B.Tech (Civil Engineering- IV Year)

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DR.R.M.L AVADH UNIVERSITY

AYODHYA

EVALUATION SCHEME & SYLLABUS

FOR

B.TECH (CIVILENGINEERING)

FOURTH YEAR

ON

CHOICE BASED CREDIT SYSTEM

(CBCS)

[Effective from the Session: 2025-2026]

B.Tech (Civil Engineering-IVYear)

Semester-VII

S No	Course Code	CourseTitle	PERIODS			EvaluationScheme				Total	Credit
			L	T	P	Sessional Exam			ESE		
						CT	TA	Total			
1	CEC-701	Bridge Engineering	3	1	0	30	20	50	100	**150**	4
2	CEC-702	Water Resource Engineering	3	1	0	30	20	50	100	**150**	4
3		Departmental Elective-IV	3	1	0	30	20	50	100	**150**	4
4		Open Elective-I	3	1	0	30	20	50	100	**150**	4
PRACTICAL/DESIGN/DRAWING											
5	CLC-751	Non destructive Testing Lab	0	0	2		-	25	25	**50**	1
6	CLC-752	Industrial Training**					-	50	-	**50**	1
7	PR-01	Mini Project#	0	0	6		-	200	-	**200**	4
		Total								**900**	**22**

**4 weeks Industrial Training to be done during the summer break of third year and report to be submitted in VII semester.

#Project should be initiated in VII semester beginning and should be completed by the end of VIII semester.

B.Tech (Civil Engineering- IV Year)

Semester-VIII

S No	Course Code	Course Title	PERIODS			Evaluation Scheme				Subject Total	Credit
			L	T	P	Sessional Exam			ESE		
						CT	TA	Total			
1	CEC-801	Construction Technology and Management	3	1	0	30	20	50	100	150	4
2	CEC-802	Departmental Elective-V	3	1	0	30	20	50	100	150	4
3		Department Elective-VI	3	1	0	30	20	50	100	150	4
PRACTICAL/DESIGN/DRAWING											
4	CLC-854	Project	0	0	12			100	300	400	12
		Total								**950**	**24**

	losses, alignment of main and distributary canals, Design of canal by Kennedy's and Lacey's theory, Waterlogging and its prevention. Lining of Irrigation Canals: Advantages and types; factors for selection of a particular type, design of lined channels, cross-section of lined channels, Economics of canal lining.	
IV	Regulation Works: Falls, Classification; Introduction to design principle of falls, Design of Sarda type and straight glacis tall. Cross drainage works: Necessity and types; Aqueduct, Siphon Aqueduct, super passage, canal siphon, level crossing.	8
V	Types of dams, design principles of gravity and earth dams, stability analysis. Spillways: Spillway types energy dissipation. Principle and design of distributary head regulator and cross regulator, canal escape, Bed bars plants, important terms, types of turbines and their suitability; Power House layout and important structures of a powerhouse.	8

Suggested Readings:

Text Books:

1. Water Resources Engg. By Larry W Mays, John Wiley India
2. Water resources Engg. By Wurbs and James, John Wiley India
3. Water Resources Engg. By R. K. Linsley, Mc Graw Hill
4. Irrigation and Water Resources Engg. By G. L Asawa, New age International Publishers
5. Irrigation Engg. And Hydraulic Structures by S. K. Garg, Khanna Publishers.

References Books:

1. Fundamental of Hydraulic Engineering System by Houghalen, Pearson Publication.
2. Irrigation and water Power engineering by B. C. Punmia, Laxmi Publications.
3. Engineering Hydrology by K. Subramanya, TMH.
4. Irrigation Water Power and Water Resource Engg. By K. R. Arora.
5. Water resource engineering by Ralph A. Wurbs & Wesley P. James, Pearson Publication

E-Learning Link:

1. https://nptel.ac.in/courses/105105110/

BRIDGE ENGINEERING

Course Outcomes (COs)	At the end of the course, students will be able to:
CO1	Discuss the IRC standard live loads and design the deck slab bridge.
CO2	Analyse and design box and pipe culverts for given loading and prepare detailing.
CO3	Design and detail reinforced concrete T-Beam bridges.
CO4	Design and check the stability of piers and abutments.
CO5	Discuss construction techniques for precast bridge members.

