Department of Civil Engineering

ADDON Course list for the year 2025-26

Sl. No	Name of the Subject	Semester
01	Global Warming and Climate Change	VII
02	Industry Oriented Construction Practices	IV
03	Advance Surveying	IV
04	Technical Aspects of Perdistrian Facilities as per IRC 103	VI
05	Industrial Waste Water Treatment	VI

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B. E (CIVIL ENGINEERING)
ADD ON COURSE SYLLABUS

ADD ON COURSE			
Course Title	**Industry Oriented Construction Practices**	CIE Marks	05
Teaching Hours/Week (L:T:P: S)	0:2:0:0	SEE Marks	-
Total Hours of Pedagogy	30	Semester	IV
Credits	-	Exam Hours	1 hr

Course objectives:

1. To bridge the gap between academic learning and industry practice
2. To understand modern construction techniques and materials
3. To gain knowledge of site execution methods
4. To learn quality control and safety practices
5. To familiarize students with documentation and project coordination

Module-1	
Interpretation of Good for Construction (GFC) Drawings for Structural Element Identification and Quantity Estimation of Steel and Concrete; Pre-Construction Activities: Site Investigation and Drawing Interpretation; Execution of Building Works: Foundations, RCC, Masonry and Finishing Practices; Modern Construction Materials and Techniques Including Ready Mix Concrete and Prefabrication; Infrastructure Construction Practices for Roads, Bridges and Drainage Systems.	**10 Hours**
Module-2	
Pre-Construction Activities: Site Investigation and Drawing Interpretation; Contemporary Alternative and Sustainable Building Materials; Site Safety Management and Quality Control Practices in Construction; Fundamentals of 3D Building Modeling for Construction Applications; Sustainable Construction Practices and Green Building Concepts; Construction Equipment and Machinery Operation in Project Execution Project Planning, Estimation, Contracts and Billing Procedures.	**10 Hours**
Module-3	
Introduction to BIM Visualization Tools: 3D Max, Enscape, and Lumion; Interior Space Planning and Modern Interior Design Concepts; Reinforcement Detailing and Centering (Formwork) Practices at Construction Sites; Application of Digital Tools in Construction Using AutoCAD, Autodesk Revit, and Project Management Software; Structural Design Using ETABS and STAAD.Pro; Architectural and Structural Modeling with Estimation Using Autodesk Revit; Structural Design Using ETABS and STAAD.Pro	**10 Hours**

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

1. Explain pre-construction activities including site investigation, drawing interpretation, estimation basics, and preparation of construction drawings using relevant digital drafting and modeling tools.

2. Understand modern construction materials and contemporary construction techniques used in industry along with basic application of BIM and visualization software.

3. Describe the execution procedures of building components such as foundations, RCC works, masonry, and finishing works supported by structural analysis and design using industry-standard software tools.

4. Apply quality control measures, safety practices, project documentation, planning, and quantity estimation methods using appropriate construction management and digital project tools.

TEXT BOOKS / REFERENCES:

1. ***K.K. Chitkara***, Construction Project Management: Planning, Scheduling and Controlling, ***McGraw Hill Education (India) Pvt. Ltd.***; *4th Edition (2026).*
2. ***S.K. Duggal***, Building Materials, ***New Age International Publishers***; *Latest Edition (2025).*
3. ***S.C. Rangwala***, Building Construction, ***Charotar Publishing House Pvt. Ltd.***; *34th Edition (2022).*
4. ***S.P. Arora & S.P. Bindra***, Text Book of Building Construction, ***Dhanpat Rai Publications***; *Latest available Edition (~2015)*
5. ***B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain***, Building Construction, ***Laxmi Publications Pvt. Ltd.***; *12th Edition (2018).*

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B. E (CIVIL ENGINEERING)
ADD ON COURSE SYLLABUS

ADD ON COURSE			
Course Title	INDUSTRIAL WASTE WATER TREATMENT	CIE Marks	05
Teaching Hours/Week (L:T:P: S)	0:3:0:0	SEE Marks	-
Total Hours of Pedagogy	30	Semester	VI
Credits	-	Exam Hours	1 hr

Course objectives: This course will enable students to;

1. understand the difference between domestic and industrial waste water
2. learn various methods of treatment of industrial waste water.
3. apply the principles of Industrial effluent treatment process for different industrial wastes.

