University of Texas at Tyler, Department of Civil Engineering
Prestressed Concrete Design (CENG 5313 cross listed with CENG 4350)
Course Information and Policies

Course Description: Introduction to analysis and design of prestressed beams, columns, and slabs. The course will cover the behavior of steel and concrete under sustained load (prestressing), analysis and design of pre-tensioned and post-tensioned reinforced concrete members and designing these members into the integral structure.

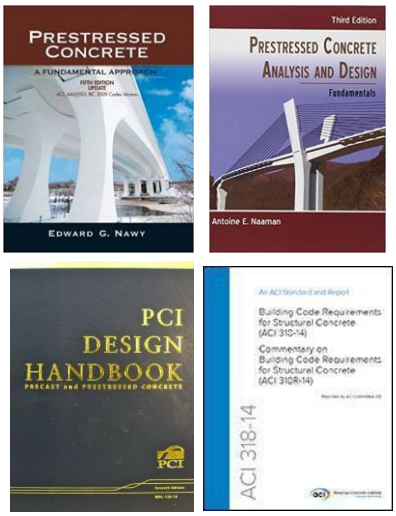
Prerequisites: CENG 4311 Reinforced Concrete

Instructor: Dr. Mirmiran **TA:** None

Class: Online **Office Hours:** Contact via CANVAS or email amirmiran@uttyler.edu

Course References: No textbook is required.

1. Prestressed Concrete: A Fundamental Approach, Nawy, Prentice Hall, 2009
2. Prestressed Concrete Analysis and Design, Naaman, Techno Press, 2012
3. PCI Design Handbook, Precast and Prestressed Concrete, 2010
4. ACI 318-14, Building Code Requirements for Structural Concrete, 2014



Course Outline:

1. Basic Prestressing Concepts, Materials, and Systems
2. Prestress Losses
3. Flexural Analysis and Design
4. Continuous Beams
5. Shear and Torsion
6. Camber and Deflections
7. Axially Loaded (Tension/Compression) Members
8. Prestressed Concrete Bridges

Course Objectives: By the end of this course, students will be able to

- Identify basic methods of fabricating prestressed concrete structures
- Calculate prestress loss and understand loss mechanism
- Design a statically determinate prestressed concrete beam for stresses in serviceability limit state
- Design prestressed concrete beams to resist ultimate bending moments and shear forces
- Calculate short- and long-term beam camber and deflections
- Analyze and design prestressed concrete slabs and beam-columns

Assignments: Homework will be assigned regularly and must be submitted electronically by the due date. All work submitted for grading must be done **professionally** and **neatly** on engineering **computation paper**, and must include the problem statement, brief description of all **steps** in the solution procedure, appropriate sketches and equations, the important results **labeled**, and conclusions. Computer printouts, if necessary, must be appended with proper **annotations**.

Virtual Field Trip: A virtual field trip is planned for students to observe production of prestressed concrete members.

Exams: There will be one mid-term and one comprehensive final exam as shown on the tentative course schedule.

Grading Plan and Scale:	
Homework	20%
Mid-term Exam	35%
Final Exam	45%

Grading Scale				
A	B	C	D	F
≥90	≥80	≥70	≥60	≥0
<100	<90	<80	<70	<60

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Tentative Schedule

Week	Dates		Topic	CANVAS Module	Assignments
	From	To			
1	1/10	1/15	Basic Prestressing Concepts, Materials and Systems Virtual Plant Tour	1 & 2	
2	1/18	1/22	Prestress Losses	3 & 4	Homework 1
3	1/24	1/29	Flexural Analysis and Design I	5	Homework 2
4	1/31	2/5	Flexural Analysis and Design II	6	
5	2/7	2/12	Flexural Analysis and Design III	7	Homework 3
6	2/14	2/19	Flexural Analysis and Design IV	8	
7	2/21	2/26	Continuous Beams	9	Homework 4
8	2/28	3/5	Preparation for Mid-Term		
			Mid-Term Exam: Concepts, Losses and Flexure		
9	3/7	3/12	Spring Break – No Class		
10	3/14	3/19	Review of Mid-Term Exam Shear and Torsion I	10	
11	3/21	3/26	Shear and Torsion II	11	Homework 5
12	3/28	4/2	Shear and Torsion III	12	
13	4/4	4/9	Camber and Deflections	13	Homework 6
14	4/11	4/16	Axially Loaded Tension/Compression Members	14	Homework 7
15	4/18	4/23	Course Review and Preparation for Final Exam		
16	**4/25**	**4/30**	**Final Exam: Comprehensive**		