"When you pass through the waters, I will be with you; and through the rivers, they shall not overwhelm you.” Isaiah 43:2

EGME 2630 Dynamics

Spring 2004

Dr. Thomas Thompson
177 ENS
766-7679

Catalog Description

Kinematic and kinetic analysis of particles, systems of particles, and rigid bodies; position, velocity, acceleration, frames of reference; Newton’s laws, work, energy, impulse, momentum; conservative and non-conservative systems; vibration of single-degree-of-freedom systems. Design project required. Pre-requisite: EGME 2530 Statics and Mechanics of Materials or EGME 2510 Statics. (Fee: $5)

Text


Prerequisite Skills

As a prerequisite to this course, I expect you to have the following skills:

1. Know the difference between a scalar and a vector.
2. Full vector manipulation including writing vectors, finding their magnitude and direction (unit vector), finding the component of one vector in the direction of another vector, and finding the dot and cross products of two vectors algebraically.
3. Sum forces and find moments.
4. Find centroids as well as calculate area and mass moments of inertia.
5. Apply the equations of static equilibrium.
6. Use friction properly.
7. Evaluate single integrals.

If you are lacking in any of these skills it is your responsibility to go back and review them to be prepared for this course.

Skills Developed in this Course

To satisfactorily complete this course, you must demonstrate competency in the following areas:

1. Use rectangular, normal-tangential, and polar coordinate systems to describe the motion (kinematics) of a particle, system of particles, and rigid bodies.
2. Use Newton's Second Law, Work-Energy, and Impulse-Momentum principles to determine the kinetics of particles, systems of particles, and rigid bodies.
3. Understand and solve introductory vibration problems.
4. In applying the above principles, continue to develop a systematic, orderly procedure for solving engineering problems.

(This course addresses CU ME Program objectives 1, 2, and 3; and ABET Outcomes a and e.)

Lectures

In lectures mechanics concepts will be introduced and example problems will be solved to demonstrate the application of these concepts and to introduce problem-solving strategies to the students. Additionally, a few minutes will be spent at the beginning of each lecture reviewing and correcting the homework.
Homework

Though worth only 20% of the course grade, the importance of the homework problem sets is difficult to overstate, since the quality of your homework will be reflected in your exam scores.

While students are encouraged to work with classmates in understanding concepts required for solving homework problems, all homework is be completed independently without the aid of worked solutions from classmates or other sources (such as printed or electronic instructor’s manuals or upperclass students). You are required to sign and date each homework set, indicating that it is your own work.

Since the comprehension of new material is based on mastery of previous concepts, homework problems assigned each day are due at the beginning of the next class session. We will spend a few minutes at the beginning of each class reviewing and grading at least one of the homework problems. While grading, students may write on their homework sheet in red pen only. Late homework will not be accepted. Homework must be neat and orderly following the prescribed format for problem solutions. The low homework grade of each student will be dropped.

To submit homework, fold once longitudinally and write your name and box number on the upper right corner of the outside of the set. Pass toward the teacher immediately after the grading session at the beginning of class.

Design Project

To demonstrate application of Dynamics principles to an actual physical system, students are required to participate in a design project. Detailed instructions are forthcoming.

Exams

There will be four (4) exams, tentatively scheduled for Friday, January 30; Monday, March 1; Monday, March 29; and Monday, April 19.

Grading

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Project</td>
<td>10%</td>
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<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Exams</td>
<td>40%</td>
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<tr>
<td>Final</td>
<td>30% (do not plan to leave town before the date shown on the course schedule!)</td>
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Attendance Policy

- Students are expected to attend ALL classes.
- Students having more than four unexcused absences will receive a full letter deduction in their course grade.
- Students missing class during an exam will only be allowed to make up the exam if the absence is excused.
- In order for an absence to be excused, it must be reported to me either in advance (for planned absences) or within one day in the case of sickness or emergency. Notification may be in writing, by phone, or by e-mail.

Special Needs

If you have a disability covered by the Americans with Disabilities Act for which academic accommodations might need to be provided in this course, please contact me or the Academic Assistance Office (Dr. Pamela Johnson, Ext. 7765, johnsonp@cedarville.edu or Mrs. Marilyn Meyer, Ext. 7633, meyerm@cedarville.edu) as soon as possible so that the appropriate accommodations can be determined and arranged.