COURSE MODULES OF THE SUBJECT TAUGHT FOR THE SESSION AUG - DEC 2025-26 (ODD SEM)

Course Syllabi with CO's

Faculty Name: **PUNEETH K**				Academic Year: 2025-2026			
Department: CIVIL ENGINEERING							
Course Code	**Course Title**	**Core/Elective**	**Prerequisite**	**Contact Hours**			**Total Hrs./ Sessions**
				L	**T**	**P**	
BCV703	Prestressed Concrete	Core	RCC	5	-	-	50
Objectives	1. To explain the necessity of prestressed concrete 2. To understand the principles and methods of design according to IS 1343 and IRC 112 3. To estimate losses due to prestressing 4. To design pre-stressed concrete pipes, tanks, beams or I-girder for bridge, one-way and two-way slabs 5. To illustrate the concept of special bridge like cable stayed bridges and balanced cantilever bridges						

Topics Covered as per Syllabus

Module-1

Introduction to pre-stressed concrete structures: Concepts of Prestressing- Historical development of prestressing-Design Codes for Pre-Stressed Structures- Advantages & Limitations of Pre-stressed Concrete Material - Need for High Strength Concrete- High Tension Steel- Types of Prestressing Steel

Module-2

Losses of Prestressing and Prestressing Systems: Losses– Immediate losses due to Friction and wobble, Elastic shortening Anchorage Slip - Time dependent losses due to Creep, Shrinkage and Relaxation losses - Introduction to Pre-stressing systems – Pre -Tensioning Devices – Post -Tensioning Devices - Anchorage Devices - Mechanical pre-stressing - Chemical Pre-stressing - Electrical Pre-stressing

Module-3

Principle and Methods of design: Combined Load Approach - Internal Couple Approach - Load Balancing Approach - Steel Stress in Bonded and Un-bonded tendons – Flexure and Shear – Crack and Deflection - Design as per IS 1343 - Design of Anchorage zone – End block- Cable Profiling for different beams - Mechanism of Transfer of Prestress in Pre-Tensioning System and Post Tensioned system

Module-4

Applications of Pre-stressing: Circular Prestressing – Introduction - Types and Design of Prestressed Concrete Pipes Pre-stressing in Buildings – Beams – One-way Slabs – Two-way Slabs – Flat slabs Structures – Tanks, Poles & Piles - Partial Prestress - behavior, advantages and disadvantages Remember the concepts of Prestressing

Module-5

Pre-stressing in Bridges: Composite Construction – Introduction - Analysis-IRC 112 Codal provisions for ULS and SLS – Design of a I-girder with cast in situ slab -Viaducts – Balanced cantilever bridges – Railway sleepers

List of Text Books & Reference

1. Prestressed Concrete Structure by T.Y. Lin, Ned H. Burns
2. Prestressed Concrete by N. Krishna Raju
3. Prestressed Concrete by G.S.Pandit and S.P.Gupta
4. IRC 112 and IS 1343 codes

Course Outcomes	At the end of the course the student will be able to: 1. Remember the concepts of Prestressing 2. Understand the concept of pre-tensioning and posttensioning 3. Carry out the Analysis and Design of composite I girder 4. Perform the design of anchorage zones, composite pipes, sleepers and tanks

Internal Assessment Marks: 25 + 25 (3 Session Tests are conducted during the semester and marks allotted based on average of 2 test and assignment performances).

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BCV703	TITLE: Prestressed Concrete							Faculty Name: Puneeth K				
List of Course Outcomes	Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	1	-	-	-	-	3	1	1	-	-	-	1	1	-
CO-2	1	-	-	-	-	3	1	1	-	-	-	1	1	-
CO-3	3	1	-	-	-	3	1	1	-	-	-	1	1	-
CO-4	3	1	-	-	-	3	1	1	-	-	-	1	1	-

Note: 3 = Strong Contribution 2= Average Contribution 1 = Weak Contribution -= No Contribution