

The Ohio State University  
Department of Civil & Environmental Engineering & Geodetic Science  
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## **CE 737 - PRESTRESSED AND PRECAST CONCRETE STRUCTURES**

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### Objectives:

Understand the behavior of prestressed concrete members and structures. Study the basic principles and design applications for prestressed concrete. The basic concepts to be covered include stress analysis, prestress losses, flexural and shear design, and deflections. Design and behavior of precast structural concrete systems will also be covered.

### Prerequisites:

CE 531, and CE 535

### Required textbook:

“*Prestressed Concrete: A Fundamental Approach, Fifth Edition*” by Edward G. Nawy. 2006. Prentice Hall. ISBN: 0-13-149759-6

In addition, “*PCI Design Handbook: Precast and Prestressed Concrete, 6<sup>th</sup> Edition*”, “*PCI Manual for Design of Hollow Core Slabs*” and handouts will be distributed.

### Other References:

- “*Building Code Requirements for Reinforced Concrete (ACI 318-05) and Commentary-ACI318R-02*” American Concrete Institute, Detroit, Michigan, 2005.
- “*Reinforced and Prestressed Concrete Structures, 2<sup>nd</sup> Edition*” by M. P. Collins, and D. Mitchell. Spon Press. ISBN: 0419249206. January 2005. 784 pages
- “*Design of Prestressed Concrete Structures, 3<sup>rd</sup> Edition*” by T.-Y. Lin, and N. H. Burns. John Wiley & Sons. ISBN: 0471018988. June 1981. 646 pages
- “*Design of Prestressed Concrete, 2<sup>nd</sup> Edition*” by A. H. Nilson. John Wiley & Sons. ISBN: 0471830720. March 1987. 608 pages

### Tentative course outline:

1. Concrete and steel material properties
2. Methods and basic concepts related to stresses and loads
3. Prestress losses
4. Analysis and design of prestressed members for flexure
5. Design of composite members
6. Analysis and design of prestressed members for shear
7. Short-term and long-term deflection considerations, deflection control and cracking
8. Torsional effects.
9. Complete design examples.