CE 584
Concrete Materials and Properties
Spring 2007

Instructor: Dr. Ghassan Chehab
221B Sackett Building
Ph: 863-2936
Email: gchehab@engr.psu.edu
http://www.engr.psu.edu/ce/Divisions/Pavements

Lecture: TTh 11:15-12:30; 207 Thomas

Office Hours: Tuesday: 1:00-3:00
You are welcome to make appointments for visit outside of office hours.

ANGEL: The ANGEL system will be used for communication, postings, and other applications as the need arises. Utilizing ANGEL for group collaboration is encouraged.


Evaluation Activities and Grading:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Grade</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>35%</td>
<td>Date to be agreed upon, comprehensive and in class</td>
</tr>
<tr>
<td>Research paper presentations</td>
<td>15%</td>
<td>10 min. presentations, total of 3 papers on recent research topics related to course content</td>
</tr>
<tr>
<td>Field/Research group project</td>
<td>35%</td>
<td>Groups formed in class; requires either site visits or lab-related work</td>
</tr>
<tr>
<td>Quizzes and assignments</td>
<td>15%</td>
<td>To be announced in class</td>
</tr>
</tbody>
</table>
Course Goal: The goal of the course is to introduce graduate students and seniors to the properties, behavior, and application of Portland cement concrete. The format emphasizes latest research and hands-on learning.

Course Objectives: The course objectives are summarized as follows:

- Provide an overview of concrete materials;
- Describe concrete macro- and micro-structure;
- Discuss concrete durability, distresses, remediation, and rehabilitation;
- Discuss production and construction practices;
- Relate concrete material properties to strength and performance in the context of building structures and transportation infrastructure;
- Describe concrete material behavior and characterization
- Update students on recent advances, latest research, and pertinent technologies;

Course Outline:

- Overview
- Composition of Concrete Mixtures
- Properties of Fresh Concrete
- Concrete Durability and Strength
- Concrete Production and Construction
- Testing of Hardened Concrete
  - Mechanical Properties
  - Non-Destructive Methods
- Concrete in Super- and Infra-structure
- Advances in Concrete
  - Specialty Mixtures
  - Repair Materials
  - Advanced Construction Processes
  - Applications and Products
- Concrete Behavior and Characterization