
**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
FACULTY OF ENGINEERING
THE UNIVERSITY OF WESTERN ONTARIO**

**CEE 9571a/b– Advanced Concrete Technology
Course Outline – Winter 2012**

- OBJECTIVES:** The objectives of this course are for the student to:
1. learn the manufacturing of cements, their hydration and microstructure.
 2. characterise the engineering properties of cement-based materials
 2. recognise the effects of the rheology and early-age properties of concrete on its long-term behaviour
 3. develop an advanced knowledge of the mechanical performance of cement-based materials and how it can be controlled
 4. use various chemical admixtures and mineral additives to design cement-based materials with tailor-made mechanical and durability properties.
 5. understand the mixture design and engineering properties of special concretes such as high-performance concrete, self-consolidating concrete, fibre-reinforced concrete, sprayed concrete, etc.
 6. bridge the gap between materials science and structural engineering so that concrete can be used properly in structural concrete projects.

PREREQUISITES: CEE 3358, CEE 3369b or their equivalent, by permission of the Instructor.

CO-REQUISITES: None.

ANTIREQUISITES: None.

TOPICS:

1. Cement manufacturing, cement hydration and microstructure
2. Properties of fresh concrete
3. Chemical and mineral admixtures in concrete
4. Mechanical properties of concrete
5. Dimensional stability of cement-based materials
6. Special concretes
 - a. High performance concrete
 - b. Self-consolidating concrete
 - c. Fibre reinforced concrete
 - d. Lightweight concrete
 - e. Polymer modified concrete
 - f. Sprayed concrete (shotcrete)

CONTACT HOURS: 2 (discussion/lecture) hours/week.
1 tutorial hour per week.

REFERENCES:

The course will be based on recent publications. Copies of lecture presentation and other reference materials will be posted on the WebCT site of the course. The following textbooks are suggested to complement information.

- [1] Properties of Concrete, A.M. Neville, Wiley
- [2] Concrete Admixtures Handbook, Noyes
- [3] Manual of Concrete Practice, ACI
- [4] Technical Journals including ACI Materials Journal, Cement and Concrete Research, Materials and Structures, etc.

UNITS: SI units will be used in lectures and examinations.

EVALUATION:	Final Examination	40%
	Term paper	40%
	Assignments	15%
	Presentation	05%
	Total	100%

TERM PAPER A term paper must be submitted 2 weeks before last class. Groups of up to 3 students can work on one term paper project. The paper must be written in the format of the ACI Materials Journal. The topic of the paper could be selected from a list provided by the instructor. A topic proposed by a student can be used if approved by the instructor.

PRESENTATION Each student/group of students will have a 15-minute presentation of their term paper followed by a 5-minute question period at least one week before the end of classes.

ENGLISH: In accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests and examinations for the improper use of English. Additionally, poorly written work with the exception of final examinations 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.

INSTRUCTOR: Dr. M.L. Nehdi, P. Eng., Professor, SEB-3083,
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Teaching Assistant: Dr. Ahmed Soliman; amoham67@uwo.ca
Administrative Assistant: Whitney Barrett, SEB-3010

CONSULTATION: Students are encouraged to discuss problems with their instructor at the end of the lecture, or during individual consultations arranged by appointment.

ATTENDANCE

Any student, who, in the opinion of the instructor, is absent too frequently from class, will be reported to the Dean (after due warning has been given). On the recommendation of the Department and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

SICKNESS / 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 email, the WebCT site of the course, and notices posted outside the Civil and Environmental Engineering Department Office.

Suggested Topics for Term Papers

List will be posted on the course website.