

PELLISSIPPI STATE COMMUNITY COLLEGE  
MASTER SYLLABUS

**DYNAMICS**  
**ENS 2310**

**Class Hours: 3.0**

**Credit Hours: 3.0**

**Lab Hours: 0.0**

**Revised: Fall 2015**

NOTE: This course is intended for University Parallel Transfer.

**Catalog Course Description:**

Study of the kinetics and kinematics of rigid bodies. Also covered are such topics as centers of mass and mass moments of inertia.

**Entry Level Standards:**

Students entering this course should be adept to applying mathematical techniques involving calculus to the solution of problems. They must have a knowledge of particle dynamics.

**Prerequisites:**

ENS 2110 and MATH 1920

**Corequisites:**

ENS 1520

**Textbook(s) and Other Course Materials:**

*Required:* Beer and Johnson. Connect Plus Engineering 2 Sem Access Card For Vector Mechanics (for Pellissippi State Community College)

*Optional:* Beer and Johnson. *Vector Mechanics for Engineers: Dynamics*. most current edition. McGraw-Hill.

**I. Week/Unit/Topic Basis:**

<b>Week</b>	<b>Topic</b>
1	Review of Particle Dynamics; Kinematics
2-4	Planar Kinematics of Rigid Bodies
5	Review of Particle Dynamics; Kinetics
6-9	Plane motion of Rigid Bodies; Forces and Accelerations
10	Review of Particle Dynamics; Work/Energy and Impulse/Momentum
11-13	Kinematics of Rigid Bodies; Bodies Involving Work-Energy, and Impulse-Momentum

- 14 Review
- 15 Final Exam Period

## **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 engineering concepts. (I, V, VI, VII)
- B. Expand the student's knowledge of vector math and how it is used in mechanics. (V, VI)
- C. Expand the student's knowledge of rigid-body dynamics using the kinematics, kinetics, and work-energy methods of solving problems. (V, VI)

\*Roman numerals after course objectives reference TBRs 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. Perform vector operations. (B)\*
3. Split forces and accelerations into Cartesian vector format. (B)\*
4. Add and subtract forces using vector analysis. (B)\*
5. Calculate the moment of a force about a point, an axis, and a line using both scalar and vector analysis. (B,C)\*
6. Draw Free Body and Mass/Acceleration Diagrams. (C)\*
7. Incorporate calculus when solving problems dealing with kinematics of rigid bodies. (C)\*
8. Understand Newton's Laws and their applicability to the dynamics of rigid bodies. (B,C)\*
9. Solve problems dealing with motion of rigid bodies. (B, C)\*
10. Apply the theory of impulse and momentum to the solution of dynamics problems. (B,C)\*
11. Apply principles of work and energy to rigid bodies. (B, C)\*
12. Find moments of inertia of rigid bodies. (C)\*
13. Calculate the radius of gyration of a rigid body. (C)\*

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

#### **IV. Evaluation:**

##### **A. Testing Procedures:**

Homework: 10%  
Weekly Quizzes: 16%  
Three Chapter Tests: 54%  
Comprehensive Final Exam: 20%

##### **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:**

A	90 – 100
B+	87 – 89
B	80 – 87
C+	77 – 79
C	70 – 77
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 president of Academic Affairs.

##### **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.
- 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](mailto:disabilityservices@pstcc.edu), or by visiting Alexander 130. More information is available at <http://www.pstcc.edu/sswd/>.