
	SRI VIDYA COLLEGE OF ENGINEERING & TECHNOLOGY COURSE PLAN (THEORY)	
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ACADEMIC YEAR: 2018-2019

Subject Code	CE6702		L	P	T	C
Subject Title	PRESTRESSED CONCRETE STRUCTURES		3	0	0	3
Year / Dept / Sem	IV / CIVIL / VII	Regulation Year	2013			
Faculty Name / Desg / Dept	M _S .R.SWATHIKA.M.E.,/ Assistant Professor / CIVIL					
Course Prerequisite	1. The students must have more knowledge about basic fundamentals of mathematics. 2. They have more details about types of concrete structures and basic concepts about prestress.					

SYLLABUS**CE6702****PRESTRESSED CONCRETE STRUCTURES****L T P C****3 0 0 3****UNIT I INTRODUCTION – THEORY AND BEHAVIOUR****9**

Basic concepts – Advantages – Materials required – Systems and methods of prestressing – Analysis of sections – Stress concept – Strength concept – Load balancing concept – Effect of loading on the tensile stresses in tendons – Effect of tendon profile on deflections – Factors influencing deflections – Calculation of deflections – Short term and long term deflections – Losses of prestress – Estimation of crack width.

UNIT II DESIGN FOR FLEXURE AND SHEAR**9**

Basic assumptions for calculating flexural stresses – Permissible stresses in steel and concrete as per I.S.1343 Code – Design of sections of Type I and Type II post-tensioned and pre-tensioned beams – Check for strength limit based on I.S. 1343 Code – Layout of cables in post-tensioned beams – Location of wires in pre-tensioned beams – Design for shear based on I.S. 1343 Code.

UNIT III DEFLECTION AND DESIGN OF ANCHORAGE ZONE**9**

Factors influencing deflections – Short term deflections of uncracked members – Prediction of long term deflections due to creep and shrinkage – Check for serviceability limit state of deflection. Determination of anchorage zone stresses in post-tensioned beams by Magnel's method, Guyon's method and IS1343 code – design of anchorage zone reinforcement – Check for transfer bond length in pre-tensioned beams.

UNIT IV COMPOSITE BEAMS AND CONTINUOUS BEAMS**9**

Analysis and design of composite beams – Methods of achieving continuity in continuous beams – Analysis for secondary moments – Concordant cable and linear transformation – Calculation of stresses – Principles of design.

UNIT V MISCELLANEOUS STRUCTURES**9**

Design of tension and compression members – Tanks, pipes and poles – Partial prestressing – Definition, methods of achieving partial prestressing, merits and demerits of partial prestressing.

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Krishna Raju N., "Prestressed concrete", 5th Edition, Tata McGraw Hill Company, New Delhi, 2012
2. Pandit.G.S. and Gupta.S.P. "Prestressed Concrete", CBS Publishers and Distributors Pvt. Ltd, 2012.

REFERENCES:

1. Rajagopalan.N, "Prestressed Concrete", Narosa Publishing House, 2002.
2. Dayaratnam.P., "Prestressed Concrete Structures", Oxford and IBH, 2013
3. Lin T.Y. and Ned.H.Burns, "Design of prestressed Concrete Structures", Third Edition, Wiley India Pvt. Ltd., New Delhi, 2013.
4. IS1343:1980, Code of Practice for Prestressed Concrete, Bureau of Indian Standards, New Delhi, 2012

Course Objectives (CO)

CO1: To introduce the need for prestressing as well as the methods, types and advantages of prestressing to the students.

CO2: Students will be introduced to the design of prestressed concrete structures subjected to flexure.

CO3: Students will be introduced to the design of prestressed concrete structures subjected to shear.

CO4: Calculate prestress losses for simple prestressed concrete girders.

CO5: Design prestressed concrete girders for flexure using current design procedures

CO6 : Construct moment-curvature and load-deflection curves for a prestressed concrete beam

Expected Course Outcomes (ECO)				At the end of the course, the students should be able to: ECO1: Student shall have knowledge on methods of prestressing ECO2: Able to design various prestressed concrete structural elements.								
Mapping of CO & PO(Specify the PO's) - (Fill the col.s with the legend given below)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	-	-	2	-	-	-	-	-	-	-	3	-
C02	-	-	-	-	-	2	-	-	-	-	3	-
C03	2	3	3	-	-	-	3	-	-	-	-	-
C04	-	-	-	-	-	-	3	3	-	-	2	-
C05	3	3	2	-	3	-	2	3	-	3	-	3
C06	3	3	3	-	3	-	-	-	-	-	-	-
Bridging the Curriculum Gap (Additional Topics beyond syllabus/Seminars/Assignments)				BCG1: Friction and Anchorage Slip								
				BCG2: Pre tensioned Box Beams								
				BCG3: The practical application of partial prestressing								
Related Website URLs				W1: http://nptel.ac.in/courses/105106118/9								
				W2: www.library.ctr.utexas.edu/ctr-publications/0-5831-3.pdf.pdf								
				W3: www.e-periodica.ch/cntmng?pid=bse-cr-001:1968:8::203								
Related Video Course Materials (min. 3 no.s)				V1: https://youtu.be/UzuVARqd5DI								
				V2: https://www.youtube.com/watch?v=pjwrXLWhISE								
				V3: https://www.youtube.com/watch?v=HLnV-fdf9k								

