



# SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation AICTE, New Delhi, Accredited by NAAC with 'A' Grade – 3.32 CGPA Recognized under 2(f) & 12(B) of UGC Act 1956 Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada Seetharampuram, W G DT, Narsapur-534280, (Andhra Pradesh)

## DEPARTMENT OF CIVIL ENGINEERING

### TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
20CE7E11	PRESTRESSED CONCRETE	VII	CIVIL	6	2023-24	03 -07-2023

#### COURSE OUTCOMES

Students are able to

1	Know different systems and devices used in prestressing. [K2]
2	Estimate the effective pre stress including the short and long term losses. [K3]
3	Analyze and design of pre stressed concrete beams under flexure. [K3]
4	Familiarize analysis and design of prestressed concrete members under shear and torsion. [K3]
5	Understand the transfer of prestress in pretensioned members. [K2]

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method	
1	Know different systems and devices used in prestressing. [K2]	<b>1. Introduction &amp; Prestressing Systems</b>					Chalk & Board, PPT
		1.1	Introduction	T1	01		
		1.2	Historic development -Basic concepts of Prestressing	T1	01		
		1.3	Advantages –limitations and Applications of Prestressed Concretes	T1	01		
		1.4	High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics	T1	01		
		1.5	High strength Steel- Types, Strength- Permissible Stresses- Relaxation of Stress, Stress Corrosion	T1	01		
		1.6	Durability, Fire Resistance, Cover Requirements	T1	01		
		1.7	<b>Prestressing Systems- Introduction</b>	T1	01		
		1.8	Tensioning devices, Pre-tensioning Systems	T1,R1	01		
		1.9	Post tensioning Systems, Basic Assumptions in Analysis of prestress and design	T1	01		
		1.10	Analysis of prestress, Resultant Stresses at a section	T1	01		
		1.11	pressure line	T1, R2	01		
		1.12	Concepts of load balancing	T1, R1	01		
		1.13	Stresses in Tendons	T1	01		
		1.14	Cracking moment.	T1, R1	01		
<b>Total</b>					<b>14</b>		



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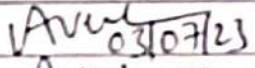
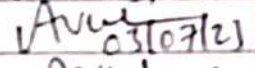
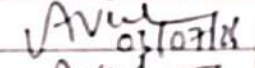
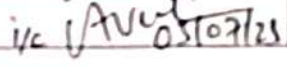
		<b>II. Losses of Pre-stressing</b>				
2	Estimate the effective pre stress including the short and long term losses. [K3]	2.1	Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes	T1	01	Chalk & Board, PPT, video
		2.2	Elastic shortening of concrete	T1	01	
		2.3	Shrinkage of concrete	T1	01	
		2.4	creep of concrete	T1	01	
		2.5	Relaxation of steel, slip in anchorage	T2	01	
		2.6	differential shrinkage	T2	01	
		2.7	bending of members and frictional losses	T2,R1	01	
		2.8	Total losses allowed for design.	T1	01	
<b>Total</b>					<b>08</b>	
		<b>III. Design for Flexural resistance</b>				
3	Analyze and design of pre stressed concrete beams under flexure. [K3]	3.1	Types of flexural failure	T2,R1	01	Chalk & Board, PPT, video
		3.2	Code procedures	T2	01	
		3.3	Design of sections for flexure	T2	02	
		3.4	Control of deflections	T2	01	
		3.5	Factors influencing deflections	T2, R2	01	
		3.6	Prediction of short term deflections.	T2	01	
		3.7	Prediction of long term deflections.	T2	02	
<b>Total</b>					<b>09</b>	
		<b>IV. Design for Shear and Torsion</b>				
4	Familiarize analysis and design of prestressed concrete members under shear and torsion.[K3]	4.1	<b>Introduction</b>	T2	01	Chalk & Board, PPT, video
		4.2	Shear and Principal Stresses	T2	01	
		4.3	Design of Shear reinforcements	T2	02	
		4.4	Codal Provisions	T3	01	
		4.5	Design for Torsion	T3	02	
		4.6	Design for Combined bending, shear and torsion.	T2	02	
<b>Total</b>					<b>09</b>	
		<b>V. Transfer of Prestress in pre tensioned members</b>				
5	Understand the transfer of prestress in pretensioned members. [K2]	5.1	<b>Introduction</b>	T1,R2	01	Chalk & Board, PPT, video
		5.2	Transmission length- Bond stresses	T1, R1	01	
		5.3	end zone reinforcement	T1,R1	01	
		5.4	Codal provisions	T1	01	
		5.5	Anchorage zone Stresses in Post tensioned members	T1, R1	02	
		5.6	Stress distribution in end block	T1, R2	02	
		5.7	Anchorage Zone reinforcement.	T1	02	
<b>Total</b>					<b>10</b>	
<b>CUMULATIVE PROPOSED PERIODS</b>					<b>50</b>	
<b>Text Books:</b>						
<b>S.No.</b>	<b>AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION</b>					
1	N. Krishna Raju, 'Prestressed Concrete', 6 <sup>th</sup> Edition, Tata McGraw hill, 2018.					
2	S. Ramamrutham 'Prestressed Concrete' 5 <sup>th</sup> Edition, Dhanpat Rai Publishing Company, 2013.					



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Reference Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	P. Dayaratnam 'Prestressed Concrete', 5 <sup>th</sup> Edition, Medtech Publishers, 2017.
2	T. Y. Lin & Burns 'Prestressed Concrete' 3 <sup>rd</sup> , Wiley India Private Limited, 2010.
Web Details	
1	<a href="https://nptel.ac.in/courses/105106118">https://nptel.ac.in/courses/105106118</a>

	Name	Signature with Date
i. Faculty	A. Venkata Krishna	 03/07/23
ii. Course Coordinator	A. Venkata Krishna	 03/07/23
iii. Module Coordinator	A. Venkata Krishna	 03/07/23
iv. Programme Coordinator	A. Venkata Krishna	 03/07/23

  
Principal