

University of Texas at Tyler
Department of Civil and Construction Engineering and Management
Prestressed Concrete Design (CENG 5313), Spring 2026
Course Information and Policies

Course Description: Introduction to analysis and design of prestressed concrete 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

Email: amirmiran@uttyler.edu

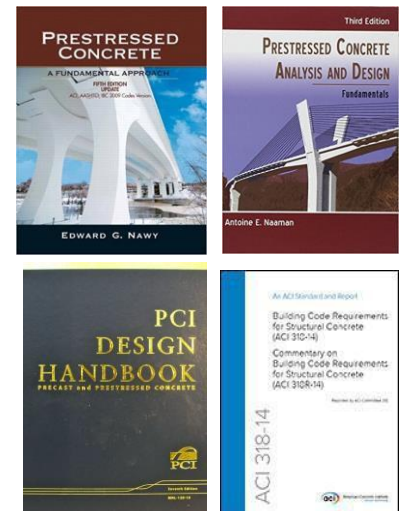
Class: Online **Office Hours:** Contact via CANVAS or email amirmiran@uttyler.edu, or optional live Q&A via zoom

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, 2022
3. PCI Design Handbook, Precast and Prestressed Concrete, 2019
4. ACI 318-19, Building Code Requirements for Structural Concrete, 2019

Course Outline and Modules:

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



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

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

Assignments: Discussions and homework will be assigned regularly and must be submitted electronically by the due date. Homework assignments 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**.

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

Grading Plan	
Discussions	10%
Homework	20%
Mid-term Exam	30%
Final Exam	40%

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

**University of Texas at Tyler, Department of Civil Engineering
Prestressed Concrete Design (CENG 5313), Spring 2026
Course Schedule**

Week	Dates		Module	Topic	Part	Lectures	Assignments
	From	To					
1	1/12	1/16	1	Basic Prestressing Concepts, Materials and Systems	1	Lecture 1	Discussions
					2	Lecture 2	
2	1/19	1/23	2	Prestress Losses	1	Lecture 3	Homework 1
					2	Lecture 4	
3	1/26	1/30	3	Flexural Analysis and Design	1	Lecture 5	Homework 2
4	2/2	2/6			2	Lecture 6	Homework 3
					3	Lecture 7	Mid-Term Exam
					4	Lecture 8	
5	2/9	2/13	4	Continuous Beams	-	Lecture 9	Discussions
			5	Shear and Torsion	1	Lecture 10	Homework 4
2	Lecture 11						
3	Lecture 12						
7	2/23	2/27	6	Camber and Deflections	-	Lecture 13	Discussions
			7	Axially Loaded (Tension/Compression) Members	-	Lecture 14	Homework 5
							Final Exam

UNIVERSITY POLICIES AND ADDITIONAL INFORMATION

UT Tyler Honor Code: Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities: To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

Campus Carry: We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

UT Tyler a Tobacco-Free University: All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quit lines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies: Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (STE 230) on or before the Census Date of the semester in which the course will be repeated. **For Spring 2026 first seven-week term, the Census Date is January 16, 2026.** Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date (January 16, 2026) is the deadline for many forms and enrollment actions, including:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing process for tuition exemptions or waivers through Financial Aid State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Final Day to Withdraw: The final day to withdraw from the course without penalty is **February 12, 2026**.

Student Accessibility and Resources: In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University offers accommodations to students with learning, physical and/or psychiatric disabilities. If you have a disability, including non-visible disabilities such as chronic diseases, learning disabilities, head injury, PTSD or ADHD, or you have a history of modifications or accommodations in a previous educational environment you are encouraged to contact the [Student Accessibility and Resources](#) (SAR) office and schedule an interview with the Accessibility Case Manager/ADA Coordinator, Cynthia Lowery Staples. If you are unsure whether the above criteria applies to you and have questions or concerns please contact the SAR office. For more information or to set up an appointment please visit the SAR office located in the University Center, Room 3150 or call 903.566.7079. You may also send an email to cstaples@uttyler.edu

Student Absence due to Religious Observance: Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Absence for Pregnant Students: This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at parents@uttyler.edu and also complete the Pregnant and Parenting Self-Reporting Form.

Student Absence for University-Sponsored Events and Activities: If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement: It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation: Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct: Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

1. "Cheating" includes, but is not limited to:
 - Copying from another student's test paper;
 - Using, during a test, materials not authorized by the person giving the test;
 - Failure to comply with instructions given by the person administering the test;
 - Possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
 - Using, buying, stealing, transporting, or soliciting in whole or part the contents of an un-administered test, test key, homework solution, or computer program;
 - Collaborating with or seeking aid from another student during a test or other assignment without authority;
 - Discussing the contents of an examination with another student who will take the examination;
 - Divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
 - Substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
 - Paying or offering money or other valuable thing to, or coercing another person to obtain an un-administered test, test key, homework solution, or computer program or information about an un-administered test, test key, home solution or computer program;
 - Falsifying research data, laboratory reports, and/or other academic work offered for credit;
 - Taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct;
 - Misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.
2. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

3. “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
4. All written work that is submitted will be subject to review by SafeAssign™, available on Blackboard.

UT Tyler Resources for Students

- [UT Tyler Student Accessibility and Resource \(SAR\) Office](#) (provides needed accommodations to students with document needs related to access and learning)
- [UT Tyler Counseling Center](#)
- [UT Tyler Writing Center](#)
- [The Mathematics Learning Center](#)
- [UT Tyler PASS Tutoring Center](#)
- [UT Tyler Supplemental Instruction](#)
- [Upswing \(24/7 online tutoring\) - covers nearly all undergraduate course areas](#)
- [Robert Muntz Library](#) and [Library Liaison](#)

Calculators: In line with the Civil Engineering Department’s policy, only calculators permitted by NCEES for use in the current semester’s FE exam are permitted to be used in the ENGR 2301 examinations. No other model of calculator will be allowed. Models previously allowed by NCEES in the past but are no longer valid for the current FE exam are prohibited in the ENGR 2301 exams. Please check www.ncees.org for the latest permitted calculator models. Examples include, but are not limited to:

- Hewlett Packard: HP 33s, HP 35s, and no others
- Casio: All FX 115 models
- Texas Instruments: All TI30X or TI-36X models

It is the student’s responsibility to check the validity of his/her calculator model, purchase, and be familiar with the functions of the permitted calculators prior to the exam. At the discretion of the course instructor, any calculator not meeting the requirements stated (especially in the case of a graphing calculator) may be used but only after an inspection of the device and a clearing of all the memory within the device, performed for the instructor at a time immediately prior to the exam. At any time during the exam, your calculator is subject to a random search by the instructor. Failure or refusal to clear all memory or to surrender your calculator to search will disqualify you from the exam immediately, unless you can produce a calculator meeting the requirements as stated above. No borrowing of other students’ calculators is allowed during exam.

Artificial Intelligence Statement: UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools’ ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler’s Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler’s Academic Integrity Policy. AI is encouraged during the course, and appropriate acknowledgment is expected.