PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

PHYSICS FOR ENGINEERS I
ENS 1510

Class Hours: 3.0 Credit Hours: 4.0
Laboratory Hours: 3.0 Revised: Fall 2009

Catalog Course Description:

Calculus based study of basic engineering physics concepts including vectors, kinematics, Newton’s Laws, work-energy, and impulse-momentum. Introduction to teamwork. Introduction to the engineering disciplines, examination of engineering principles and design issues; oral and written presentation skills.

Entry Level Standards:

Students entering this course must have a comprehensive knowledge of mathematics, including knowledge of differential calculus, and computer applications used in engineering problem solving and communication. They must have demonstrated a capacity for solving problems.

Corequisites:

MATH 1910

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>Introduction to Physics for Engineers</td>
</tr>
<tr>
<td>2</td>
<td>One Dimensional Kinematics</td>
</tr>
<tr>
<td>3</td>
<td>Two and Three Dimensional Kinematics</td>
</tr>
<tr>
<td>4</td>
<td>Newton’s Laws and Forces</td>
</tr>
<tr>
<td>5</td>
<td>Newton’s Laws and Forces</td>
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<tr>
<td>6</td>
<td>Newton’s Laws and Forces</td>
</tr>
<tr>
<td>7</td>
<td>Newton’s Laws and Forces</td>
</tr>
<tr>
<td>8</td>
<td>Work and Energy</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Use mathematical principles to analyze and solve problems dealing with the kinematics of particles. I.5, I.6, V.1, V.2, V.3, VI.1, VI.2, VI.3, V.4, VI.5, VI.6, VII.1, VII.2, VII.3, VII.4, VII.5, VII.6.

B. Use mathematical principles to analyze and solve problems dealing with the kinetics of particles. I.5, I.6, V.1, V.2, V.3, VI.1, VI.2, VI.3, V.4, VI.5, VI.6, VII.1, VII.2, VII.3, VII.4, VII.5, VII.6.

C. Use work-energy and impulse-momentum principles to analyze and solve problems dealing with kinetics of particles. I.5, I.6, V.1, V.2, V.3, VI.1, VI.2, VI.3, V.4, VI.5, VI.6, VII.1, VII.2, VII.3, VII.4, VII.5, VII.6.

D. Use mathematical principles to analyze and solve problems dealing with rigid bodies in general plane motion. I.5, I.6, V.1, V.2, V.3, VI.1, VI.2, VI.3, VI.4, VI.5, VI.6, VII.1, VII.2, VII.3, VII.4, VII.5, VII.6.

*Roman numerals after course objectives reference TBR’s general education goals.

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 engineering mechanics. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

2. Use critical thinking to solve problems presented in the book, class projects, and class exams. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*

3. Use related equipment and tools for making engineering related measurements and observations. *Natural Sciences Outcome, Technological Literacy Outcome*

4. Collect data, generate graphs and tables of the collected data, summarize the data, and draw conclusions from the data. *Natural Sciences Outcome, Technological Literacy Outcome*

5. Create written reports and PowerPoint presentations based on laboratory experiences. *Communication Outcome, Technological Literacy Outcome*

6. Use technology available to expand upon or solve problems in the text; examples may
include software packages such as MATLAB, Working Model, and MD Solids. Mathematics Outcome, Technological Literacy Outcome

*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. Apply mathematical techniques, including calculus, to determine displacement, velocity, and acceleration of particles, including rectilinear and curvilinear motion. A
2. Understand vectors and their application to dynamics. B, C
3. Apply dimensional analysis to insure correctness of solution concerning units. A, B, C
4. Apply Newton's First Law to solve problems dealing with forces on an object at rest or moving at a constant velocity. B
5. Apply Newton's Second and Third Laws to solve problems dealing with force and acceleration, including rectilinear and curvilinear motion. B
6. Apply Newton's Laws of gravitation and motion to determine friction and drag forces on objects in motion. B
7. Use a work-energy analysis to determine forces, velocities, or displacements for objects in motion. C
8. Use an impulse-momentum analysis to determine forces, velocities or time elapsed for objects in motion. C
9. Apply mathematical techniques, including calculus, to determine linear as well as angular displacement, velocity, and acceleration of rigid bodies in pure rotation as well as general plane motion. A, D

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

V. Evaluation:

A. Testing Procedures: 80% of grade
   - Four module exams (52%)
   - Homework (10%)
   - Comprehensive Final Exam (18%)

B. Laboratory Expectations: 15% of grade
   - Group experiments/projects will be completed and results will be documented in a laboratory report. All lab material will be kept in a portfolio which will also be part of the laboratory grade

C. Field Work:
   - N/A
D. Other Evaluation Methods: 5%

Participation in laboratory and classroom lectures

E. Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>92 - 100</td>
</tr>
<tr>
<td>B+</td>
<td>87 - 92</td>
</tr>
<tr>
<td>B</td>
<td>82 - 86</td>
</tr>
<tr>
<td>C+</td>
<td>77 - 81</td>
</tr>
<tr>
<td>C</td>
<td>70 - 76</td>
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<tr>
<td>D</td>
<td>60 - 69</td>
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<tr>
<td>F</td>
<td>Below 60</td>
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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 Learning, may have requirements that are more stringent. In the event that the college is closed for an extended amount of time (more than two days), the instructor will communicate with students through e-mail and class will continue using the Online/Hybrid/Web-Enhanced Courses feature on the MyPellissippi homepage.

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. In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) and F or zero for the assignment or (2) and F for the course.

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 134 or 126 or by phone: 694-6751 (Voice/TTY) or 539-7153. More information is available at www.pstcc.edu/departments/swd/.