



CE435/545: PRESTRESSED CONCRETE STRUCTURES

SPRING 2017 - 88439/90138

Catalog Description: (3 Units) In this course, we will discuss behavior, analysis and design of statically determinate and indeterminate prestressed concrete structures; calculation of loss of prestress. Graduate-level requirements may include a research paper or a comprehensive design project.

Prerequisite(s): CE 333 is a hard prerequisite for the course. CE 335 is a prerequisite for the course that can be waived by instructor consent only.

Course Objectives: To develop the concepts and techniques to perform analysis and design prestressed concrete elements.

ABET Outcomes:

Primary

- A. Apply mathematics, science and engineering principles
- C. Ability to design a system, component, or process to meet desired needs
- E. Ability to identify, formulate, and solve engineering problems

Secondary

- J. Knowledge of contemporary issues
- K. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- M. Be proficient in the major areas of civil engineering

Instructor: Cac M. Dao, Ph.D.
Class Time & Place: Tu-Th 11:00am – 12:15pm @ Modern Languages, Room 411
Office Hours: Tu-Th 2:00 – 3:00pm
Office: CE Bldg., Room 208
e-mail: cmd@email.arizona.edu

Textbook: Prestressed Concrete: A Fundamental Approach, E. Nawy, 5th Edition.

Reference Texts: Post-Tensioned Buildings Design and Construction, B. Aalami, PT-Structures.
Design of Prestressed Concrete Structures, Lin and Burns, 3rd Edition.
Reinforced Concrete: A Fundamental Approach, E. Nawy, 6th Edition.
Design of Reinforced Concrete, J. McCormac and R. Brown, 10th Edition.

Reference Codes: ACI 318-05 (*or later*) Building Code Requirements for Structural Concrete/Commentary
PCI Design Handbook, 6th Edition (*or later*), Precast/Prestressed Concrete Institute
ASCE 7-10, Minimum Design Loads for Buildings.

Course Content:

TOPIC	ARTICLES	HOMEWORK PROBLEMS
Basic Concepts	Chapter 1	HW #1
Material and Systems	Chapter 2	HW #2
Partial Losses	Chapter 3	HW #3
Flexural Design	Chapter 4	HW #4
Deflections	Chapter 7	HW #5
Indeterminate Beams	Chapter 6	HW #6
Shear and Torsion	Chapter 5	HW #7
Two-way Floor Systems	Chapter 9	HW #8
Selected Topics	TBA	TBA

Last day of classes: Tue. May. 2 **No classes:** Spring Break: Tue. and Thu. March 14 and 16.

Final exam: Tue. May 9, 10:30am - 12:30pm.

Homework:

- Homework is to be done neatly on Engineering Problem paper using only one side of a sheet.
- Always use a straight edge when drawing lines.
- Work shall be neatly lettered, logically arranged and capable of being readily reviewed by the instructor. Do not crowd problems together on the sheet.
- Each problem should include:
 - ✓ Student's name, subject name, and page number identification (top of page only).
 - ✓ Problem identification (Chapter; problem number).
 - ✓ Problem statement: normally includes a sketch, and must be sufficient to define the problem so that the solution can be evaluated without reference to the textbook.
 - ✓ The solution must include diagrams (e.g., free-body diagram etc) as are necessary to understand the work and the meanings of the symbols employed.
 - ✓ Results are to be given to three significant figures.
 - ✓ Answers must be complete with all necessary information such as magnitude, units of measurement and vector direction. Underline intermediate answers. Box final answers.**Points will be deducted for not reporting the proper units.**

Examinations:

You **will be required** to take two midterm examinations during the semester and a final examination. All exams are closed book; calculators are permitted.

Examinations are regarded as an engineering report. Procedures and presentation of solutions should be precise and legible. Penalties are assessed for: (1) algebra and arithmetic errors; (2) answers presented without proper units, sign or direction; (3) incomplete free body diagram; and (4) illegible presentation. **No credit will be given for correct answers obtained by incorrect reasoning or compensation errors.** Partial credit may be given for work that pertains to the correct solution.

Times for the midterm exams will be announced in class. Calculators that can be used for exams are given in the following link. These are the approved calculators for FE (Fundamentals of Engineering) certification exam:

<http://ncees.org/about-ncees/news/2013-approved-calculator-list-announced/>

Grading Policies:

Midterm Exams	25%
Design Project	20%
Final Exam	30%
Homework	25%

Assignment of the final grade will be based on the following scale:

A	90 - 100
B	80 < 90
C	70 < 80
D	60 < 70
E	< 60

Absence and Class Participation Policies: Participating in course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their healthcare provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

Please examine the course syllabus for potential conflicts at the start of the semester and promptly notify me via email of any anticipated accommodation needs, providing as much notice as possible.

If you miss class for any reason, you must check D2L to review the course news as well as the lecture slides and other materials from the class that you missed.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/2016-17/policies/classatten.htm>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <http://uhap.web.arizona.edu/policy/appointed-personnel/7.04.02>

Classroom Behavior Policy: To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (i.e. texting, chatting, reading a newspaper, making phone calls, web surfing, etc).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Nondiscrimination and Anti-Harassment Policy: The University is committed to creating and maintaining an environment free of discrimination

<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Policy Regarding Dishonest Scholastic Work: The University's Code of Academic Integrity holds the student fully responsible for the content and integrity of all academic work related to examinations, homework, term projects, laboratory reports, and any other grading component. Furthermore, the ethical principles of the engineering profession as enunciated in the codes of ethics of various engineering professional societies specifically prohibit dishonest work and/or plagiarism. Therefore, in the event that an instructor observes or is made aware of cheating taking place in this course, he/she will take action to make sure that those involved are subjected to the most severe disciplinary sanctions permitted by the University.

Accessibility and Accommodations: It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Students with disabilities or special needs who require reasonable accommodations to fully participate in course activities or meet course requirements must register with the S.A.L.T. Center (<http://www.salt.arizona.edu/>) or the Disability Resource Center (<http://drc.arizona.edu/>). If you qualify for special accommodations, please email or bring your letter of request to me as soon as possible.

Class Note Copyright: Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Providing student email addresses to a third party is not permitted. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of electronic resources provided by The University of Arizona. This conduct may also constitute copyright infringement.

THESE POLICIES WILL BE STRICTLY ENFORCED WITHOUT EXCEPTION.