

**PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS**

**APPLIED MECHANICS W/LAB
MET 2026**

Lecture/Lab Hours: 4

Credit Hours: 3

Date Revised: Spring 2017

Catalog Course Description

A study of the forces acting on bodies in motion, and the selection and application of basic elements common to most mechanical designs. Topics include linear and rotational motion, displacement, acceleration, velocity, work, energy, power, shafts, bearings, power transmission, fasteners and lubrication.

Prerequisites

None

Co-requisites

None

Textbooks and Other Supplies

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

Week/Topic Basis

Week	Topic
1	Kinematics of Particles
2-3	Kinematics of Rigid Bodies
4-5	Kinetics: The Laws of Force and Motion
6-7	Work, Energy and Power
8	Journal Bearings
9	Rolling Contact Bearings
10-11	Shaft Design and Associated Elements
12	Gearing with Belt and Chain Drives

13-14	Design Project
15	Final Project/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. Expand student understanding of kinematics. (A,B,C,E,F)
2. Enhance effective understanding of work, energy, and power. (A,B,C,E,F)
3. Expand student understanding of journal and rolling contact bearings. (A,B,C,E,F)
4. Enhance effective understanding of shafts and associated elements. (A,B,C,E,F)
5. Engage and develop the student's skills, knowledge, and abilities regarding the correct identification and application of mechanical components and power transmission drivetrains. (A-F)

Expected Student Learning Outcomes

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

The student will

- a. Identify the basic types of motion. (1)
- b. Differentiate the concepts of displacement vs. distance, speed vs. velocity, and uniform vs. average acceleration. (1)
- c. Apply the concepts of absolute & relative velocity, and translational & pure rotational motion. (1)
- d. Convert linear and angular motion. (1)
- e. Solve for normal and tangential components of acceleration. (1)
- f. Analyze systems and apply the second and third laws of motion. (1)
- g. Differentiate positive and negative work. (1)
- h. Calculate work done by variable sources, elastic springs, and couples. (1)
- i. Differentiate potential and kinetic energy. (1)
- j. Convert electrical, mechanical, and thermal power. (2)
- k. Solve for mechanical efficiency. (2)
- l. Explain and apply the hydrodynamic theory of lubrication. (3)
- m. Solve for life expectancy of a bearing. (3)
- n. Select an appropriate bearing based on system analysis. (3)
- o. Calculate critical speeds. (3, 4)
- p. Select shaft material, size, and shape from standard tables. (3, 4)
- q. Select appropriate fasteners. (1-4)
- r. Analyze system and select appropriate belt and chain drives from standard catalogs. (1-4)
- s. Identify basic gear geometry and types of gears. (4)
- t. Calculate gear forces and stresses. (4)
- u. Select appropriate gearing system which provides maximum operational efficiency. (3-5)
- v. Document technical information in a neat and orderly format. (1-5)
- w. Complete assignments based on oral and written instructions. (1-5)

Evaluation

Total evaluation will be based on the following point distribution.

Testing Procedures

Unit Exams

60 points

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

Laboratory Experiences

30 points

Laboratory will include problem solving sessions and a special design project.

Field Work

N/A

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

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