Module-1	
Difference between domestic and industrial waste water, effect of effluent discharge on streams, methods of industrial waste water treatment; volume reduction, strength reduction, neutralization, equalization and proportioning.	**10 Hours**
Module-2	
Removal of organic, inorganic and colloidal solids, combined treatment methods; merits, demerits and feasibility, principles of discharge of raw, partially treated and completely treated wastes in to streams. Process flow chart, sources and characteristics of industrial waste water, treatment methods, reuse and recovery and disposal; cotton and textile industry, tanning industry.	**10 Hours**
Module-3	
Process flow chart, sources and characteristics of industrial waste water, treatment methods, reuse and recovery and disposal; cane sugar and distilleries, dairy industry, steel and cement industry, paper and pulp industry, pharmaceutical and food processing industry.	**10 Hours**

Course outcomes: After studying this course, students will be able to:

1. Understand the difference between domestic and industrial waste water and acquires knowledge about treatment methods of industrial waste water.
2. Manage sewage and industrial effluent issues.
3. Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.

TEXT BOOKS / REFERENCES:

T1. Metcalf and Eddy, "Wastewater Engineering - Collection, Treatment, Disposal and Reuse", McGraw Hill Pub.Co., 2009.

T2. Nelson Leonard Nemerow, "Industrial Waste Treatment", Butterworth-Heinemann, 2007.

R1. Patwardhan A.D, "Industrial Waste Water Treatment", PHI Learning Private Limited-New Delhi

R2. Hammer, M.J. and Hammer, M.J., "Water and Wastewater Technology", 7th Ed., Prentice Hall of India

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DEPARTMENT OF CIVIL ENGINEERING
ADD ON COURSE SYLLABUS

B. E. CIVIL ENGINEERING
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
SEMESTER – VI
Academic Year: 2025-26

TECHNICAL ASPECTS OF PEDESTRIAN FACILITIES AS PER IRC 103

Teaching Hours/Week (L-T-P-S)	3-0-0-0

Course Learning Objectives: This course will enable students to:

1. Understand the definition of pedestrian facilities
2. Comprehend the importance of Pedestrian facilities.
3. Design the pedestrian facilities as per standards

Module - 1

Definitions of footpath, street crossings, school zone improvement and Pedestrian Level of Service (LOS). Definition of Pedestrian, Importance of Pedestrian facilities, Concept of Pedestrian LOS, Characteristics of Pedestrian facilities (Physical and User Characteristics)

Module - 2

Pedestrian Facilities design standards: Footpath, Kerbs, Continuity and Consistency, Tactile pavers, Level change, Maintenance, Pedestrian Crossings and Ramps and steps.

Module - 3

Pedestrian facilities design standards: Elevator/Lift, Street furniture, Bollards, Lighting, Washrooms and Toilets, school zone improvements, Pedestrian facilities- Parking, Pedestrian facilities at transit areas. Road safety audit and Pedestrian facility audit. Speed-flow, density relationship for pedestrian movements. Simulation of pedestrian movement in software.

Course Outcomes

After the successful completion of the course the student will be able to

CO1: Understand the meaning of pedestrian, importance of pedestrian facilities
CO2: Design the pedestrian facilities as per IRC
CO3: Apply appropriate techniques to solve field problems using advanced software

Text Books

T1: Holt, Daniel J. Pedestrian Safety. No. PT-112. SAE Technical Paper, 2004.
T2: Zegeer, Charles V. Pedestrian facilities users guide: Providing safety and mobility. Diane publishing, 2002.
T3: Noyce, David A., PE Tim J. Gates, and Janet M. Barlow. "Pedestrian and Bicyclist Safety at Intersections." Textbook on Intersection Safety and Design (2004).

Reference Books

R1: Relevant IRC Codes: IRC103 - 2012 "Development of Guidelines for the Selection of Pedestrian Crossing Facilities–A Relook."
R2: Specifications for Roads and Bridges-MoRT&H, IRC, New Delhi.
R3: Access Board (2004), Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines United States Architectural and Transportation Barriers Compliance Board (U. S. Access Board), Washington DC (www.access-board.gov/ada-aba/final.pdf)

GLOBAL WARMING AND CLIMATE CHANGE

Course Code	ADDON	Semester	7
Teaching Hours/ Week (L:T:P:S)	2:0:0:0	CIE Marks	10
Credits	03	SEE Marks	-
Examination Nature	Theory	Total Marks	10

Course objectives: To understand

- The factors responsible for climate change.
- The biological and sociological consequences of changes and
- The possible engineering, economic, and legal solutions to avoid more extreme perturbations.

