CEE 632 – 850: Prestressed Concrete

(3 credits)

Lectures	Asynchronous Online		
Instructor	Anthony Massari Atm2@njit.edu	Office Hours:	Email to schedule
Prerequisite	CEE 333		
Required Textbook			
Other Recommende	Naaman, Antoine E., Prestressed Concr Edition, Techno Press 3000, ISBN: 9 ed Texts & Reading	ete Analysis and 1 978-0-9674939-2-	Design: Fundamentals, 3 rd 3
	ACI 318 – Building Code Requirements for Structural Concrete PCI Design Handbook, Precast and Prestressed Concrete		

Course Description (from NJIT's course catalog)

Analysis and design of pre-tensioned and post-tensioned prestressed concrete elements for both determinate and indeterminate structures will be studied. Examples of prestressed elements used in buildings and bridges will be discussed, as well as the source and magnitude of prestress losses.

POLICIES & PROCEDURES

Academic Integrity: It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course. Refer to NJIT's Dean of Students website to become familiar with the Code on Academic Integrity and how to avoid Code violations.

https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Post Tensioning Manual

Communication: Email as needed

Lectures/Class: Asynchronous online

Homework: Individual HW assignments will be assigned weekly.

Homework Solutions: Solutions to problems will be posted 2 weeks after announcement.

Exams: All exams are open book and takehome.

Calculation of Course Grade: A weighted average grade will be calculated as follows:

Homework	20%
Midterm Exam	40%
Final Exam	40%

The <u>minimum</u> requirements for final letter grades are as follows:

A = 90.0%, B+ = 87.0%, B = 80.0%, C+ = 77.0%, C = 70.0%, D = 65.0%, F < XX.0%

Instructor Commitment: You can expect the instructor to be courteous, punctual, organized, and prepared for lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if office hours are moved; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling or unavailable; and to grade uniformly and consistently.

Al statement: The use of artificial intelligence (AI) is permitted in this course only when explicitly stated in assignments. If students use AI for any course-related work, they must cite it according to the guidelines provided on the <u>NJIT Library AI Citation page</u>. If you have any questions about AI use in this course, please contact the course instructor before submitting any assignments. In cases where AI use is not allowed, students are expected to complete work without AI assistance to develop their skills in this subject area.

Students with Documented Disabilities: NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have, a physical, medical, psychological, or learning disability that may require accommodations, please contact the Coordinator of Student Disability Services located in the Center for Counseling and Psychological Services, in Campbell Hall, Room 205, (973) 596-3414. Further information on disability services related to the self-identification, documentation and accommodation processes can be found on the webpage at: (http://www.njit.edu/counseling/services/disabilities.php)

Week	Topics	Reading	
1	Intoduction, Prestressing Methods, Prestressing Systems,	Chapter 1	
	General Design Principles		
2	Materials for Prestressing	Chapter 2	
3	The Philosophy of Design	Chapter 3	
4	Flexure - Working Stress Design	Chapter 4	
5	Flexure - Ultimate Strength Design	Chapter 5	
6	Midterm Exam		
7	Design for Shear	Chapter 6	
8	Servicability Design and Analysis	Chapter 7	
9	Computation and Types of Prestress Loses	Chapter 8	
10	Indeterminate Analysis	Chapter 10	
11	Final Exam		

Course Schedule:

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- · to encourage research and scholarships among our faculty and students
- to promote service to the engineering profession and society

Program Educational Objectives

Our Program Educational Objectives are reflected in the achievements of our recent alumni:

- 1. **Engineering Practice:** Alumni will successfully engage in the ethical practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
- 2. **Professional Growth:** Alumni will advance their technical and interpersonal skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as academia, business, and law through further education.
- 3. **Service:** Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Student Outcomes

Our **Student Outcomes** are what students are expected to know and be able to do by the time of their graduation:

- 1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
- 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
- 3. an ability to communicate effectively with a range of audiences
- 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
- 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
- 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusion
- 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 4/22/2025