PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

APPLIED MECHANICS
MET 2025

Class Hours: 3.0                  Credit Hours: 4.0
Laboratory Hours: 3.0          Revised: Spring 05

Catalog Course Description:

Applied Mechanics is a study of the forces acting on bodies in motion, and a study in the selection and application of basic elements common to most machine designs. Topics include linear and rotational motion, as well as displacement, acceleration, velocity, work, energy, power, shafts, bearings, power transmission, and lubrication.

Entry Level Standards:

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

Prerequisites:

MET 1020 & MET 1051

Textbook(s) and Other Course Materials:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Kinematics of Particles</td>
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<tr>
<td>2-3</td>
<td>Kinematics of Rigid Bodies</td>
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<tr>
<td>4-5</td>
<td>Kinetics: The Laws of Force and Motion</td>
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<tr>
<td>6-7</td>
<td>Work, Energy and Power</td>
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<tr>
<td>8</td>
<td>Journal Bearings</td>
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<tr>
<td>9</td>
<td>Rolling Contact Bearings</td>
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<tr>
<td>10-11</td>
<td>Shaft Design &amp; Associated Elements</td>
</tr>
<tr>
<td>12</td>
<td>Gearing w/ Belt &amp; Chain Drives</td>
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<tr>
<td>13-14</td>
<td>Design Project</td>
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</tbody>
</table>
II. Course Objectives*:

A. Demonstrate an understanding of kinematics. (A-G)
B. Demonstrate an understanding of work, energy, and power. (A-G)
C. Demonstrate an understanding of journal and rolling contact bearings. (A-G)
D. Demonstrate an understanding of shafts and associated elements. (A-G)
E. Demonstrate an understanding of power transmission. (A-G)

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

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, Mathematics Outcome, Technological 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. Communication Outcome, Natural Sciences Outcome, Mathematics Outcome, Technological 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 packages such as AutoCAD, Microsoft Word, Word Perfect, Excel, FeatureCAM Manufacturing Software, Coordinate Measuring software, MD Solids, Working Model 2D. Communication Outcome, Natural Sciences Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies

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, Natural Sciences Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies

*Strategies and outcomes listed after instructional processes reference TBR's goals for strengthening general education knowledge and skills, connecting course work 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.  C  
11. Solve for mechanical efficiency.  C  
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, D  
16. Select shaft material, size, and shape from standard tables.  B, D  
17. Select appropriate fasteners.  B  
18. Analyze system and select appropriate belt and chain drives from standard catalogs.  C, E  
19. Identify basic gear geometry and types of gears.  C, E  
20. Calculate gear forces and stresses.  C, E  
21. select appropriate gearing system which provides maximum operational efficiency.  C, E  

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

V. Evaluation:

A. Testing Procedures:

Total evaluation will be based on the following point distribution.

Unit Exams  (60 Points)  
There will be 4-6 unit exams administered during the course.

B. Laboratory Expectations:

Laboratory  (30 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 and exercises, response to verbal questions, quizzes, and regular attendance.

E. Grading Scale:

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


C. Accommodations for disabilities:

If you need accommodation because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Privately after class or in the instructor's office.

To request accommodations students must register with Services for Students with Disabilities: Goins 127 or 131, Phone: (865) 539-7153 or (865) 694-6751 Voice/TDD.

D. 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.