



**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

GRIET/CE/SE/BOS/1E/G/18-19

30 June 2018

Minutes of Meeting

For

I, II M.Tech Structural Engineering

(For students admitted from 2018-19 as per GR18 Regulations)

Board of Studies

Held on 30 June, 2018



**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND
TECHNOLOGY (AUTONOMOUS)**

DEPARTMENT OF CIVIL ENGINEERING

BOS COMMITTEE MEMBERS for the GR-18 Regulations (as per AICTE Model Curriculum 2018)

The following BOS committee members were present for P.G.(M.Tech Structural Engineering)
on 30th June 2018.

S.No	Name of the Expert	Designation	Organization	Signature with Date
1	Dr. G.V.V. Satyanarayana	Chairman, BOS, Civil Engineering, GRIET	Professor of CE, GRIET	
2	Dr. G.K. Viswanath	JNTU Nominee	Professor of Civil Engineering & Director UGC-Human Resource Development Center, JNTUH Hyderabad.	
3	Prof. P. Srinivasa Sharma	Member, BOS, Course Expert, CE, GRIET	Professor of Civil Engineering, CBIT Hyderabad.	
4	Mr. V.V. Krishna Reddy	Industry Expert, CE, GRIET	Chief Consultant & Proprietor, Continental Designers Project Consultant, Hyderabad.	
5	Mr. S.P. Anchuri	Industry Expert, CE, GRIET	Chief consultant of Anchuri & Anchuri , A consultancy firm in Hyderabad.	
6	Dr. M.V. Seshagiri Rao	Member, BOS, Course Expert, CE, GRIET	Professor of Civil Engineering, CVR Engineering College, Hyderabad.	
7	Dr. K. Satyanarayana	Member, BOS, CE, GRIET	Associate Professor, ME, GRIET	
8	Dr. V. Mallikarjuna Reddy	Member, BOS, Dept., CE, GRIET	Professor & HOD, CE, GRIET	 30/6/18
9	Dr. N. Sanjeev	Member, BOS, Dept., CE, GRIET	Professor, CE, GRIET	
10	Dr. V. Srinivasa Reddy	Member, BOS, Dept., CE, GRIET	Professor, CE, GRIET	 30/6/18
11	Dr. Mohammed Hussain	Member, BOS, Dept., CE, GRIET	Professor, CE, GRIET	 30/6/18
12	Dr. C. Lavanya	Member, BOS, Dept., CE, GRIET	Associate Professor, CE, GRIET	 30/6/18
13	Mr. T. Srinivas	Member, BOS, Dept., CE, GRIET	Associate Professor, CE, GRIET	
14	Mr. Y. Kamala Raju	Member, BOS, Dept., CE, GRIET	Assistant Professor, CE, GRIET	

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DESIGN OF PRE-STRESSED CONCRETE STRUCTURES

Course Code: GR18D5186

L/T/P/C: 3/0/0/3

Course Objectives

- To develop an advanced understanding regarding behaviour of pre stressing members.
- To be able to perform in analysis and design statically determinate PSC members.
- To demonstrate the stresses with anchorage system in pre stressed concrete members.
- To be able to perform in analysis and design statically indeterminate PSC members.
- To be able to perform in analysis and design of precast and pre stress composite constructions.

Course Outcomes: At the end of the course, the student will be able to

- Find out losses in the pre-stressed concrete. Understand the basic aspects of pre stressed concrete fundamentals, including pre and post-tensioning processes.
- Analysis and Design for ultimate strength of statically determinate pre stressed concrete structures.
- Design of end blocks for pre stressed members.
- Analysis and Design for ultimate strength of statically indeterminate pre-stressed concrete structures.
- Design composite structures using pre-stressed concrete

Unit I

Introduction to pre-stressed concrete: types of pre-stressing, systems and devices, materials,

Losses in prestress, Analysis of PSC flexural members, basic concepts, stresses at transfer and service loads, ultimate strength in flexure, code provisions.

Unit II

Statically determinate PSC beams: Design for ultimate and serviceability limit states for Flexure, analysis and design for shear and torsion, code provisions.

Unit III

Transmission of pre-stress in pre-tensioned members; Anchorage zone stresses for posttensioned members.

