

**Western University-Faculty of Engineering
Department of Civil and Environmental Engineering**

CEE 9628 - Prestressed Concrete - Course Outline - January 2013

Dr. M.A. Youssef, P.Eng., SEB3020B, youssef@uwo.ca, Secretary SEB3005

This course will cover basic understanding of the behaviour of prestressed concrete and the design of statically determinate and indeterminate prestressed concrete structures.

Outline of Course Topics:

1. *Introduction:*
Principles and methods of prestressing, material properties, partial loss of prestress
2. *Axially loaded members:*
Short-term and long-term response, tension stiffening, width and spacing of cracks
3. *Flexural Analysis and Design:*
Moment-curvature relationship, service load design, ultimate flexural strength, composite beams, camber and deflections, width and spacing of cracks
4. *Columns:*
Combined axial load and flexure
5. *Shear design:*
Simplified method, modified compression field theory
6. *Indeterminate Prestressed Concrete Structures:*
Restraint action
7. *Disturbed regions:*
Anchorage zones, strut and tie models, bearing resistance, shear friction, shear interface of composite beams

Evaluation:

The final mark will be determined as follows:

Assignments ¹	50%
Final Examination (open book)	50%

Total	100 %

1. All work must be done professionally on engineering computation paper. All developed programs and excel spread sheets must be copied on a CD and attached. They should be self-explanatory.

Note: Students must pass the final examination to pass the course.

Use of English:

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Assignments:

Late assignments will be penalized 10% per day late.

Suggested References:

- CDH, 2006, Concrete Design Handbook (Third Edition), Cement Association of Canada, Ottawa, ON.
- CPCI, current edition, *Design Manual: Precast and Prestressed Concrete*, Canadian Prestressed Concrete Institute, Ottawa, ON.

Contact Hours:

2.5 lecture-hours /week

Computing:

Students are required to use personal computers running a Windows environment.

Cheating:

University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning. (see Scholastic Offence Policy in the Western Academic Calendar).

Conduct:

Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others.

Sickness and other Problems:

Students should immediately consult with the instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see attached). The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

Notice:

Students are responsible for regularly checking their e-mail, the course website and notices posted outside the Civil and Environmental Engineering Department Office.

The document "INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMIT ASSIGNMENTS AS SCHEDULED" is part of this course outline.