ENGR 2326 Dynamics
Section 1: 8:00-8:50 TTH, EN 104; Lab 12:00 noon – 2:50 T, EN 114

Spring 2013

Instructor: Dr. David Bridges, Associate Professor of Mechanical Engineering
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Office Hours: 3-5 p.m. TTH, others by appointment or as available


Course Description (catalog): 3 sem. hrs. (2:3). Theory of engineering mechanics involving the motion of particles, rigid bodies and systems of particles; Newton’s Laws; work and energy relationships; principles of impulse and momentum; application of kinetics and kinematics to the solution of engineering problems. Prerequisite: ENGR 2325

Course Description (narrative): In this course, students will learn how to apply Newton’s laws and the laws of conservation of energy to compute the motions of particles and rigid bodies. We will first examine the “geometry” of the motions (kinematics) and then the forces that produce those motions (kinetics). We will examine particles first (objects with no significant physical orientation) and then rigid bodies (objects whose physical orientation is significant). As time allows, we will examine vibrational systems.

Course Learning Objectives: Upon completing this course, students will be able to

1. Demonstrate an understanding of the kinematics of particles
2. Demonstrate an understanding of the kinetics of particles
3. Demonstrate an understanding of the kinetics of systems of particles
4. Demonstrate an understanding of the plane kinematics of rigid bodies
5. Demonstrate an understanding of the plane kinetics of rigid bodies
6. Demonstrate an understanding of oscillatory motion
7. Demonstrate an understanding of free vibration
8. Demonstrate an understanding of harmonically-excited vibration

Course Outline/Schedule (tentative):

Chapter 12 Kinematics of a Particle (sections 12.1-12.10)
Chapter 13 Kinetics of a Particle: Force and Acceleration (sections 13.1-13.6)

Test #1 On or about 22 Feb 2013

Chapter 14 Kinetics of a Particle: Work and Energy (sections 14.1-14.6)
Chapter 15 Kinetics of a Particle: Impulse and Momentum (sections 15.1-15.7)
Chapter 16 Planar Kinematics of a Rigid Body (sections 16.1-16.3)

Test #2 On or about 29 Mar 2013

Chapter 16 Planar Kinematics of a Rigid Body (sections 16.4-16.8)
Chapter 17 Planar Kinematics of a Rigid Body: Force and Acceleration (sections 17.1-1.5)
Chapter 18 Planar Kinematics of a Rigid Body: Work and Energy (sections 18.1-18.5)
Chapter 19 Planar Kinematics of a Rigid Body: Impulse and Momentum (sections 19.1-19.3)

Test #3 On or about 26 Apr 2013

Chapter 22 Vibrations (sections 22.1-22.5, as time allows)

Final 8:00 am, Friday, 10 May 2013
**Homework / Lab:** For each lecture, there will be two suggested problems and one assigned problem. The assigned problems may be worked in groups of no more than three. The assigned problems will be due every Monday at the beginning of class. If you work the problems in groups, each student should turn in his or her own copy of the problems, and identify the other members of the group. These will be checked for effort, not for correctness (but you must make a legitimate attempt on each assigned problem to receive credit for the attempt). The assigned problems (or similar problems) will then be worked at the beginning of the lab session the next day (Tuesday). These will be followed by problem assignments which will be worked in the lab, in groups, with assistance from the instructor. These will be turned in at the end of the lab and graded. If you manage to work the problems and demonstrate the correct answers before the lab period is up, you may leave. On the day following the lab (Wednesday), there will be a short quiz at the beginning of class on one of the problems worked during the lab. The grade breakdown for each week’s “cycle” will be 25% attempted homework, 50% in-lab problems, 25% problem quiz.

**Grading:** Three one-hour tests will be given on dates announced at least two class periods in advance. These tests will make up 65% of the final course grade. The homework / lab exercises will make up 15% of the final course grade, and a three-hour comprehensive final will make up 20% of the course grade. Grades will be assigned on a 10-point scale: 90-100=A, 80-89=B, 70-79=C, 60-69=D, below 60=F.

**Absences:** Tests missed as a result of unexcused absences will result in a score of zero. Under most circumstances, the final exam grade will be substituted for tests missed due to excused absences. The absence must be excused in advance except in case of extreme emergency. No makeup exams will be given, except under unusual circumstances and entirely at the discretion of the instructor.

**Communications:** All outside-of-class communications will be conducted through the message and e-mail functions of the Blackboard site for the class. Each student should make sure his or her preferred e-mail address is the one in the Blackboard system, and each student should check e-mail and the Blackboard message site regularly.

**Academic Honesty:** Academic honesty is expected at all times. Occurrences of cheating will be dealt with according to university regulations regarding academic misconduct.