



DEPARTMENT OF Civil Engineering

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech. Civil Engineering		
Course Title	Prestressed Concrete Structures		
Course Code	CEPE15	No. of Credits	3
Course Code of Pre-requisite subject(s)	Nil		
Session	January 2019	Section (if, applicable)	-
Name of Faculty	Dr. J. KARTHIKEYAN	Department	Civil Engineering
Official Email	jk@nitt.edu	Telephone No.	0431-2503176
Course Type	<input type="checkbox"/>	Elective course	
Syllabus (approved in Senate)			
Principles of prestressing - Materials of prestressing - Systems of prestressing - Loss of prestress - Deflection of Prestressed Concrete members.			
Slabs - Pre-tensioned and Post-tensioned beams - Design for flexure, bond and shear - IS code provisions - Ultimate flexural and shear strength of prestressed concrete sections - Design of end anchorage zones using IS code method.			
Composite beams - Analysis and design. Partial prestressing - non-prestressed reinforcements.			
Analysis of Continuous beams - Cable layout - Linear transformation - Concordant cables.			
Design of compression members and tension members. Circular prestressing - Water tanks - Pipes - Analysis and design - IS Code provisions			
1. References 1. Lin. T.Y., Burns, N.H., Design of Prestressed Concrete Structures, John Wiley & Sons, 1982.			
2. RajaGopalan N. Prestressed Concrete, Narosa Publishing House, New Delhi, 2002.			
3. IS 1342:2012, Indian Standard Prestressed Concrete – Code of Practice, (2 nd Revision), BIS, 2012.			
4. IS 3370 & IS 456:2000, Annexure for slab design (only that page)			
COURSE OBJECTIVES			
1. To learn the principles, materials, methods and systems of prestressing			
2. To know the different types of losses and deflection of prestressed members			
3. To learn the design of prestressed concrete beams for flexural, shear and tension and to calculate ultimate flexural strength of beam			
4. To learn the design of anchorage zones, composite beams, analysis and design of continuous beam			
5. To learn the design of water tanks			

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MAPPING OF COs with POs

Graduates of the Civil Engineering Programme will be able to:

- 1) Apply the knowledge of mathematics, science, engineering fundamentals, and Civil Engineering principles to the solution of complex problems in Civil Engineering.
- 2) Identify, formulate, research literature, and analyse complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- 3) Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4) Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
- 5) Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM and GIS including prediction and modelling to complex Civil Engineering activities with an understanding of the limitations.
- 6) Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.
- 7) Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8) Apply ethical principles and commit to professional ethics and responsibilities and norms of the Civil Engineering practice.
- 9) Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10) Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as; being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11) Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.
- 12) Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcomes At the end of the course student will be able to	Programme Outcomes (PO) (Enter Numbers only)
1. design a prestressed concrete beam accounting for losses	1 to 4, 10
2. design the anchorage zone for post tensioned members.	1 to 4, 10, 12
3. design composite members.	1 to 4, 10
4. design continuous beams	1 to 4, 10
5. design water tanks	1 to 4, 10

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COURSE PLAN – PART II *

COURSE OVERVIEW

Prestressed Concrete Structures is one of the most important design course for the undergraduate students of civil engineering. This course emphasizes the fundamental concepts of analysis and design of prestressed concrete structures and provides students a sufficiently strong basis for handling everyday design problems, and the tackling of the more complex problems with confidence. Further, by going through the course one would develop adequate understanding of the philosophy of prestressing design. This course enables the students to have an in-depth knowledge on various systems for prestressing.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	8 to 12 hours	Principles of prestressing - Materials of prestressing - Systems of prestressing - Loss of prestress - Deflection of Prestressed Concrete members.	PPT, Chalk and talk
2.	8 to 12 hours	Slabs - Pre-tensioned and Post-tensioned beams - Design for flexure, bond and shear - IS code provisions - Ultimate flexural and shear strength of prestressed concrete sections - Design of end anchorage zones using IS code method.	Chalk and talk
3.	4 to 5 hours	Composite beams - Analysis and design. Partial prestressing - non-prestressed reinforcements.	Chalk and talk
4.	4 to 5 hours	Analysis of Continuous beams - Cable layout - Linear transformation - Concordant cables	Chalk and talk
5.	5 to 7 hours	Design of compression members and tension members. Circular prestressing - Water tanks - Pipes - Analysis and design - IS Codal provisions	Chalk and talk

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Internals - I	Mid or end of February 2019	1 hour	20

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2	Internals -II	Last week of March 2019	1 hour	20
3	Assignment	-	-	10
4	Final Assessment	First week of May 2019	3 hours	50
CPA	Compensation Assessment* (if necessary)	Third week of April 2019		

COURSE EXIT SURVEY : As per the Institute policy

COURSE POLICY

The students must take the above mentioned internals/exam seriously and score well. Students have to take Internals, Seminar and end semester examination mandatorily as per the scheduled date and time mentioned by the teacher. If a student is unable to take any one of the internals (Internals-1 or 2) due to some genuine reasons. He/she should inform the teacher well in advance and one CPA will be given to them (i.e. before the end semester exam). Only for genuine cases, CPA will be given and it is upto the teacher who handles the course. If a student is absent for the end semester examination, he/she will be given "X" grade even if he leaves in genuine reason. For such students, re-exam will be conducted during the month of December-2019, May 2020 and so on for 50 marks (3 hours duration) and mark range/ grading system assigned for his/her batch will be followed.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

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ADDITIONAL INFORMATION, IF ANY

Other important/General Instructions to the students:

1. Be attentive in the class, clear your subject doubts and interact very well in the class work session and do not miss any class work session unwantedly.
2. Use of mobile phones are strictly prohibited in the class rooms/exam hall. Programmable calculators are not allowed in the examination hall.
3. Take only the relevant code books and design charts to the exam as per your teachers instruction and do not write anything in these code books/charts.
4. Copying in the examination or any other malpractices cannot be tolerated and the student will be detained and F grade will be awarded. Strict disciplinary action will be taken on such type of students.

FOR APPROVAL

Course Faculty _____

J. Kalithayal

CC- Chairperson _____

[Signature]

HOD _____

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