

ES 598 a/b – Durability, Monitoring, and Rehabilitation of Concrete Structures

Course Outline

OBJECTIVE: The objectives of this course are for the students to become able to:

1. Recognize the mechanisms of degradation of concrete structures;
2. Design repair strategies for deteriorated concrete structures including repairing with composites;
3. Learn how to conduct field monitoring and non-destructive evaluation of concrete structures.

PREREQUISITES: CEE 347a/368, CEE 369b or their equivalent, by permission of the Instructor.

CO-REQUISITES: NONE.

ANTIREQUISITES: NONE.

TOPICS:

Properties of cement and concrete. Mechanisms of degradation of concrete structures. Damage identification. Repair materials and strategies. Repair and rehabilitation with composites. Monitoring and non-destructive evaluation of concrete structures. Forensic engineering. Service life prediction and analysis. Durability and repair of concrete pavements (time permitting).

CONTACT HOURS: 2 (discussion/lecture/tutorial) hours/wk (personal study - 6 hours).

REFERENCES:

The course will be based on recent publications. Copies of technical papers will be placed for reference in room ESB3005. The following textbooks are suggested to complement information.

- [1] Concrete Repair and Maintenance Illustrated, P.H. Emmons, 1993
- [2] Concrete Repair Manual, American Concrete Institute, 1999
- [3] Guide to Evaluation of Concrete Structures Prior to Rehabilitation, ACI Committee 364, 1994.
- [4] Service Life Prediction, State of the Art Report, ACI Committee 365, 2000.

[5] Durability of Concrete in Cold Climates, E & FN Spon, by M. Pigeon and R. Pleau, 1995.

[6] Guide to Durable Concrete, ACI Committee 201, 1992.

COMPUTING: Assignments may require the use of structural analysis software.

LABORATORY:

There is no formal laboratory component of this course. However, site visits may be organized for the inspection and evaluation of existing damaged concrete structures in the London area.

UNITS: SI units will be used in lectures and examinations

EVALUATION:

Final Examination	40%
Term Paper	40%
Presentation	10%
Assignments	<u>10%</u>
Total	100%

TERM PAPER:

A term paper must be submitted 2 weeks before last class. 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 will have a 15-minute presentation of his/her term paper followed by a 5-minute question period at least one week before the end of classes. The sequence of presentations will be determined randomly at the beginning of the term.

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 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., ESB3039A, email: mnehdi@eng.uwo.ca

Secretary: SEB 3005

CONSULTATION:

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

NOTICE:

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. Students are responsible for regularly checking their email and notices posted outside the Civil and Environmental Engineering Department Office.