

# CEE 6523 – Prestressed Concrete – Spring 2022

Mason 3133; TR, 9:30 am – 10:45 am

Version 1, 30 December 2021

## Instructor

Karl F. “Fred” Meyer, PhD, PE, F.ACI

[fred.meyer@ce.gatech.edu](mailto:fred.meyer@ce.gatech.edu) or MS Teams Chat

Mason 5142A, (404) 894-5805

Office Hours: By appointment. To meet students' requirements, needs, and comfort levels, meetings and office hours will be offered in-person, virtually, or outdoors.

## Importance of Course

Prestressed Concrete is a follow-on course to CEE 4520 and complements CEE 6521 with a focus on prestressed concrete members. It is an important course for those focusing on structural engineering in graduate school or in practice since a significant number of concrete members and structures are prestressed. With concrete being one of the predominant building materials globally, it is very important that you understand the mechanics, behavior, and detailing requirements for a safe and efficient concrete structure.

## My Expectations

- Conduct yourself as an engineering professional. At this point in your education, you have chosen to advance your learning. Let me help you be a great engineer and leader in your future profession.
- Come to class ready to participate and learn. Mobile devices must be silenced and out of sight.
- Bring your curiosity with you to class and ask questions. If I don't know the answer, I'll find out.
- Submit work that is neat, complete, and easy to follow. Include sketches as necessary to communicate your work. Use a straightedge for all straight lines. Ensure your writing is large enough for me to read. I may deduct points from homework that fails to meet this standard.

## Course Objectives

- Describe the benefits gained through the use of prestressing in reinforced concrete members and structures.
- Explain the methods used to construct prestressed concrete members and structures.
- Analyze and design prestressed concrete members and structures in accordance with ACI Strength Design and AASHTO provisions.

## Pre-requisites/Co-requisites

CEE 4520 (Reinforced Concrete Design)

## Textbooks

- Prestressed Concrete: A Fundamental Approach, Fifth Edition Update, Edward G. Nawy, Pearson, Upper Saddle River, NJ, 2010. **ISBN: 0-13-608150-9 (Required)**
- ACI 318-19 Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute, Farmington Hills, MI, 2019. **ISBN: 9781641950565 (Required)**
- PCI Design Handbook, 8th Ed., Precast/Prestressed Concrete Institute, Chicago, IL 2017.
- AASHTO, LRFD Bridge Design Specifications, 9th Ed., American Association of State Highway & Transportation Officials, Washington, DC, 2020.
- Design of Prestressed Concrete Structures, T. Y. Lin and Ned H. Burns, John Wiley & Sons, New York, 1981.

# CEE 6523 – Prestressed Concrete – Spring 2022

Mason 3133; TR, 9:30 am – 10:45 am

Version 1, 30 December 2021

## Website

The website for this course is <https://canvas.gatech.edu>. Students are expected to check the website regularly for daily lesson requirements and are responsible for the material posted. Example problems and material from lectures are posted regularly. I own the copyright of the course materials I create for this course (exams, examples, slides) and as a result, students are not allowed to reproduce, distribute or publicly post these course materials without my explicit written permission.

## Grades

Your final grade will be determined based on the following grade scheme and scale:

- Participation Grade (5%)
  - Homework (40%)
  - Mid-term Exams (25%)
  - Final Exam (30%)
- 
- A  $\geq$  90%
  - 80%  $\geq$  B < 90%
  - 70%  $\geq$  C < 80%
  - 60%  $\geq$  D < 70%
  - F < 60%

## Exams

See the course schedule for exam dates. You will be allowed to reference your ACI 318 Code during exams and will be allowed one exam reference sheet, 8.5" x 11", both sides, in your own writing for each mid-term exam and the final. You will have a total of three sheets by the time you get to the final exam and may list anything that will help prompt your memory during the exams. I will collect the reference sheets with your exams then return them to you following exam grading.

Cheating from another student's exam is unethical, unprofessional, and unacceptable. Cheating is a direct violation of the Georgia Tech Honor Code and will be dealt with accordingly per Georgia Tech policy. Other examples of cheating include, but are not limited to, bringing unauthorized material to the exam, collaborating or sharing exam reference pages, talking during the exam and using mobile devices.

## Course Conduct

The Georgia Tech Honor Code is the standard of conduct for this course. The Honor Code is available at <http://www.honor.gatech.edu/>. You are allowed to work in groups on all homework, but any work you turn in must be written in your own hand and cannot be a direct copy of any other student's work. In-class exams are to be your own work. Honesty and integrity are two foundational characteristics of a professional that I expect from each of you throughout this course.

## Late Policy

In the professional world, those who submit requirements late will likely develop a poor reputation and may lose the opportunity themselves or for their company to compete for or take part in an important project. I expect you to submit course requirements in accordance with the published submission date and time. If conditions arise that will not allow you to submit your work on-time, contact me at least 24 hours in advance. For those who submit work late without prior approval, the penalty will be 10% per day for up to three days. Work submitted after three days will receive zero credit.