Course Details

Unit	Topics / Subtopics	No. of Lectures
I	**General Considerations for Road Bridges** Introduction – Site selection – Soil exploration – Bridge type selection – Economical span – Number of spans – Determination of HFL – General arrangement drawing	8
II	**Standard Specifications:** Width of carriageway, Clearances, Loads (Dead, IRC Live, Impact), Wind load, Longitudinal/Centrifugal/Horizontal forces	8
II	**Culverts** Introduction, Analysis and Design of Box Culverts, Slab Culverts, Pipe Culverts	8
IV	**General Provision for Design of Reinforced Concrete T-Beam Bridges** Introduction , design provision as per IRC	8
V	**General Provision for Design of Substructure and Bearings** Introduction to substructures, design provision for substructures as per IRC. Bearings: Forces, Types, Applications and design provision as per IRC	8

Text &Reference Books

1. Johnson Victor D., *Essentials of Bridge Engineering*, 7th Edition, Oxford, IBH Publishing Co., Ltd., 2006.
2. Ponnuswamy, *Bridge Engineering*, 4th Edition, McGraw-Hill, 2008.
3. Krishnam Raju N., *Design of Bridges*, 4th Edition, Oxford and IBH Publishing Co., Ltd., 2008.
4. Vazirani, Ratvani & Aswani, *Design of Concrete Bridges*, 5th Edition, Khanna Publishers, 2006.
5. Jagadish T.R. & M.A. Jayaram, *Design of Bridge Structures*, 2nd Edition, 2009.
6. Swami Saran, *Analysis and Design of Sub-Structures*, 2nd Edition, Oxford IBH Publishing Co. Ltd., 2006.

	Angles, Splices, Gusset Plate, Working Load Design.	
IV	Compression Members Introduction, Effective Length, Slenderness Ratio (λ), Types of Sections, Types of Buckling, Classification of Cross Sections, Column Formula, Design Strength, Design of Axially Loaded Compression Members, Built-Up Columns (Latticed Columns), Lacing, Batten, Compression Member Composed of Two Components Back-to-Back, Splices, Design of Column Bases.	8
V	Beams Introduction, Types of Sections, Behaviour of Beam in Flexure, Section Classification, Lateral Stability of Beams, Lateral-Torsional Buckling, Bending Strength of Beams, Laterally Supported Beams, Laterally Unsupported Beams, Shear Strength of Beams, Web Buckling, Bearing Strength, Web Crippling, Deflection, Design Procedure of Rolled Beams, Built-Up Beams (Plated Beams), Purlins, Beam Bearing Plates, Effect of Holes in Beam, Introduction to Plate Girder, Introduction to Gantry Girder.	8

Suggested Readings:

Text Books:

1. Design of Steel Structures by N.Subramanian, Oxford University Press
2. Limit State Design Design of Steel Structures by KS Sairam, Pearson Education
3. Design of Steel Structures by S Ramamurtham, Dhanpat Rai Publishing Company
4. Design of Steel Structures by S. K. Duggal, Tata Mcgraw Hill.

Reference Books

1. Steel Structures by Robert Englekirk. Hohn Wiley & sonsinc.
2. Structural Steel Design by Lambert tall (Ronald Press Comp. New york.
3. Design of steel structures by Willam T Segui, CENGAGE Learning
4. Structural Steel Design by D Mac Laughlin, CENGAGE Learning

E-Learning Link

1. https://nptel.ac.in/courses/105105162/

B.Tech (Civil Engineering- IV Year)

