PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

REINFORCED CONCRETE DESIGN
CET 2420

Class Hours: 3.0  Credit Hours: 3.0
Laboratory Hours: 0.0  Revised: Spring 2011

Catalog Course Description:

Design of reinforced concrete structures, fundamentals of design of beams, columns, floor systems, footing and retaining walls.

Entry Level Standards:

Students entering this course should have good note-taking and study skills. Good math skills are a must.

Prerequisite:

MET 1040

Textbook(s) and Other Course Materials:

Text:
Simplified Reinforced Concrete, Nawy, Prentice Hall

Reference:
Simplified Design of Reinforced Concrete, 4th edition, Harry Parker, John Wiley and Sons, Inc.
Reinforced Concrete Fundamentals, 3rd edition, Phil M. Ferguson, John Wiley and Sons, Inc

Other:
- Paper
- Pencil

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Concrete as a Material</td>
</tr>
<tr>
<td>2</td>
<td>Placing, Curing and Testing of Concrete</td>
</tr>
<tr>
<td>3</td>
<td>Flexural Analysis and Design Principles</td>
</tr>
<tr>
<td>4</td>
<td>Bonds and Anchorage of Steel Reinforcement</td>
</tr>
<tr>
<td></td>
<td>EXAM I</td>
</tr>
<tr>
<td>5</td>
<td>Design of Rectangular Beams</td>
</tr>
<tr>
<td>6</td>
<td>Design of Rectangular Beams</td>
</tr>
</tbody>
</table>
II. Course Goals*:

The course will:

A. Build the skills to determine the physical and mechanical properties of reinforced concrete. I & II
B. Develop an awareness of the ACI design code limitations. I & II
C. Build the skills to apply ACI code limits to beam design. I, II & III
D. Build the skills to apply ACI code limits to column design. I, II & III
E. Build the skills to apply ACI code limits on reinforcing steel design. I, II & III
F. Expand the student’s understanding of how to determine foundation loads and design footings. I, II & III

*Roman numerals after course objectives reference goals of the Engineering Technology program.

III. Expected Student Learning Outcomes*:

The student will be able to:

1. Explain the basic hypothesis of concrete. A
2. Describe how cement is manufactured. A
3. Explain the importance of the water/cement ratio. A
4. Identify admixtures and their importance. A
5. Standardized tests on both fresh and hardened concrete. A
6. Explain the nature of bending stresses and the nature of beam failure. B
7. Apply ACI load factors correctly in design calculations. B
8. Design singly reinforced beams in flexure. B,C
9. Design a one-way slab. C
10. Design a doubly reinforced beam in flexure. C
11. Design T and L beams. C
12. Properly design reinforcing steel for bond and anchorage. E
13. Design beams for deflection and cracking. C
14. Explain how column loading and column type affect design considerations. D
15. Design rectangular columns. D
16. Design round columns. D
17. Identify the types of footings. F
18. Explain the shear and flexural behavior of footings. F
19. Design footings. F
20. Design retaining walls. F

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures: 70 – 80% of grade

Four examinations are scheduled. They will be True/False, Multiple Choice, Matching, and Problem Solving. Students normally have 1 week to complete the exam.

Examinations will normally be given as scheduled. Should a student have a planned vacation, operation, etc. occur during a scheduled exam, every effort should be made to take the exam prior to the scheduled absence. When a student misses an exam due to illness, he must contact the instructor immediately upon return and make-up the exam within one week.

B. Laboratory Expectations:

N/A

C. Field Work:

N/A

D. Other Evaluation Methods: 20 – 30% of grade

Quizzes:
Quizzes may be given by the instructor. Most quizzes will be unscheduled and randomly given. They cover the previous sessions material or the reading assignment for that day. There is no make-up or extra credit given for quizzes missed.

Written Assignments:
A minimum of two written reports will be required. Topics will be provided by the
instructor. Students will also be required to hand in appropriate homework at the instructor's discretion. All written assignments must be handed in on 8½ x 11 engineering notepad paper, typing paper, or forms provided by your instructor.

All written assignments will be assessed a 10% penalty for each school day it is late. All student work submitted for evaluation may be retained by the instructor.

A subjective evaluation based on attendance, classroom participation and attitude may be included (10%).

E. Grading Scale:

Grades are based on the following:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>91 - 100</td>
<td>A</td>
</tr>
<tr>
<td>86 - 90</td>
<td>B+</td>
</tr>
<tr>
<td>81 - 85</td>
<td>B</td>
</tr>
<tr>
<td>76 - 80</td>
<td>C+</td>
</tr>
<tr>
<td>71 - 75</td>
<td>C</td>
</tr>
<tr>
<td>66 - 70</td>
<td>D+</td>
</tr>
<tr>
<td>60 - 65</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>F</td>
</tr>
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</table>

V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of the Learning Division, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of the Learning Division.

B. Academic and Classroom Misconduct:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

• Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
• Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
• Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
• Taking an exam for another student.
• Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
• Any of the above occurring within the Web or distance learning environment.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical
information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at www.pstcc.edu/departments/swd/.