# CEE 6523 – Prestressed Concrete – Spring 2022

Mason 3133; TR, 9:30 am – 10:45 am

Version 1, 30 December 2021

## **Attendance**

This will be an active classroom, where I expect you to come to class prepared to learn and participate. Those students who attend class regularly will likely perform far better in the course, especially on exams. I will base your participation grade, in part, on your class attendance. In the event of a medical emergency or an illness that is severe enough to require medical attention, students are responsible for contacting the Office of the Dean of Students as soon as possible to report the medical issue or emergency, providing dated documentation from a medical professional and requesting assistance in notifying their instructors. The medical documentation will be handled confidentially within the Dean of Students Office and will inform a decision as to whether communication with instructional faculty is appropriate. It is the expectation of the Institute that instructional faculty will honor a request from the Office of the Dean of Students to excuse a medical emergency or illness and allow make-up of the work missed, including homeworks, quizzes, presentations, examinations, or other class assignments. All other Georgia Tech approved absences will be honored per the appropriate policy.

## **COVID Considerations**

Please do not come to class if you have any COVID symptoms and use good judgment about coming to class if you have been around someone with COVID symptoms. I will make all course content available and will make every reasonable effort to allow for makeups/extensions for students who are quarantined and/or ill. Students are expected to be familiar with and abide by the Institute guidelines, information, and updates related to Covid-19. Find campus operational updates, Frequently Asked Questions, and details on campus surveillance testing and vaccine appointments on the [Tech Moving Forward site](#).

## **Accommodations for Students with Disabilities**

Georgia Tech has policies regarding disability accommodation, which are administered through The Office of Disability Services. <http://disabilityservices.gatech.edu/>. For students with disabilities, please contact this office to request classroom accommodations and e-mail me as soon as possible in order to set up a time to discuss your learning needs. Reminders well in advance of special needs are appreciated and are your responsibility.

## **Recordings of Class Sessions and Required Permissions:**

Classes may not be recorded by students without the express consent of the instructor unless it is pursuant to an accommodation granted by the Office of Disability services. Class recordings, lectures, presentations, and other materials posted on Canvas are for the sole purpose of educating the students currently enrolled in the course.

Students may not record or share the materials or recordings, including screen capturing or automated bots, unless the instructor gives permission. Digitally proctored exams may require students to engage the video camera, but those recordings will not be shared with or disclosed to others without consent unless legally permitted.

- For classes where participation is voluntary, students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded.
- For classes requiring class participation, if students are identifiable by their names, facial images, voices, and/ or comments, written consent must be obtained before sharing the recording with persons outside of currently enrolled students in the class.

## **Diversity Statement**

I consider the classroom environment to be a place where you will be treated with dignity and respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

## CEE 6523 – Prestressed Concrete – Spring 2022

Mason 3133, TR, 9:30 am – 10:45 am

Version 1, 30 December 2021

Week	Date	LSN	Lesson Topic (Notes 1, 2, and 3)	Assignment Due (Note 4)
1	11 Jan	INT1	Introduction to Prestressed Concrete	
	13 Jan	INT2	Basic Concepts of Prestressing	
2	18 Jan	MAT1	Concrete Materials 1	
	20 Jan	MAT2	Concrete Materials 2	
3	25 Jan	LOS1	Prestress Losses 1	HW # 1 due
	27 Jan	LOS2	Prestress Losses 2	
4	1 Feb	FLX1	Flexural Analysis and Design 1	
	3 Feb	FLX2	Flexural Analysis and Design 2	
5	8 Feb	FLX3	Flexural Analysis and Design 3	HW # 2 due
	10 Feb	FLX4	Flexural Analysis and Design 4	
6	15 Feb	FLX5	Flexural Analysis and Design 5	
	17 Feb	SHR1	Shear and Torsion Analysis and Design 1	
7	22 Feb	SHR2	Shear and Torsion Analysis and Design 2	HW # 3 due
	24 Feb	SHR3	Shear and Torsion Analysis and Design 3	
8	1 Mar	MID1	Mid-Term Exam # 1	
	3 Mar	CON1	Continuous Systems 1	
9	8 Mar	CON2	Continuous Systems 2	
	10 Mar	CON3	Continuous Systems 3	
10	15 Mar	CON4	Continuous Systems 4	HW # 4 due
	17 Mar	CON5	Continuous Systems 5	
11	22 Mar		Spring Break	
	24 Mar		Spring Break	
12	29 Mar	DROP	Class Drop for Beam Testing at Structures Lab	
	31 Mar	CON6	Continuous Systems 6	HW # 5 due
13	5 Apr	SLB1	Two-Way Slabs 1	
	7 Apr	MID2	Mid-Term Exam 2	
14	12 Apr	SLB2	Two-Way Slabs 2	
	14 Apr	BRG1	Bridge Design 1	
15	19 Apr	BRG2	Bridge Design 2	HW # 6 due
	21 Apr	DROP	Class Drop for Field Trip to PT Concrete Plant	
16	26 Apr	FER	Final Exam Review	
Final	2 May		Final Exam 8:00 am – 10:50 am	

- 1** The instructor reserves the right to amend the information presented on this syllabus at any time.
- 2** There will be beam tests in the GT Structures Lab on Friday afternoons from 3:00 – 6:00 pm. The schedule of tests is TBD. You will be given a class drop to make-up for time spent in the lab. Students will be expected to attend at least one of the beam tests.
- 3** There will be a field trip to a prestressed concrete plant on Friday 28 January 2022 at 2:00 – 5:00 pm. Further details will be provided on attire and plant location.
- 4** Unless otherwise specified, homework is due at the start of class on the date indicated.