

**CEE 474**  
**Construction Materials**

- Catalog data:** 20-CEE-474. Construction Materials. 3 ug. cr. General characteristics, physical properties, methods of manufacturing and uses/design of concrete, mortar, brick, steel, wood, and asphalt.
- Prerequisites:** ENFD 375 (Basic Strength of Materials), CEE 381 (Structures I).
- Textbook:** Derucher et al., *Materials for Civil and Highway Engineers*, 4<sup>th</sup> ed., Prentice Hall, 1998 and/or Somayaji, *Civil Engineering Materials*, 2<sup>nd</sup> ed., Prentice Hall, 2001. (Note – One textbook is selected – professor’s preference – and the other is used a reference.)
- References:** *ASTM Standards, AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, ACI Manual of Concrete Practice, National Design Specifications for Wood Construction.*
- Coordinator:** Richard A. Miller, Associate Professor, 732 ERC, 556-3744, Richard.Miller@UC.EDU
- Goals:** This course introduces students to the basic tests for civil engineering materials. Students learn basic QC/QA tests for concrete, aggregates, asphalt, wood, masonry and steel.
- Lecture or lab topics:**
1. Aggregates
  2. Concrete – Fresh property tests
  3. Concrete – Hardened property tests
  4. Concrete – reinforced beam test
  5. Masonry prism tests/ Mortar cube tests
  6. Asphalt – Marshall testing
  7. Wood – Tension, bending and compression
  8. Steel – tensile properties
- Computer usage:** Use of spreadsheets and word processors for lab reports is required
- ABET criterion 3:** a, b, f, g,
- ABET criterion 8:** a, e
- Date prepared:** November 11, 2003  
Last Update April 25, 2007

### **Specific Examples of ABET Criterion 3**

- a: Students are expected to perform statistical analysis and curve fitting on lab data.
- b: Students perform experiments and must analyze data for lab reports. Simply reporting data is insufficient. Students must discuss possible sources of and magnitudes of error, compare to expected (published) values and report problems with and deviations from standard procedures.
- f: Specifications, tests and standards are not simply presented from a technical viewpoint, but are also discussed in the context of professional integrity, i.e. that there is a moral responsibility to properly enforce standards and specifications to assure the client is receiving his/her money's worth. There are discussions of the pressure on Quality Control/Quality Assurance personnel to "overlook" violations of the standards, especially when the enforcement of a standard will cause additional costs and/or affect profitability. There are also discussions on how firms might attempt to cut costs and increase profits through the use of uncertified or improperly trained personnel, use of un-calibrated or improperly maintained equipment, failure to follow exact test methods to save time or labor, etc.
- g: Students are required to write lab reports as though they are a testing lab reporting results to a client. As a group, they must present a letter of transmittal summarizing results and appendices discussing testing procedures and results. Individual discussions of the results are also required. Students are instructed to write as though the reader is a Civil Engineer, but is not necessarily familiar with the specific tests.

### **Specific Examples of ABET Criterion 8**

- a: See "a" above.
- e: See "f" above.