PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

STRENGTH OF MATERIALS
MET 1050

Class Hours: 2.0   **Credit Hours: 3.0**

Laboratory Hours: 3.0   **Date Revised: Spring 99**

Catalog Course Description:

A study of the internal reactions within a body caused by external forces acting on the body. Included are stress, strain, torsion, and bending and defection of beams.

Entry Level Standards:

Students entering this course must have a working knowledge of geometry, advanced algebra, and trigonometry.

Prerequisite:

 MET 1040

Textbook(s) and Other Reference Materials Basic to the Course:

Required:
Statics and Strength of Materials. Cheng, Mc Graw Hill, 1997.
References:
Statics and Strengths of Materials. Bassin, Brodsky, & Wolkoff, McGraw-Hill, 4th Edition, 1988.
Statics and Strength of Materials. Morrow, Prentice-Hall, 1981.
Statics and Strength of Materials. Wolf, Merrill Publishing Company, 1988.

I. Week/Unit/Topic Basis:

Week	Topic
1	Moment of Inertia
2-4	Concept of stress; simple stress, shear stress, bearing stress; geometric stress concentration; stress on thin walled pressure vessels
5-7	Introduction to strain; axial strain, thermal strain
8	Mechanical properties of materials
9-10	Torsion
11-12	Shear and bending moments in beams

13-14	Stresses in beams
15	Deflection in simple beams
16	Final Exam Period

II. Course Objectives*:

A. Evaluate the stress and strains in structures and machines. I, II

B. Understand the relationships between stress and strain and use these relationships to evaluate the mechanical properties of common engineering materials. I, II

C. Determine the stress distribution and angle of twist in hollow or solid circular shafts. I, II

D. Evaluate shear forces, bending moments, and deflection along the length of statically determinate beams. I, II

E. Operate equipment used in the field of strength of materials and effectively communicate the results of an experiment. III,IV

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

III. Instructional Processes*:

Students will:

1. Use concepts derived in the text to solve strength of materials problems. This includes those presented in the book and encountered in the laboratory. *Problem Solving and Decision Making Outcome*

2. Evaluate solutions to determine if they are reasonable. *Numerical Literacy Outcome*

3. Participate in laboratory experiments. The laboratory exercises will demonstrate the concepts studied in the text, give the student experience with equipment used in industry, and develop leadership and team working skills. *Problem Solving and Decision Making Outcome, Active Learning Strategy*

4. Evaluate data collected from an experiment and prepare college level written laboratory reports. *Communication Outcome, Technological Literacy Outcome, Numerical Literacy Outcome*

5. Use the concepts from the text and laboratory experiments to design, build, and test a simple truss. A lab report and presentation to the class will be completed on the results. *Communication Outcome, Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Transitional Strategy*

*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. Calculate moment of inertia for a specific cross section. A

2.   Analyze various systems and solve for normal axial stress. A

3.   Analyze various systems and solve for shear stress. A

4.   Analyze various systems and solve for stresses due to abrupt changes in geometrical shape. A

5.   Analyze various systems and solve for axial strain. A

6.   Use stress-strain diagrams to evaluate material properties. A, B

7.   Solve for thermal strain. A

8.   Associate and apply the concepts of Hooke's Law, and Poissons's Ratio. A, B

9.   Calculate torsion stress and angle of twist for structures subjected to twisting loads. C

10.   Draw shear and bending moment diagrams for various types of beams. D

11.   Calculate bending stresses or moments at various sections of a beam. D

12.   Calculate the deflection of beams under varied loads. D

13.   Complete experiments on strength of materials and prepare college level written reports. E

14.   Work with team members to construct a truss, experimentally determine the maximum load the truss can hold, complete a laboratory report and give a presentation to the class on the results. A, B, E

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

V. Evaluation:

A. Testing Procedures: 75% of grade

There will be 6-8 unit exams administered during the course. There will be two comprehensive final exams administered during the course; one at the end of the statics portion and one for strength of materials portion. Each exam will count 10 points.

B. Laboratory Expectations: 20% of grade

Laboratory will include special projects and one oral presentation. Guidelines and requirements for special projects will be provided by the instructor.

C. Other Evaluation Methods: 5% of grade

Based on instructor observation during the course, each student will be evaluated on participation activities. Evaluation parameters to include active participation in class discussions, response to verbal questions, and regular attendance.

D. Grading Scale:

A	92-100
B+	88-91
B	83-87
C+	79-82
C	74-78

D   65-73
F   Below 65

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. Individual instructors may have requirements that are more stringent.

B. Academic Dishonesty:

Cheating on a quiz or assigned project will not be tolerated. First offense will result in immediate dismissal and automatic failure of the course. Assistance from other students is encouraged during the learning stages of the course, but each student is responsible for completing their own course assignments.

C. Other Policies:

Make-Up Exams: As a general rule, no make-up exams will be administered during the course.
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 will result in automatic failure of the course.
Counseling: Counseling is available during posted office hours or by appointment.