Modules	Teaching Hours
Module -1 Introduction: Radioactive forcing, Earth Albedo, Irradiance, Energy budget. Scientific principles- warming earth and Principle of thermodynamics. Green-House Effect as a Natural Phenomenon, Green House Gases GHGs) and their Emission Sources and sinks of C02, Methane, Nitrous oxides, carbon cycle disequilibrium, Global Warming Potential (GWP) of GHGs Characterization & Classification of atmospheric pollutants,–description and application of point, line and areal sources.	**10** **(L1,L2)**
Module -2 Climate change- Climate change trends. Components of climate change process, Ozone layer depletion and its control, Impacts of climate change: Global and India, Temperature Rise, Sea Level rise, Coastal Erosion and landslides, Coastal Flooding, Wetlands and Estuaries loss Impact of ocean current on global climate, EL-NINO & LA-NINA effects.	**10** **(L1,L2)**
Module -3 Kyoto Protocol: Importance, Significance and its role in Climate Change Carbon Trading - Mechanisms, Various Models (Indian) Global and Indian Scenario. Cleaner Development Mechanisms: Various Projects related to CO2 Emission Reduction. Alternatives of Carbon Sequestration: Conventional and non-conventional techniques , Role of Countries and Citizens in Containing Global Warming	**10** **(L1,L2)**

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Course outcomes: On completion of this studies students are able to:

- Measure climate factors and how they change.
- Understand connections between global warming and human activities.
- Identify effects of climate change on biodiversity and ecosystems in different biomes and aquatic systems.
- Model possible scenarios for future climate change.
- Achieve possible ways to deal with climate change.

Text / Reference Books:

T1. Barry R.G., and Chorley R.L., "Atmosphere, Weather and Climate", 4th Edition, ELBS Publication.
T2. Bolin B., "Carbon Cycle Modelling", John Wiley and Sons Publications.
T3. Corell R.W., and Anderson P.A., "Global Environmental Change", Springler Verlog Publishers.
T4. Francis D., "Global Warming: The Science and Climate Change", Oxford University Press.
T5. Frame B., Medury Y., and Joshi Y., "Global Climate Change: Science, Impact and Responses".

CO & PSO – PO Mapping Matrix

Mapping of Course Outcomes and Program specific outcomes to program outcomes

Course outcomes	Program outcomes												Program Specific Outcomes	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1		1	1										
CO2	1		1											
CO3			2											

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B. E (CIVIL ENGINEERING)
ADD ON COURSE SYLLABUS

ADD ON COURSE FOR EVEN SEM AY 2025-26

Course Title	**Advanced Surveying**	CIE Marks	10
Teaching Hours/Week (L:T:P: S)	0:3:0:0	SEE Marks	-
Total Hours of Pedagogy	30	Semester	IV
Credits	-	Exam Hours	1 hr

Course objectives:

To impart practical knowledge of advanced surveying techniques and Total Station operation.
To train students in digital data collection, export, and processing using surveying software.
To develop field-to-office integration skills through practical exercises and a mini project.

Module 1	
Contouring, Profile Leveling, Cross-Sectioning, Topographic Survey.	**10 Hours**
Module 2	
Introduction to Total Station. Create new jobs, Station set up, Taking back sight, Determine horizontal distance, Vertical Distance and angles using total station.	**10 Hours**
Module 3	
Saving the job in total station, Exporting the job from Total Station to USB in different formats like DXF, CSV, etc Opening the exported file in the computer and exporting it in the required software's like AUTOCAD, SURFER, MATLAB, etc	**10 Hours**
Mini-Project	
Mini Project on Total Station using Excel, Surfer, AutoCAD Software's	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

1. Conduct advanced field surveys using Total Station and conventional methods.(PO1-H, PO5- H)
2. Export and process survey data using software such as Excel, AutoCAD, and SURFER. (PO4-M, PO5- H)
3. Apply surveying techniques to solve practical problems through a mini project. (PO2-H, PO9- M)

TEXT BOOKS / REFERENCES:

T1: Punmia B C, Higher Surveying, 16thEdition, Laxmi Publications co., New Delhi.
T2: Satheesh Gopi, Advanced surveying | total station, GPS, GIS, remote sensing, drone, and hydrographic surveying | 3rd edition | Pearson.