

CIVL-415 – Reinforced Concrete Design - Fall 2008

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Office Hours: MW 9:00-10:50 AM, F 9:00-9:50 AM

Course Description: Introduction to the analysis and design of reinforced concrete structural elements by the strength design method. Laboratory includes experiments on concrete, concrete structural elements, and a design project.

Course Objectives:

- Provide students with an understanding of the behavior of reinforced concrete structures
- Develop characteristics for a variety of reinforced concrete structural component types
- Introduce analytical tools for mathematical modeling of structural elements and systems
- Apply basic concepts of structural design including design strength envelopes
- Provide a solid foundation for subsequent study of more advanced topics
- Review and reinforce fundamental skills in mathematics, science and engineering, statics, strength of materials, structural mechanics, materials testing lab and soil mechanics
- Provide a understanding of concrete as a construction material
- Provide laboratory experience with cement, concrete aggregates, and concrete properties
- Provide students with a team based capstone design experience for the structures portion of the CE curriculum
- Prepare students for successful completion of the professional PE examination

Course Texts:

- Reinforced Concrete Design, Wang, 7th Edition, Wiley, 2007 ISBN 9780471262862

Prerequisites: CIVL-312, CIVL-313

Meetings: MWF 8-9, in Siskiyou 120

No Class Days: Sept. 1 (Labor Day), Nov 11 (Veterans Day), Nov. 24 through 28 (Thanksgiving)

Final Exam: Friday, December 19, 2008 @ 8:00 9:50 AM, Siskiyou 120.

Grading Basis: There will be homework, quizzes, a design project, lab scores, 2 one-hour tests and a two-hour final exam. Several design problems will be assigned during the term, including one computer design project. The final grade will be based on the following proportions: *A failing grade in the laboratory portion of class will result in a failing grade for the course!

Homework & Quizzes	10 %
2 midterm tests	35 %
Lab scores	25 %
Design Project	10 %
Final exam	20 %

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ABET Criteria:

This course has been identified to help you meet ABET Criteria listed below:

- b. Ability to design and conduct experiments and analyze and interpret data
- c. Ability to design a component to meet desired needs
- e. Ability to identify, formulate and evaluate engineering problems
- g. Ability to communicate effectively
- k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

To pass this course, you must show you have met these criteria as follows:

Ability to design and conduct experiments, as well as to analyze and interpret data – Each student is required to formulate a laboratory procedure for measuring the deflection of the concrete beam in order to obtain Load vs. Deflection, and Load vs. Moment. The laboratory procedures are evaluated on a 10-point scale. Typically, 9 to 10 points would represent mastery, 8 points above adequate proficiency, and 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. Proficiency is required on this project to graduate in the Civil Engineering department.

Ability to design a system, component or process to meet desired needs – The final score on the Structural design project is used to measure student proficiency with each student having to design at least one specific component of the design project in each of the 5 phases of the design. Project submittals that pertain to the design of structural systems and components are evaluated on a 10-point basis. Typically, 9 to 10 points would represent mastery, 8 points above adequate proficiency, and 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. Proficiency is required on this project to graduate in the Civil Engineering department.

Ability to identify, formulate, and solve engineering problems – Student proficiency is measured by scores on homework, exams and the final design project. The final grade in this course is the evaluation of this criterion.

Ability to communicate effectively – Student proficiency is measured by the score on at least one technical oral presentation on a topic related to the material design project. Presentations are evaluated on a 10-point basis. Typically, 9 to 10 points would represent mastery, 8 points adequate proficiency, and below 8 points would be indicative that the student lacks proficiency in effective communication skills. Proficiency is required on this project to graduate in the Civil Engineering department.

Ability to use techniques, skills, and modern engineering tools for engineering practice – Student proficiency is measured by a score on Lab 2, Structural Analysis of Buildings. Exercise is evaluated based on completeness, quality and answering the questions given on the assignment. It is evaluated on a 20-point basis. 18 to 20 points would represent mastery, 16 to 18 points above adequate proficiency, 12 to 16 points adequate proficiency, and below 12 points, students lack proficiency. Proficiency is required on this lab to graduate in the Civil Engineering department.