

PELLISSIPPI STATE COMMUNITY COLLEGE  
MASTER SYLLABUS

**MACHINE ELEMENTS W/LAB  
MET 2030**

**Class Hours: 2.0**

**Credit Hours: 3.0**

**Laboratory Hours: 2.0**

**Revised: Fall 2010**

**Catalog Course Description:**

A study in the selection, application and maintenance of basic elements common to most machine designs. Topics include shafts, bearings, power transmission and lubrication.

**Entry Level Standards:**

Students entering this course must have a working knowledge of statics, strength of materials, dynamics, and basic machine shop practices.

**Prerequisites:**

MET 1022

**Textbook(s) and Other Course Materials:**

*Machine Elements in Mechanical Design*, 2004, Robert L. Mott, Prentice Hall, Latest Edition

**I. Week/Unit/Topic Basis:**

<b>Week</b>	<b>Topic</b>
1-2	Introduction to Mechanisms W/Related Topics
3-4	Bearings
5-7	Shaft Design & Associated Elements
8-9	Gearing & Cams
10-11	Belt & Chain Drives w/Associated Elements
12	Fasteners & Power Screws
13-14	Design Project
15	Final Presentation & Exam

**II. Course Goals\*:**

The course will:

- A. Demonstrate an acquired knowledge of journal and rolling contact bearings. (A-G)
- B. Demonstrate an understanding of shafts and associated elements. (A-G)
- C. Demonstrate an acquired knowledge of power transmission. (A-G)
- D. Demonstrate an understanding of cams. (A-G)

\*Letters after course objectives reference MET Program Outcomes (as required by ABET).

### **III. Expected Student Learning Outcomes\*:**

The student will be able to:

- 1. explain and apply the hydrodynamic theory of lubrication. A
- 2. solve for life expectancy of a bearing. A
- 3. select an appropriate bearing based on system analysis. A
- 4. calculate critical speeds. B
- 5. select shaft material, size, and shape from standard tables. B
- 6. select appropriate fasteners. B
- 7. analyze system and select appropriate belt and chain drives from standard catalogs. C
- 8. identify basic gear geometry and types of gears. C
- 9. calculate gear forces and stresses. C
- 10. select appropriate gearing system which provides maximum operational efficiency. C
- 11. identify and explain the function of various types of cams and followers. D
- 12. design a simple cam. D

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

### **IV. Evaluation:**

Total evaluation will be based on the following point distribution.

#### **A. Unit Exams: (50 Points)**

There will be 4-6 exams administered during the course.

#### **B. Laboratory: (40 Points)**

Laboratory will include problem-solving sessions and a special design project. Guidelines and requirements for special project will be provided by the instructor.

#### **C. Participation: (10 Points)**

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

response to verbal questions, quizzes, and regular attendance.

D. Other Evaluation Methods:

N/A

E. Grading Scale:

Final grade for this course will be based on the following alphabetic/numerical scale.

A 93-100  
B+ 88-92  
B 83-87  
C+ 79-82  
C 74-78  
D 65-73  
F Below 65

**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 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.

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/](http://www.pstcc.edu/departments/swd/).

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 will result in automatic failure of the course.