CONSTRUCTION TECHNOLOGY & MANAGEMENT		
Course Objectives: This course aims at the following educational objectives: To plan Bar Chart, CPM chart, PERT chart material requirement schedule, Manpower schedule, Machinery Schedule, Construction Management, to analyze, evaluate and design construction contract documents.		
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course 1. Understand the use of advanced materials in construction projects 2. Plan and develop management solutions to construction projects. 3. Evaluate construction project economics, cost-benefit analysis and breakeven analysis. 4. Understand the principles of project management, resource management and inventory		
Unit	**Topics**	**No. of Lectures**
I	Elements of Management: Project cycle, Organisation, planning, scheduling monitoring updating and management system in construction.	8
II	Network Techniques: Bar charts, milestone charts, work break down structure and preparation of networks. Application of network techniques like PERT, GERT, CPM AON and AOA in construction management. Project monitoring, cost planning, resource allocation through network techniques. Line of balance technique.	8
III	Engineering Economics: Time value of money, Present economy studies, Equivalence concept, financing of projects, economic comparison present worth method Equivalent annual cost method, discounted cash flow method, analytical criteria for postponing of investment retirement and replacement of asset. Depreciation and breakeven cost analysis.	8
IV	Contract Management: Legal aspects of contraction, laws related to contracts, land acquisition, labour safety and welfare. Different types of contracts, their relative advantages and disadvantages. Elements of tender preparation, process of tendering pre-qualification of contracts, Evaluation of tenders, contract negotiation and award of work, monitoring of contract extra items, settlements of disputes, arbitration and commissioning of project.	8
V	Equipment Management: Productivity, operational cost, owning and hiring cost and the work motion study. Simulation techniques for resource scheduling. Construction equipment for earth moving Hauling equipment, Hoisting equipment, Conveying equipment, Concrete Production equipment	8
Suggested Readings:		

DEPARTMENTAL ELECTIVES

S.NO	SUBJECT	SUBJECTCODE
1.	Ground Improvement Techniques	DCE 001
2.	Environmental Geotechnology	DCE 002
3.	Advanced Foundation Engineering	DCE 003
4.	Prestressed Concrete	DCE 004
5.	Bridge Engineering	DCE 005
6.	Groundwater Hydrology	DCE 006
7.	Water Resources systems, Analysis, Planning & Management	DCE 007
8.	Remote Sensing and GIS	DCE 008
9.	Ecology & Environmental Impact Assessment	DCE 009
10.	Water Distribution and Wastewater Collection System Design	DCE 010
11.	Air and Water Quality Modelling	DCE 011
12.	Environmental Planning and Management	DCE 012
13.	Industrial Pollution Control	DCE 013
14.	Advanced Environmental Biotechnology	DCE 014
15.	Management of Water Resources	DCE 015
16.	Geo-environmental Engineering	DCE 016
17.	Engineering Behavior of Soil	DCE 017
18.	Analysis of Transportation System	DCE 018
19.	Transportation Environment Interaction	DCE 019
20.	Rehabilitation, Reconstruction and Recovery	DCE 020
21.	Disaster Resilient Structures and Retrofitting	DCE 021
22.	Disaster Response and Preparedness	DCE 022
23.	Disasters and Special Structure	DCE 023
24.	Man-made and Biological Disasters-Detection and Mitigation	DCE 024
25.	Hydroinformatics	DCE 025
26.	Zero Energy Buildings	DCE 026
27.	Carbon Audit and Management	DCE 027
28.	Energy Generation from Waste	DCE 028
29.	Ocean Renewable Energy	DCE 029
30.	Zero Emission Vehicles	DCE 030
31.	Safety in Engineering Industry	DCE 031
32.	TQM & TPM	DCE 032
33.	Global Disaster Scenario and Type of Natural Disaster	DCE 033
34.	Green Building & Energy Management	DCE 034
35.	Automation in Construction Industry	DCE 035
36.	Construction Techniques of Deep Foundations	DCE 036
37.	Construction Techniques of Steel and Concrete Composite Structures	DCE 037
38.	Estimating Tendering & Bidding	DCE 038
39.	Formwork for Concrete Structure	DCE 039
40.	Construction Economics	DCE 040
41.	Infrastructure Valuation	DCE 041
42.	Structural Masonary	DCE 042
43.	Engineering Geology	DCE 043
44.	Environmental Sciences	DCE 044
45.	Cyber Security	DCE 045