PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

ENGINEERING FUNDAMENTALS II
ENS 1520

Class Hours: 3.0  
Credit Hours: 4.0

Laboratory Hours: 3.0  
Revised: Fall 2015

Catalog Course Description:
Calculus-based study of basic physics concepts, including statics, gravitation, oscillations, waves, fluid mechanics, heat and temperature, and first and second law of thermodynamics. Introduction to team work. 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 and integral calculus, and computer applications used in engineering problem solving and communication. They must have demonstrated a capacity for solving problems.

Prerequisites:
ENS 1510

Corequisites:
MATH 1920

Textbook(s) and Other Course Materials:
Tipler and Mosca. Webassign Premium 1 semester access card for Physics for Scientists and Engineers eBook, Most Current Edition.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Gravitation, Oscillatory Motion,</td>
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<td>2</td>
<td>Waves, Superposition and Interference of Waves</td>
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<td>3</td>
<td>Statics</td>
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<td>4</td>
<td>Statics</td>
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<td>5</td>
<td>Strength of Materials</td>
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<td>6</td>
<td>Properties of Fluids, fluid statics</td>
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<td>7</td>
<td>Fluid Dynamics</td>
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<td>Chapter</td>
<td>Title</td>
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<tr>
<td>8</td>
<td>Temperature and Ideal Gases</td>
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<tr>
<td>9</td>
<td>Heat Flow, First Law of Thermodynamics</td>
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<tr>
<td>10</td>
<td>First Law of Thermodynamics</td>
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<tr>
<td>11</td>
<td>Second Law of Thermodynamics</td>
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<tr>
<td>12</td>
<td>Entropy</td>
</tr>
<tr>
<td>13</td>
<td>Thermal Properties and Processes</td>
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<tr>
<td>14</td>
<td>Thermal Properties and Processes. Review</td>
</tr>
<tr>
<td>15</td>
<td>Final Exam Period</td>
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**II. Course Goals**:  
The course will:

A. Develop the student’s awareness of the need to use a variety of learning methods in order to grasp fundamental engineering concepts. (I, V, VI, VII)

B. Expand the student’s knowledge of fundamental engineering topics including statics of rigid bodies, gravitation of planetary motion, oscillatory motion and waves, fluid mechanics, ideal gases, temperature and heat, and the first and second laws of thermodynamics. (V, VI)

C. Enhance the student’s ability to work with a team and to complete hands-on laboratory experiments and projects. (I, V, VI, VII)

*Roman numerals after course goals reference the University Parallel Transfer program (General Education Goals).*

**III. Expected Student Learning Outcomes**:  
The student will be able to:

1. Take responsibility for their learning by reading the textbook material prior to the lecture, attending and participating in lecture and laboratory, completing all assignments and laboratories, collaborating with peers, using tutors in the PSCC Learning Center, meeting with the instructor during office hours, and using outside sources such as study guides and internet sites. (A)*

2. Apply equations of static equilibrium to determine forces acting on objects at rest. (B)*

3. Analyze forces acting on objects in planetary motion to determine the gravitational force, trajectory, velocity, acceleration or radius of curvature. (B)*

4. Relate springs, pendulum, and uniform circular motion with simple harmonic motion. (B)*

5. Evaluate various parameters of wave motion for both standing and traveling waves. (B)*

6. Comprehend the various properties of incompressible fluids and how pressure and velocity are affected by changes in the elevation and flow area. (B)*

7. Grasp the basic concepts of thermal science and how they relate to the first and second laws of thermodynamics. (B)*
8. Apply dimensional analysis to insure correctness of solution concerning units. (B, C)*

9. Participate in a positive manner with a group to complete experiments and team projects(C)*

10. Analyze a set of laboratory instructions and complete the tasks in an accurate and timely manner. (C)*

11. Complete written reports and oral presentations employing correct diction, syntax, usage, grammar, and mechanics (C)*

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures: 85% of grade
   - Five module exams (55%)
   - Online Homework (9%)
   - Homework Portfolio (3%)
   - 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:
   - N/A

E. Grading Scale:
   - A 90 - 100
   - B+ 87 - 89
   - B 80 - 86
   - C+ 77 - 79
   - C 70 - 76
   - D 60 - 69
   - F Below 60

V. Policies:

A. 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
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.
- 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.

C. 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 may be contacted by sending email to disabilityservices@pstcc.edu, or by visiting Alexander 130. More information is available at http://www.pstcc.edu/sswd/.