CIVE 467 – Design of Reinforced Concrete Structures  
Spring 2015  
MWF 12:00-12:50pm  Engineering 120

Instructor:  
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Office Hours: MWF 1-2:30 pm  
I will do my best to always be available at these times. Also, if my door is open at other times feel free to stop by. If you have trouble reaching me please schedule an appointment via email.  
Course Website: Canvas

Course Objectives:  
A student successfully completing this course will be able to:  
1. Describe the structural design process including the importance of design philosophies, in particular Load and Resistance Factor Design (LRFD).  
2. Determine dead and live loads for design of basic structures using ASCE 7 minimum load requirements and tributary areas.  
3. Describe how the material properties and behavior of concrete and reinforcement affect design.  
4. Use ACI 318 to analyze and design RC beams loaded in flexure and shear, including one-way slabs, considering both strength and serviceability limit states.  
5. Use ACI 318 and appropriate design aids to analyze and design RC columns and beam-columns – particularly “short” columns  
6. Create designs meeting the detailing requirements of ACI 318 including development and splice lengths, minimum and maximum bar spacings, and minimum cover.  
7. Explain and consider in their designs, design constraints related to safety (strength limit states), economy (least member size), and constructability.

Topics:  
1. Design process and philosophies  
2. Structural Loads  
3. Material properties of concrete and reinforcement  
4. Flexure of beams and one-way slabs  
5. Shear  
6. Detailing requirements  
7. Columns and Beam Columns  
8. Footings  
9. Various design considerations such as sustainability as time permits.

Required Text:  
ACI 318-14 Building Code Requirements for Structural Concrete and Commentary. American Concrete Institute, Farmington Hills, MI: 2014.

You should bring this book to class with you EVERY DAY. An important part of the course is becoming familiar with the code and learning how to interpret its provisions.

In order to get the student discounted price of $99 you will need to become a student member of ACI and order your code. Detailed ordering directions are posted on Canvas. Code orders should be placed by January 23, 2015 in order to receive your code in time to keep up with the class.
Supplementary Texts:
It usually takes a while for textbooks to catch up with code updates. I have heard that there is an updated book, but I have not been able to find the book on the web for purchase. If I get better information I will let you know. The basic theory behind the design of reinforced concrete beams and columns has not changed, and it is my understanding that ACI 318-14 is different from ACI 318-11 primarily in terms of organization (i.e. where things are located within the code). If you are the type of student who finds textbooks to be an important learning tool I would still recommend looking into traditional textbooks. A used or older edition, or a book from the library, might be cost effective options – just make sure the book is newer than 2002 (there was a major change in design philosophy at that time). The book listed below is my favorite reinforced concrete design textbook, but it does have quite a bit of theory and is pretty expensive.


Prerequisites: CIVE 367

Assignments and Grading:

Homework (15%)
Homework problems will be assigned as needed, roughly once a week. These assignments should be completed individually, although I encourage you to consult with other students and me when necessary. Make sure you give every problem a reasonable amount of effort before seeking help. Remember that working through the problems is one of the best ways to learn the material and prepare for tests.

Assignments will be due by 3:00pm on the assigned due date. Late assignments will not be accepted.

Engineers must be able to communicate their work to each other. Hand calculations are part of the design documentation process. Homework should be completed on one side of engineering paper. Your submitted work should document your complete process, including all the steps you took to reach the solution, references to equations and code sections that you used and listing any necessary assumptions. Organization, neatness, and completeness (in terms of solution process) will count for 10% of the grade on each homework assignment. This part of the grade will be assigned at the grader’s discretion; but I will instruct them to grade this component harshly.

Weekly Quizzes (15%)
We will have a short quiz at the beginning of class each Friday. Quizzes will cover lecture topics and assigned reading from ACI 318 from the preceding week. The quizzes are intended encourage students to stay on top of course subjects and help me judge student understanding as we go through the semester. Quizzes will emphasize conceptual content but will also have some calculations. Students will be allowed to use their own copy of ACI 318 and a FE approved calculator during quizzes.

Class Participation/Behavior (3%)
I expect students to be respectful to me and their fellow students. One percentage point will be subtracted for each occurrence of disrespectful behavior such as (but not limited to) students holding private conversations while I am talking or disruptive entrances and exits from the classroom. Students who continue to display disruptive behavior after they have lost all 3% will be referred to the Office of Conflict Resolution and Student Conduct Services. I also expect students to stay on task during class periods when I allow time for working either individually or in pairs. If students consistently get off task, class participation points may also be lost.

Exams (67%)
There will be two midterms (20% each) in this class and a final (27%). All tests will be cumulative with an emphasis on more recent material. Students must use a FE approved calculator on exams. Students will be allowed to use their copy of ACI 318 and a single page (8½ x 11, front and back) formula sheet
during tests. Students may write in manuals as they see fit, and they may use SMALL tabs to mark significant pages, but larger tabs/post-its with notes are NOT ALLOWED.

Midterms will be announced in class at least one week prior to the test date. I am tentatively planning to have them in class on Wednesday February 25th and Wednesday April 1st. The final exam will be given on Wednesday, May 13th from 7:30-9:30am as scheduled by the university. Make-up exams will be given only in extraordinary, documented circumstances.

Final Grades
Term grades for this course will be assigned using +/- grading. Remember these grades are a reflection of your work throughout the semester. You need to start worrying about your final grade NOW. By the time we get to May it is too late to make big changes.

Academic Integrity:
This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog (http://catalog.colostate.edu/Content/files/2014/FrontPDF/1.6POLICIES.pdf) and the Student Conduct Code (http://www.conflictresolution.colostate.edu/conduct-code).

As stated by the Catalog “Academic integrity is conceptualized as doing and taking credit for one's own work.” Promoting academic integrity is particularly important to me as your professor because I want to be fair to all students, because I believe that all students in this class are capable of success on their own, and because you are training to be civil engineers – a profession that has deep responsibility for public safety. I believe that to be ethical engineers in the future you must practice being ethical students now.

In this class all assignments should be completed by individuals. Below I have described in general terms how academic integrity applies to each graded component. This description is not all-inclusive, please contact me if you have questions about behaviors not specifically described here.

Exams will include the following honor pledge for you to sign:

I have not given, received or used any unauthorized assistance on this exam.

Homework Assignments – Students are encouraged to consult with and learn from each other, but the final submitted assignment must reflect the individual effort and understanding of the student submitting the assignment. Direct copying is not acceptable and in this case all students with the same work will be given a zero.

Weekly Quizzes - Quizzes should be completed individually without aid from other students. Students are allowed to use only their own copy of ACI 318.

Exams – The midterm and final exams should be completed individually without aid from other students. Students are allowed to use only their own copy of ACI 318 and a one page formula sheet. Exams must be taken with FE approved calculators.

Class Participation/Behavior – When I ask for group work during class sessions it is important that each student participates in the assignment, so as not to compromise the learning opportunity of other students.

Special Needs:
If you have any special needs please come visit me during office hours so that we can discuss how I can help you be successful in this course.