



CE 415 – Prestressed Concrete

Code and Name: CE 415 – Prestressed Concrete

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

- Prestressed Concrete Design: M.K.Hurs, 2nd Ed., CRC Press, 1998

Other References:

- *Building Code Requirements for Structural Concrete (ACI 318M-11)*

- *Course handouts: distributed on a regular basis to provide more information on the topic.*

Course Description:

Theoretical basis for the analysis and design of pre-stressed concrete members; estimation of losses in pre-stressed reinforced concrete members and structures; design of post-tensioned beams and slabs; introduction to pre-tensioned, precast construction systems and techniques; use of pre-stressing in containment structures and structural strengthening and rehabilitation

Pre-requisites: CE313 Reinforced Concrete Design

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (From Fall 2019-SOs: 1-7)

1. Analyze the prestress and bending stresses of the prestressed section (1)
2. Recognize the various application of prestressed concrete and limitations (1)
3. Estimate different types the losses in prestressed structural element (1)
4. Calculate the deflections of the pre-stressed members (1)
5. Design pre-stressing concrete sections (2)
6. Design the pre-tensioned members (2)
7. Flexural design of the post-tensioned members (2)
8. Develop computational tools to facilitate the design process (2)

Topics to be covered:

- Introduction to prestressed concrete applications and revision of reinforced concrete mechanics
- Design properties of materials
- Introduction to design codes and specifications, load combinations in design codes
- Calculation of elastic stresses in beams
- Loss of prestress force
- Short-term losses
- Long-term losses
- Serviceability limit state design
- Ultimate limit state design
- Shear Design
- Deflections

Grading Policy:

The grading for the course is: 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, and projects for the remaining 20% that is modified by the course instructor.