Unit IV

Statically indeterminate structures: Analysis and design - continuous beams and frames, choice of cable profile, linear transformation and concordancy. Analysis and design of pre-stressed concrete pipes, columns with moments

Unit V

Composite construction with precast PSC beams and cast in-situ RC slab - Analysis and design, creep and shrinkage effects. Partial prestressing - principles, analysis and design concepts, crack width calculations.

Text Books

1. Prestressd Concrete by N.KrishnaRaju, Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan, Narosa Publications.

Reference Books

1. Design of Prestressed Concrete Structures, Lin T.Y., Asia Publishing House, 1955.
2. Prestressed Concrete, Krishnaraju N., Tata McGraw Hill, New Delhi, 1981.
3. Limited State Design of Prestressed Concrete, Guyan Y., Applied Science Publishers, 1972.
4. IS: 1343- Code of Practice for Prestressed Concrete. 5. IRC: 112.



GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED PRESTRESSED CONCRETE
ELECTIVE –III

M.Tech (STE)

Course Code: GR17D5166

I Year - II Semester

L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Student will be able to

- Develop an understanding of the necessity of prestressed concrete structures.
- Develop an understanding of various techniques of prestressing.
- Develop an understanding of the design of prestressed concrete members for ultimate, limit state and limit state of serviceability.
- Develop an understanding of the design of continuous beams and simple portal frames

COURSE OUTCOMES: On successful completion of this course, it is expected that students should be able to

- Acquire the knowledge of evolution of process of prestressing.
- Acquire the knowledge of various prestressing techniques.
- Analyse and design of prestressed concrete beams, and slabs.
- Understand the terminology related to pre-stressing and pre-stressing systems
- Analyse and Design of pre-tensioned as well as post-tensioned concrete beams and slabs using working stress as well as limit state methods
- Analyse and design the anchorage systems for pre-stressing at the construction site to design various pre-stressed structures and retaining elements.
- analysis of continuous beams and simple portal frames (single bay and single story)

UNIT - I

General Principles of Prestressed Concrete (PSC): Pre-tensioning and post – tensioning – Prestressing by straight, concentric, eccentric, bent and parabolic tendons – Different methods and systems of pre - stressing like Hoyer system, Freyssinet system, Magnel Blaton system – Lee-Mc call system

Losses of Prestress: Loss of prestress in pretensioned and posttensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, relaxation of steel, slip in anchorage, bending of member and frictional loss – Analysis of sections for flexure.

UNIT - II

Design of Section for Flexure: Allowable stresses – Elastic design of simple beams having rectangular and I-section for flexure – kern lines – cable profile and cable layout. Design of Sections for Shear: Shear and Principal stresses – Improving shear resistance by different prestressing techniques – horizontal and vertical pre-stressing – Analysis of rectangular and I-beam – design of shear reinforcement – Indian code provisions.



UNIT - III

Deflections of Prestressed Concrete Beams: Short term deflections of uncracked members– Prediction of long-time deflections – load – deflection curve for a PSC beam – IS code requirements for max deflections.

UNIT - IV

Transfer of Pre-stress in Pre-tensioned Members: Transmission of pre-stressing force by bond –Transmission length – Flexural bond stresses – IS code provisions –Anchoragezone stresses in post tensioned members – stressdistribution in Endblock Analysis by approximate Guyon and Magnel methods – Anchorage zone reinforcement

UNIT - V

Statically Indeterminate Structures: Advantages & disadvantages of continuous PSC beams– Primary and secondary moments – P and C lines – Linear transformation concordant and non-concordant cable profiles – Analysis of continuous beams and simple portal frames (single bay and single story)

TEXT BOOKS

1. N. Krishna Raju, Prestressed concrete, Tata Mc Graw Hill Book – Co., New Delhi, 5th Edition, 2012.
2. S. Ramamrutham, Prestressed concrete, Dhanpat Rai & Sons, Delhi, 2nd Edition, 1983.

REFERENCE BOOKS

1. T.Y. Lin and Burn, John Wiley, Design of prestress concrete structures, New York, 3rd Edition, 1981.
2. Dayaratnam, PrestressedConcrete.