

PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

STRUCTURAL STEEL DESIGN
CET 2410

Class Hours: 3.0

Credit Hours: 3.0

Laboratory Hours: 0.0

Revised: Fall 2013

Catalog Course Description:

Design of structural steel members and their connections. Topics include tension and compression members, beams, girders, trusses, and columns subjected to concentric and eccentric loads.

Entry Level Standards:

Students entering this course should have some note-taking and study skills. They need some reading comprehension and written communication skills. Students may enroll in this course concurrently with DSPS, DSPW and DSPM courses.

Prerequisites:

MET 1040

Textbook(s) and Other Course Materials:

Textbook:

Steel Buildings: Analysis and Design; Dillon, Crawley; John Wiley and Sons, Inc.
Basic Steel Design; Johnston, Lin and Galambos; Prentice-Hall.
Manual of Steel Construction; AISC

Reference:

None

Other:

- A scientific calculator
- 8 1/2 x 11 Engineering Notepad
- Pencil

I. Week/Unit/Topic Basis:

Week	Topic
1	Properties of Steel, Allowable Loads, and Safety Factors
2	Design of Tension Members
3	Beams in Bending
4	Beam Shear, Web Crippling, and Deflection

- 5 Cover Plate Beam Design
- 6 Plate Girder Design
- 7 Continuous Beam Design
EXAM 1
- 8 Column Stresses; Buckling; Effective Length
- 9 Column Design
EXAM 2
- 10 Simple Bolted Connections
- 11 Welded Connections
- 12 Standard Beam Connections
EXAM 3
- 13 Composite Beam Design
- 14 Plastic Design of Steel; Miscellaneous
- 15 FINAL EXAM

II. Engineering Technology General Outcomes (Educational objectives)

- I. Apply basic engineering theories and concepts creatively to analyze and solve technical problems
- II. Utilize with a high degree of knowledge and skill equipment, instruments, software, and technical reference materials currently used in industry.
- III. Communicate effectively using developed writing, speaking, and graphics skills.
- IV. Assimilate and practice the concepts and principles of working in a team environment.
- V. Obtain employment within the discipline or matriculate to a four year program in engineering or industrial technology

III. Engineering Technology Concentration Competencies*

Students will:

- A. Apply the knowledge, techniques, skills, and modern tools for the concentration of study to specifically defined engineering technology activities
- B. Demonstrate the knowledge of mathematics, science, engineering and technology to engineering technology problems using developed practical knowledge
- C. Conduct and report the results of standard tests and measurements, and conduct, analyze and interpret experiment or project results
- D. Function effectively as a member of a technical team
- E. Identify, analyze and solve specifically defined engineering technology-based problems

F. Employ written, oral and visual communication in a technical environment

- At the program level all 6 competencies apply to roman numerals I – V of the Engineering Technology General Outcomes (Educational objectives) listed above.

IV. Course Goals*:

The course will

1. Build the skills to determine the physical and material properties of steel frame members. A ,B & E
2. Build the skills to determine the structural loads on steel frame members. A ,B & E
3. Foster the ability to select the proper rolled structural steel shape to support applied building loads. A ,B & E
4. Foster the ability to use the appropriate design tables on the AISC manual. A
5. Build the skills to design statically determinant beams in accordance with AISC specifications. A ,B, E & F
6. Build the skills to design steel columns. A ,B, E & F
7. Build the skills to design steel connections. A ,B, E & F

*Capital letters after course goals reference the competencies of the Engineering Technology concentrations listed above.

V. Expected Student Learning Outcomes*:

Students will be able to:

- a. Describe typical steels used in steel frame buildings. 1
- b. Explain allowable yield and ultimate design stresses. 1
- c. Describe the physical properties of typical rolled structural steel shapes and their uses. 1 & 3
- d. Explain structural dead loads. 2
- e. Explain structural live loads. 3
- f. Explain net section area. 2 - 6
- g. Explain gross section area. 2 - 6
- h. Explain applied shear forces. 2 - 6
- i. Explain applied tensile forces. 2 - 6
- j. Explain applied compressive forces. 2 - 6
- k. Explain applied bending moments. 2 - 6
- l. Design steel tension members. 4 & 5

- m. Design steel beams in bending. 4 & 5
- n. Determine lateral support when required. 4 & 5
- o. Design steel beams for shear. 4 & 5
- p. Design cover plated beams. 4 & 5
- q. Design web stiffness when required. 4 & 5
- r. Design built-up plate girders. 4 & 5
- s. Design continuous beams. 4 & 5
- t. Design columns. 4 & 6
- u. Design column base plates. 4
- v. Design bolted connections. 4 & 7
- w. Design riveted connections. 4 & 7
- x. Design welded connections. 4 & 7
- y. Design beam to beam connections. 4,5 & 7
- z. Design beam to column connections. 4,5 & 7
- aa. Design column to column connections. 4,5 & 7
- bb. Design composite steel/concrete beams. 5

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

VI. 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:

Students may be required to hand in answers to select questions at the end of each chapter or other appropriate homework at the instructor's discretion. All written assignments must be handed in on 8 x 11 engineering notepad, typing paper, lined paper with smooth edges 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:

91 - 100	A
86 - 90	B+
81 - 85	B
76 - 80	C+
71 - 75	C
66 - 70	D+
60 - 65	D
Below 60	F

VII. 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 Academic Affairs, 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 Academic Affairs.

B. Academic Dishonesty:

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.

Please see the Mississippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that 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 sending email to disabilityservices@pstcc.edu, or visiting Goins 127, 132, 134, 135, 131. More information is available at <http://www.pstcc.edu/sswd/>.

D. Other Policies:

Safety and Equipment Abuse:

Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury could result in automatic failure of the course