PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

APPLIED MECHANICS
MET 2025

Class Hours: 3.0 **Credit Hours: 4.0**

Laboratory Hours: 3.0 **Date Revised: Spring 00**

Catalog Course Description:

A study of the forces acting on bodies in motion and the dynamics analysis of the basic elements common to most machune designs.

Entry Level Standards:

Students entering this course must have a working knowledge of statics and strength of materials.

Prerequisites:

MET 1020 and MET 1050

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

Introduction to Mechanics: Levinson, Prentice-Hall, 2nd Edition, 1968.
Machine Design for Mechanical Technology: Kolstee, Holt- Rinehart-Winston, 1984.
Mechanisms and Dynamics of Machinery: Mahre & Reinholtz, John Wiley & Sons, 4th Edition, 1987.
Applied Mechanics for Engineering Technology: Walker, Prentice-Hall, 4th Edition, 1991.
Machine Elements in Mechanical Design: Mott, Merril Publishing Company, 1984.
Machine Design: Creamer, Addison-Wesley Publishing Company, 3rd Edition, 1984.
Mark's Standard Handbook for Mechanical Engineers: Current Printing, McGraw-Hill.
Motion and Power: Kolstee, Prentice-Hall, 1984.

I. Week/Unit/Topic Basis:

Week	Topic
1	Kinematics of Particles
2	Kinematics of Rigid Bodies
3	Kinematics of Rigid Bodies (cont.)
4	Kinetics: The Laws of Force and Motion
5	Kinetics: The Laws of Force and Motion (cont.)
6	Work, Energy and Power

7	Work, Energy and Power (cont.)
8	Journal Bearings
9	Rolling Contact Bearings
10	Shaft Design & Associated Elements
11	Shaft Design & Associated Elements (cont.)
12	Gearing
13	Belt & Chain Drives
14	Design Project
15	Design Project (cont.)
16	Final Presentation/Exam

II. Course Objectives*:

A. Demonstrate understanding of kinematics. I, II, IV

B. Demonstrate understanding of work, energy, and power. I, II, IV

C. Demonstrate understanding of journal and rolling contact bearings. I, II, IV

D. Demonstrate understanding of shafts and associated elements. I, II, IV

E. Demonstrate understanding of power transmission. I, II, IV

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

III. Instructional Processes*:

Students will:

1. Actively listen to class lectures and participate in class discussions that develop and reinforce an understanding of the theories, concepts, principles, and applications of applied mechanics. *Communication Outcome, Problem Solving and Decision Making Outcome, Information Literacy Outcome, Active Learning Strategies*

2. Work individually or in teams to complete projects, lab experiments, and assignments related to the theories, concepts, principles, and applications covered in the lecture or demonstration portion of the course. *Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

3. Collect, analyze, and tabulate data in an orderly format to prepare a college level technical report using computer software paackages such as Autocad, Microsoft Word, Word Perfect, Excel, EZ-Feature Manufacturing Software, Data Myte Statistical Process Control, Ziess-Numerex Coordinate Measuring software, MD Solids, Working Model 2D. *Communication Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies, Transitional Strategy*

4. Use research and oral presentation skills to present findings to a subject matter expert, peer group or an evaluation team from industry. *Communication Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

*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. Identify the basic types of motion. A
2. Differentiate the concepts of displacement vs distance, speed vs velocity, and uniform vs average acceleration. A
3. Apply the concepts of absolute & relative velocity and translational & pure rotational motion. A
4. Convert linear and angular motion. A
5. Solve for normal and tangential components of acceleration. A
6. Analyze systems and apply the second and third laws of motion. B
7. Differentiate positive and negative work. C
8. Calculate work done by variable sources, elastic springs, and couples. C
9. Differentiate potential and kinetic energy. C
10. Convert electrical, mechanical, and thermal power.
11. Solve for mechanical efficiency
12. Explain and apply the hydrodynamic theory of lubrication. A
13. Solve for life expectancy of a bearing. A
14. Select an appropriate bearing based on system analysis. A
15. Calculate critical speeds. B
16. Select shaft material, size, and shape from standard tables. B
17. Select appropriate fasteners. B
18. Analyze system and select appropriate belt and chain drives from standard catalogs. C
19. Identify basic gear geometry and types of gears. C
20. Calculate gear forces and stresses. C
21. Select appropriate gearing system which provides maximum operational efficiency. C

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

V. Evaluation:

A. Testing Procedures:

Unit Exams--50 points
There will be 4-5 unit exams administered during the course.

B. Laboratory Expectations:

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. Field Work:

N/A

D. Other Evaluation Methods:

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, pop quizzes, and regular attendance.

E. 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 (Pellissippi State Catalog). Individual departments/ programs/ disciplines, with the approval of the vice president of Academic and Student Affairs, 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 quizzes or 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.