PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

PARTICLE DYNAMICS
ENS 1310

Class Hours: 3.0 Credit Hours: 3.0
Laboratory Hours: 0.0 Date Revised: Fall 2004

NOTE: This course is intended for University Parallel Transfer.

Catalog Course Description:

Kinematics, simple harmonic motion; kinetics, Newton's laws, work-energy, impulse-momentum; impact.

Entry Level Standards:

Students entering this course must have a comprehensive knowledge of mathematics, including knowledge of differential and integral calculus. They must have demonstrated a capacity for solving problems.

Prerequisite:

ENS 1210

Corequisite:

MATH 1920

Textbook(s) and Other Course Materials:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Dynamics</td>
</tr>
<tr>
<td>1-2</td>
<td>Kinematics of Particles: Rectilinear: general displacement, velocity with emphasis on uniform or constant acceleration; graphical relationships.</td>
</tr>
<tr>
<td>2-4</td>
<td>Kinematics of Particles: Curvilinear: derivatives of vector functions; rectangular components; motion relative to a frame of translation; tangential and normal components</td>
</tr>
<tr>
<td>5-9</td>
<td>Kinetics of Particles: Newton's Second Law; linear momentum; dynamic equilibrium; radial and transverse components; Newton= s law of gravitation</td>
</tr>
<tr>
<td>10-12</td>
<td>Kinetics of Particles: Work and Energy; Conservation of energy</td>
</tr>
<tr>
<td>13-14</td>
<td>Kinetics of Particles: Impulsive motion; Impact, central and oblique; Energy and momentum</td>
</tr>
<tr>
<td>15</td>
<td>Final Exam Period</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Understand the definitions and principles of particle dynamics. I.1, I.6

B. Analyze, solve, and interpret results of problems dealing with the kinetics and kinematics of particles. I.6, VI.2, VI.3, VI.4, VI.5, VII.4, VII.5, VII.6

C. Apply differential and integral calculus including vector calculus to the solution of dynamics problems. VI.2, VI.3, VI.4

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

III. Instructional Processes*:

Students will:

1. Participate in classroom discussions which challenge their abilities to think creatively and visualize complex spatial and mathematical relationships to solve problems. Communication Outcome, Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategy

2. Discuss the importance of personal qualities such as personal responsibility, time management principles, self-esteem, sociability, self-management, integrity and honesty in school and in the workplace, and dynamics of change in the workplace. Communication Outcome, Transitional Strategy

*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 solve problems dealing with Kinematics of particles, including rectilinear and curvilinear motion. A, B, C

2. Use various coordinate systems. A, B, C

3. Apply dimensional analysis to insure correctness of solution concerning units. A, B

4. Apply Newton's Laws of gravitation and motion. A, B, C

5. Understand the concepts of energy. A, B, C

6. Solve problems using impulse and momentum. A, B, C

7. Understand vectors and their application to dynamics. A, B

8. Understand conservation of energy and momentum. A, B

9. Solve problems of relative motion. A, B, C

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

V. Evaluation:

A. Testing Procedures:

The percentage that each of the above factors count and the frequency of tests, homework and quizzes is left to the discretion of the instructor, but the following is offered as a guide:

Homework: 10%
Quizzes: 10%
Chapter or Topic Tests: 60%
Final Exam: 20%
No make-up tests will be administered. In case of medical problems, notify the instructor prior to the absence.

B. Laboratory Expectations:

N/A

C. Field Work:

Outside reading of material in the college library will be required in this course.

D. Other Evaluation Methods:

N/A

E. Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93 - 100</td>
</tr>
<tr>
<td>B+</td>
<td>88 - 92</td>
</tr>
<tr>
<td>B</td>
<td>83 - 87</td>
</tr>
<tr>
<td>C+</td>
<td>78 - 82</td>
</tr>
<tr>
<td>C</td>
<td>70 - 77</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69</td>
</tr>
<tr>
<td>F</td>
<td>Below 60</td>
</tr>
</tbody>
</table>

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.

Regular attendance in this course is required. Students who miss the equivalent of 10% of classroom hours may, at the discretion of the instructor, be dropped one letter grade. Students who arrive late for class after the roll has been taken, have the responsibility of seeing the instructor after class to change their status from A (absent) to T (tardy).

B. Academic and Classroom Misconduct:

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:

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.