S.No	Topic Name	Book – P. No	Teaching Aids	No of hrs	Cumulative hrs
UNIT I INTRODUCTION – THEORY AND BEHAVIOUR					
1.	Basic concepts – Advantages – Materials required-	T1 1-19	Class room teaching	1	1
2.	Systems and methods of prestressing	T1 73-87	Assignments	1	2
3.	Analysis of sections – Stress concept –	T1	Class room	1	3

		90-97	teaching		
4.	Strength concept - Load balancing concept	T1 97-110	Class room teaching	1	4
5.	Effect of loading on the tensile stresses in tendons -	T1 112-114	Class room teaching	1	5
6.	Effect of tendon profile on deflections	T1 114-117	Class room teaching	1	6
7.	Factors influencing deflections - Calculation of deflections	T1 151-152	Class room teaching	2	8
8.	Short term and long term deflections	T1 152-160	Class room teaching	2	10
9.	Losses of prestress - Estimation of crack width.	T1 124-141	Class room teaching	2	12
UNIT II DESIGN FOR FLEXURE AND SHEAR					
1.	Basic assumptions for calculating flexural stresses	T1 192-193	Class room teaching	1	13
2.	Permissible stresses in steel and concrete as per I.S.1343 Code	T1 192-204	Class room teaching	2	15
3.	Design of sections of Type I and Type II post-tensioned beams	T1 337-342	Class room teaching	2	17
4.	Design of sections of Type I and Type II pre-tensioned beams	T1 342-354	Class room teaching	2	19
5.	Check for strength limit based on I.S. 1343 Code	T1 323-325	Class room teaching	2	21
6.	Layout of cables in post-tensioned beams - Location of wires in pre-tensioned beams	T1 332-334	Assignments	1	22
7.	Design for shear based on I.S. 1343 Code.	T1 244-248	Class room teaching	2	24
UNIT III DEFLECTION AND DESIGN OF ANCHORAGE ZONE					
1.	Factors influencing deflections - Short term deflections of uncracked members	T1 151-152	Assignments	1	25
2.	Prediction of long term deflections due to creep and shrinkage	T1 160-163	Class room teaching	2	27
3.	Check for serviceability limit state of deflection.	T1 163	Class room teaching	1	28
4.	Determination of anchorage zone stresses in post-tensioned beams by Magnel's method	T1 288-294	Class room teaching	2	30
5.	Determination of anchorage zone stresses in post-tensioned beams by Guyon's method	T1 295-300	Class room teaching	2	32
6.	Determination of anchorage zone stresses in post-tensioned beams by IS1343 code	T1 304	Class room teaching	1	33
7.	Design of anchorage zone reinforcement	T1 305-311	Class room teaching	2	35
8.	Check for transfer bond length in pre-tensioned beams.	T1 312	Class room teaching	1	36

UNIT IV COMPOSITE BEAMS AND CONTINUOUS BEAMS					
1.	Analysis and design of composite beams	T1 472-476	Class room teaching	2	38
2.	Methods of achieving continuity in continuous beams	T1 440	Class room teaching	2	40
3.	Analysis for secondary moments	T1 442	Class room teaching	2	42
4.	Concordant cable and linear transformation	T1 456-458	Class room teaching	2	44
5.	Calculation of stresses	T1 468-471	Class room teaching	2	46
6.	Principles of design	T1 472	Class room teaching	2	48
UNIT V MISCELLANEOUS STRUCTURES					
1.	Design of tension and compression members	T1 73-87	Class room teaching	1	49
2.	Tanks	T1 511-517	Class room teaching	2	51
3.	Pipes	T1 491-499	Class room teaching	2	53
4.	Pole	T1 574-581	Class room teaching	2	55
5.	Partial prestressing	T1 395	Class room teaching	2	57
6.	Definition, methods of achieving partial prestressing	T1 397-398	Seminars	2	59
7.	Merits and demerits of partial prestressing.	T1 396	Seminars	1	60

	<i>Prepared by</i>	<i>Approved by</i>
Signature		
Name	Ms.R.SWATHIKA	Mr.P.SURESHKUMAR
Designation	Assistant Professor / CIVIL	Assistant Professor & HOD (CIVIL)
Signed date		

LEGEND:**METHODOLOGY TO MAP OBJECTIVE WITH OUTCOME**

Course outcomes are achieved through

- a.** Suitable Analogies.
- b.** Class room teaching.
- c.** Assignments.
- d.** Tutorials
- e.** Weekly, monthly and model exams.
- f.** Brain storming.
- g.** Group discussion and role play.
- h.** Seminars