

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE  
MASTER SYLLABUS

**REINFORCED CONCRETE DESIGN  
CET 2420**

**Class Hours: 3.0**

**Credit Hours: 3.0**

**Laboratory Hours: 0.0**

**Date Revised: Spring  
02**

**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 Reference Materials Basic to the Course:**

Text:

*Simplified Reinforced Concrete*, Nawy, Prentice Hall

Reference:

*ACI 318-77 Building Code Requirements for Reinforced Concrete With Commentary*, Notes on ACI 318-77, Portland Cement Association.

*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:**

<b>Week</b>	<b>Topic</b>
1	Concrete as a Material
2	Placing, Curing and Testing of Concrete
3	Flexural Analysis and Design Principles
4	Bonds and Anchorage of Steel Reinforcement EXAM I

5	Design of Rectangular Beams
6	Design of Rectangular Beams
7	Design of T Beams
8	Design of T Beams
9	Design of Beams in Torsion EXAM II
10	Design of One-way Slabs
11	Design of Retaining Walls EXAM III
12	Analysis and Design of Columns
13	Analysis and Design of Columns
14	Design of Footings
15	Design of Footings; Concrete
16	FINAL EXAM

## II. Course Objectives\*:

- A. Determine the physical and mechanical properties of reinforced concrete. I & II
- B. Ascertain the ACI design code limitations. I & II
- C. Apply ACI code limits to beam design. I, II & III
- D. Apply ACI code limits to column design. I, II & III
- E. Apply ACI code limits on reinforcing steel design. I, II & III
- F. Determine foundation loads and design footings. I, II & III

\*Roman numerals after course objectives reference goals of the CET program.

## III. Instructional Processes\*:

Students will:

1. Actively listen to class lectures and participate in class activities that develop and reinforce comprehension of the theories, concepts, principles and applications of distance measurement using surveying instruments. *Communication Outcome, Problem Solving & Decision Making Outcome, Active Learning Strategies*
2. Work individually and in teams to complete class assignments. *Communication Outcome, Problem Solving & Decision Making Outcome, Information Literacy Outcome, Active Learning Strategies*
3. Use WordPerfect/Word or other appropriate software to generate written home work

assignments. *Communication Outcome, Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

4. Interpret and use the ACI design Code. *Communication Outcome, Technological Literacy Outcome, Active Learning Strategies*

\*Strategies and outcomes listed after instructional processes reference Pellissippi State's goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

#### **IV. Expectations for Student Performance\*:**

Upon successful completion of this course, the student should 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

\*Letters after performance expectations reference the course objectives listed above.

## V. Evaluation:

### A. Testing Procedures:

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:

#### 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 8 1/2 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.

### C. Field Work:

N/A

### D. Other Evaluation Methods:

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

### E. Grading Scale:

Final grades will be computed from the grades obtained on homework, quizzes and examinations as follows:

Quizzes & Homework = 20% - 30%

Examinations = 70% - 80%

Grades are based on the following:

91 - 100 A

86 - 90 B+

81 - 85 B

76 - 80 C+

71 - 75 C

66 - 70 D+

60 - 65 D

Below 60 F

## VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog). Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

It is the student's responsibility to attend every scheduled class activity on time.

Students are responsible to get assignments missed and to make-up any work missed during an absence

B. Academic Dishonesty:

To use any form of unauthorized aid (notes, text, etc.) during a quiz or obtain any form of help from another student during testing is considered a form of cheating. Any time any form of cheating is observed the student will receive a 0 on that quiz or test.