

Syllabus – Fall 2014 (Draft subject to change)
ENGR 5660 Advanced Civil Engineering Materials
ENCE 4999 Topics in Advanced CE Materials

COURSES: ENGR 5660 ENCE 4999 3 Credits

INSTRUCTOR: Dr. Weidong Wu

Office: EMCS 440B

Phone: (423) 425-5822

E-Mail: Weidong-Wu@utc.edu

CLASS MEETING: TBD

MEETING ROOM: TBD

OFFICE HOURS: Open door policy or by appointment

DESCRIPTIONS:

This class teaches the physical and mechanical properties of both conventional and emerging materials used in civil engineering. The course will cover advanced topics about material properties of steel, cement, concrete, and soil. Material modeling and simulation may also be presented. State-of-the-art research in development of new civil engineering materials will be introduced.

OBJECTIVES

The students should have in-depth knowledge and better understanding about conventional CE materials. They should have fundamental knowledge of some emerging materials. The students will be able to write good technical report and give professional presentation.

HOMEWORK AND PROJECT:

All HWs need to be typed (will also accept scanned copies of nicely AND neatly handwritten materials) and submitted electronically to my email with subject: Your last name_HW#

The students should identify a project problem, finish the report and present his/her work in the last lecture of this course.

The instructor will give students latest publications about civil engineering materials. The students are expected to read, understand, summarize and share with his/her fellow students by giving 5-10 minutes talks.

TEXTBOOKS:

No textbook required. The following is a list of books to be used in this class.

1. Mehta, P.K. and Monteiro, P.J.M. *Concrete microstructure, properties, and materials*, 4th ed. Mc Graw Hill 2014

2. Allwood J.M., and Cullen, J.M. *Sustainable materials with both eyes open*, UIT Cambridge Ltd. 2012
3. Daczko, J.A. *Self-consolidating concrete*, Spon Press 2012
4. Michael S. Mamlouk and John P. Zaniwski, *Materials for Civil and Construction Engineers*, Prentice Hall, 3rd ed, 2010
5. Roberto A. Lopez-Anido (Editor), Tarun R. Naik (Editor), Gary T. Fry (Editor), *Emerging materials for civil infrastructure*, ASCE 2000
6. Aitcin, P.C. *High-performance concrete*, E& FN Spon 1998
7. Tsai S.W. *Theory of composites design*, Think composites 1992

GRADING POLICY:

A final grade will be assigned based on the following percentages:

Homework: 40%

Mid-term exam: 15%

Course project: 30%

Final exam: 15%

A: 90 and above B: 80-89 C: 70-79 D: 60-70 F: 59 and below

The undergraduate will not need to present during the class.

The final score will also be based on the student's overall performance.

HONOR CODE:

OFFENSES: Cheating on any exam, quiz, work to be completed in class; cheating on final examination; theft or attempted theft of exam questions or possession of exam questions prior to the time of the examination shall all be offenses subject to appropriate penalties. • PENALTIES: The penalty for commission of any offense set out above is failure in the course and, subject to the approval of the Chancellor, dismissal or suspension from the University.

STUDENTS WITH DISABILITIES

If you are a student with a disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) and think that you might need special assistance or a special accommodation in this class or any other class, call the Disability Resource Center (DRC) at 425-4006 or come by the office, 102 Frist Hall. The instructor will then be happy to work with the student to make reasonable accommodations.

TENTATIVE TOPICS (Subject to change)

1. Introduction

2. Fundamental concepts of civil engineering materials engineering
3. Advanced topics on conventional Civil Engineering materials (Steel, Concrete, Aggregate, Cement, Soil,...)
4. Concrete:
 - a. High Performance Concrete
 - b. Pre-stressed concrete
 - c. Fiber reinforced concrete
 - d. Self-consolidating/compacting concrete (SCC)
 - e. Recycling of asphalt concrete
5. Composite materials
6. Sustainable/green materials
7. Smart materials
8. Nano materials
9. Computational modeling of civil engineering materials