

**PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS**

**MACHINE ELEMENTS W/LAB
MET 2030**

Lecture/Lab Hours: 4

Credit Hours: 3

Date Revised: Spring 2017

Catalog Course Description

A study in the selection and application of basic elements common to most machine designs. Topics include shafts, bearings, power transmission, and lubrication. In addition, preventive maintenance regarding these elements is included.

Prerequisites

MET 1005 or MET 1022

Co-requisites

None

Textbooks and Other Supplies

Industrial Mechanics and Maintenance, Larry Chastain, Prentice Hall, Latest Edition

Week/Topic Basis

Week	Topic
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

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.

Engineering Technology Concentration Competencies

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

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.

Course Goals

NOTE: Capital letters after course goals reference goals of the Engineering Technology Program.

The course will

1. Guide students to demonstrate an acquired knowledge of journal and rolling contact bearings. (A,B,C,E,F)
2. Expand student understanding of shafts and associated elements. (A,B,C,E,F)
3. Guide students to demonstrate an acquired knowledge of power transmission. (A,B,C,E,F)
4. Enhance effective understanding of cams. (A,B,C,E,F)

Expected Student Learning Outcomes

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

The student will

- a. Explain and apply the hydrodynamic theory of lubrication. (1)
- b. Solve for life expectancy of a bearing. (1)
- c. Select an appropriate bearing based on system analysis. (1)
- d. Calculate critical speeds. (2)
- e. Select shaft material, size, and shape from standard tables. (2)
- f. Select appropriate fasteners. (2)
- g. Analyze system and select appropriate belt and chain drives from standard catalogs. (3)
- h. Identify basic gear geometry and types of gears. (3)
- i. Calculate gear forces and stresses. (3)
- j. Select appropriate gearing system which provides maximum operational efficiency. (3)
- k. Identify and explain the function of various types of cams and followers. (4)
- l. Design a simple cam. (4).

Evaluation

Total evaluation will be based on the following point distribution.

Testing Procedures

Unit Exams

50 points

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

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, response to verbal questions, quizzes and regular attendance.

Laboratory Experiences 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.

Field Work

N/A

Other Evaluation Methods

N/A

Grading Scale

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

A 93-100

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

Policies

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.

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

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 Disability Services (DS) in order to receive accommodations in this course. [Disability Services](#) (<http://www.pstcc.edu/sswd/>) may be contacted via [Disability Services email](#) or by visiting Alexander 130.

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