	Distinguish international conventions & protocols for environment protection	4	10

BCE3506: Solid and Hazardous Waste Management (PE-I)

	Course Outcomes	CL	Class Sessions
BCE3506.1	Evaluate sampling and characterization of solid waste	5	9
BCE3506.2	Apply steps in solid waste management-waste reduction at source, collection techniques, materials and resource recovery/recycling	3	9
BCE3506.3	Understand engineering, financial and technical options for solid waste management	2	10
BCE3506.4	Understand & become aware of environment and health impacts of hazardous waste mismanagement	2	8
BCE3506.5	Analyze hazardous waste constituents including QA/QC issues	4	9

BCE3507: Air and Noise Pollution Control (PE-I)

	Course Outcomes	CL	Class Sessions
BCE3507.1	Analyze history of air pollution, air pollution episodes, sources and classification of air pollutants	4	8
BCE3507.2	Classify fundamentals of air pollution and its associated environmental impacts	2	9
BCE3507.3	Understand techniques and instrumentation of ambient air sampling & monitoring	2	8
BCE3507.4	Evaluate the key concepts of air quality management & control	5	9
BCE3507.5	Analyze the concepts of noise pollution & its monitoring procedures	4	12

BCE3508: Water Resources Engineering (PE-II)

	Course Outcomes	CL	Class Sessions
BCE3508.1	Understand the types of techniques related to water resources field methods.	2	8
BCE3508.2	Analyze field scale water resources considering environmental impact.	4	9
BCE3508.3	Use the instruments and protocols for water resources.	3	8
BCE3508.4	Apply the knowledge of quantity management surface and sub-surface water	3	10
BCE3508.5	Use legal aspects of water and environment systems in water resource management	3	10

BCE3509: Water Quality Engineering (PE-II)

	Course Outcomes	CL	Class Sessions
BCE3509.1	Use the knowledge of disposal methods for waste water on land and in water.	3	9
BCE3509.2	Understand necessity, objectives layout of a wastewater treatment plant.	2	8
BCE3509.3	Apply the concept of advanced treatment processes for waste water.	3	9
BCE3509.4	Examine the biological characteristics and treatment of waste water.	4	10
BCE3509.5	Analyze types of treatment units for industrial waste water	4	9

BCE3510: Surface Hydrology (PE-II)

	Course Outcomes	CL	Class Sessions
BCE3510.1	Apply hydrology principles to solve water resources management problems.	3	10
BCE3510.2	Evaluate evapo-transpiration & infiltration rate values.	5	10
BCE3510.3	Evaluate water power development criteria & characteristics.	5	9
BCE3510.4	Plan Hydro power plant structure & layout.	5	8
BCE3510.5	Analyze water conductor system & water hammer	4	8

BCE3511: Flood Control & Drainage Engineering (PE-II)

	Course Outcomes	CL	Class Sessions
BCE3511.1	Understand the role and responsibility of engineers in Flood Mitigation.	2	8
BCE3511.2	Understand the role and responsibility of engineers in Estimation of Design Flood	2	10
BCE3511.3	Apply the knowledge of GPS, GIS, Remote Sensing in Natural Hazard Mitigation	3	8
BCE3511.4	Apply the Concept in Operation and Maintenance of Urban Drainage System.	3	10
BCE3511.5	Examine pattern of Drainage system at Irrigation area.	4	9

BCE3516: Reinforced Cement Concrete Structures Lab

	Course Outcomes	CL	Class Sessions
BCE3516.1	Explain the basic concepts of Working stress method of reinforced concrete design & concept of pre-stress concrete.	4	2
BCE3516.2	Illustrate the concept of Limit State Design for structures	3	4
BCE3516.3	Analyze the singly reinforced rectangular sections, doubly reinforced rectangular sections	4	6
BCE3516.4	Analyze flexural and compression members by Limit State Design	4	6
BCE3516.5	Evaluate the design and detailing of RCC structural elements required for buildings and design of one-way and two-way slab.	5	8

BCE3517: Advanced Structural Analysis Lab

	Course Outcomes	CL	Class Sessions
BCE3517.1	Analyze beam curved in plan and elevation.	4	9
BCE3517.2	Analyze two hinged arches for axial thrust, shear and moment	4	9
BCE3517.3	Analyze three hinged arches for axial thrust, shear and moment	4	9
BCE3517.4	Analyze the stresses & tensions in cables	3	9
BCE3517.5	Evaluate prismatic / Non-prismatic displacement based bar element using finite Element method and Rayleigh Ritz method	5	9

BCE3518: Advanced Surveying Lab

	Course Outcomes	CL	Class Sessions
BCE3518.1	Use the techniques of Tacheometric surveying	3	4
BCE3518.2	Classify the concepts of basic surveying techniques	2	4
BCE3518.3	Operate survey instruments effectively with precision	4	6
BCE3518.4	Apply the concepts of modern surveying techniques & instrumentation	3	10
BCE3518.5	Design mini project using the surveying techniques.	6	8

BCEXX07: Introduction to Art and Aesthetics (Open Elective-I)

	Course Outcomes	CL	Class Sessions
BCEXX07.1	Summarize the Art and Architectural concepts	2	9
BCEXX07.2	Use of Building byelaws for building construction.	3	8
BCEXX07.3	Use of Architectural Principles for building construction.	3	9
BCEXX07.4	Interpret Town Planning principles along with Safety and Legal aspects	3	10
BCEXX07.5	Plan concepts of green building considering LEED certification criteria	5	9