

HAS-302	Introduction to Civil Engineering	2L:0T:0P	2 credits
---------	-----------------------------------	----------	-----------

Course Objectives:

CO1	To give overview of the content to be covered in journey of Civil Engineering
CO2	To understand the diverse application and scope of Civil Engineering.
CO3	To encourage the students to pursue a career in one of the domains of Civil Engineering.
CO4	To expose the students to the various avenues available for doing creative and innovative work.

Module 1:

Basic Understanding: What is Civil Engineering/ Infrastructure? Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career.

History of Civil engineering: Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers.

Overview of National Planning for Construction and Infrastructure Development; Position of construction industry vis-à-vis other industries, five year plan outlays for construction; current budgets for infrastructure works.

Fundamentals of Architecture & Town Planning: Aesthetics in Civil Engineering, Examples of great architecture, fundamentals of architectural design & town planning; Building Systems (HVAC, Acoustics, Lighting, etc.); LEED ratings; Development of Smart cities

Module 2:

Fundamentals of Building Materials: Stones, bricks, mortars, Plain, Reinforced & Prestressed Concrete, Construction Chemicals; Structural Steel, High Tensile Steel, Carbon Composites; Plastics in Construction; 3D printing; Recycling of Construction & Demolition wastes

Basics of Construction Management & Contracts Management: Temporary Structures in Construction; Construction Methods for various types of Structures; Major Construction equipment; Automation & Robotics in Construction; Modern Project management Systems, Advent of Lean Construction, Importance of Contracts Management.

Environmental Engineering & Sustainability: Water treatment systems, Effluent treatment systems, Solid waste management, Sustainability in Construction;

Geotechnical Engineering: Basics of soil mechanics, rock mechanics and geology; various types of foundations, basics of rock mechanics & tunneling.

Hydraulics, Hydrology & Water Resources Engineering: Fundamentals of fluid flow, basics of water supply systems; Underground Structures; Underground Structures Multi- purpose reservoir projects.

Ocean Engineering: Basics of Wave and Current Systems, Sediment transport systems; Ports & Harbours and other marine structures.

Power Plant Structures: Chimneys, Natural & Induced Draught Cooling towers, coal handling systems, ash handling systems, nuclear containment structures, hydro power projects.

Module 3:

Structural Engineering: Types of buildings; tall structures, various types of bridges, Water retaining structures; Other structural systems; Experimental Stress Analysis, Wind tunnel studies.

Surveying & Geomatics: Traditional surveying techniques, Total Stations, Development of Digital Terrain Models; GPS, LIDAR.

Traffic & Transportation Engineering: Investments in transport infrastructure development in India for different modes of transport; Developments and challenges in integrated transport development in India: road, rail, port and harbour and airport sector; PPP in transport sector; Intelligent Transport Systems; Urban Public and Freight Transportation; Road Safety under heterogeneous traffic; Sustainable and resilient pavement materials, design, construction and management; Case studies and examples.

Repairs & Rehabilitation of Structures: Basics of corrosion phenomena and other structural distress mechanisms; some simple systems of rehabilitation of structures; Non- Destructive testing systems; Use of carbon fibre wrapping and carbon composites in repairs.

Industrial lectures: Case studies of large civil engineering projects by industry professionals, covering comprehensive planning to commissioning.

Basics of Professionalism: Professional Ethics, Entrepreneurial possibilities in Civil Engineering, Possibilities for creative & innovative working, Technical writing Skills enhancement; Facilities Management; Quality & HSE Systems in Construction.

Course Outcomes: After the completion of this course the students will be able to:


CO1	Understand to what constitutes Civil Engineering.
CO2	Identify the various areas available to pursue and specialize within the overall field of Civil Engineering.
CO3	Think and plan of doing creative and innovative work.
CO4	Highlight the possibilities for taking up entrepreneurial activities in this field.

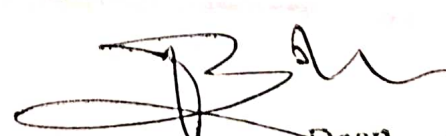
Text Books:

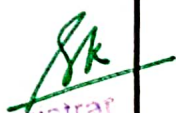
1. S.S. Bhavikatti "Basic Civil Engineering" New Age Publication.
2. Dhale Shrikrishna A. & Tajne Kiran M, "Basic Civil Engineering" S Chand.
3. B.C. Punmia "Basic Civil Engineering" Laxmi publication.

Reference Books:

1. Satheesh Gopi "Basic Civil Engineering" Pearson Education India.
2. S.K Garg "Environmental Engineering Water Supply Engineering" Khanna Publishers.
3. L. R. Kadiyali, "Traffic Engineering and Transport Planning" Khanna Publishers


Head
Department of Civil Engineering
Invertis University
Bareilly-243123, UP


Dean
Faculty of Engineering & Technology
Invertis University
Bareilly-243123, UP


Registrar
Invertis University
Bareilly