

MIME 2300 Engineering Dynamics

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Semester: Spring 2009

Instructor: Dr. Phillip R. White

Phone: (419) 530-8241

Email: pwhite@utoledo.edu

Office: NI 4065

Web page: www.utoledo.edu/dl

Office Hours: T,R 1-4, any time I'm in the office, or by appt.

Class Time: Lec. MWF 10:00-10:50

Teaching Assistant(s):

Name:

Email:

Office

Office Hours

Azita Belashi

azitta@gmail.com

T,R 4-6, Sun 3-5 PH 2nd level study area

Shruti Baharani

sbaharani@gmail.com

Same as those given for Azita

Textbook: Engineering Mechanics Dynamics, **Eleventh** Edition, R. C. Hibbeler, ©2007, Prentice Hall. (Required)

Coordinating Faculty: Berhan, Hefzy, White

Catalog Description:

[3 hours] Kinematics of particles and rigid bodies. Thorough study of kinetics of particles and rigid bodies using Newton's laws of motion, work-energy methods, and impulse and momentum methods. Prerequisite: CIVE 1150

Course Objectives:

To teach students the application of kinematics, Newton's laws of motion, work and energy methods and impulse and momentum methods to planar motion of particles and rigid bodies.

Standard Course Outcomes:

At the end of this course the student should have the knowledge and skills to:

1. solve constant and variable acceleration problems in particle kinematics.
2. draw free body diagrams and apply Newton's second law of motion to solve kinetics problems associated with particles;
3. solve kinetics problems for particles involving static and kinetic friction;
4. solve kinetics problems for particles using the principles of work and energy;
5. solve kinetics problems for particles using the principle of impulse and momentum;
6. solve kinetics problems involving collision of particles;
7. solve problems involving angular momentum of particles;
8. find the velocities and accelerations in linkages, gear trains and rigid body systems;
9. determine the mass moment of inertia for rigid bodies;
10. solve kinematics problems involving Coriolis components of acceleration;
11. understand the kinematics of a wheel rolling on a flat surface.
12. draw free body diagrams and apply Newton's second law of motion to solve kinetics problems associated with rigid body systems;
13. solve kinetics problems involving the rolling and/or sliding of cylinders and
14. solve kinetics problems for rigid bodies using the principle of work and energy;

15. solve kinetics problems involving principles of impulse and momentum; and
16. understand that the course is only basic and there is a need for life-long learning

Assessment Tools: (to determine if outcomes and therefore the objectives have been achieved)

1. In-class quizzes and closed-book exams.
2. Daily problem sets.

Overview:

The course consists of two parts. The first part deals with particles and the second part deals with rigid bodies. In both parts, kinematics is first discussed followed by application of Newton’s laws of motion, work and energy methods and impulse and momentum methods.

Material:

1. Introduction
2. Rectilinear and planar curvilinear kinematics of particles
3. Newton’s law of motion applied to particles
4. Work and energy methods applied to particles
5. Impulse and momentum methods applied to particles
6. Kinematics of rigid body mechanisms
7. Mass moment of inertia
8. Newton’s law of motion applied to rigid bodies
9. Work and energy methods applied to rigid bodies
10. Impulse and momentum methods applied to rigid bodies

Grading:

Test 1 and Test 2	(@25% each)	50%
Test 3		35%
Homework		10%
Quizzes & Attendance		5%

Standard grading scale lower limits A 93, A- 90, B+ 87, B 83, B- 80, C+ 77, C 73, C- 70, D+ 67, D 63, D- 60, F 0

Normal Class Period Schedule:

Homework is submitted as student arrives. After class begins, homework will not be accepted.
 Students sit in assigned seats. (On the second class period students select seat to be occupied for the remainder of the semester.)
 Homework for the next period is assigned
 Grades from any previous quiz or test are presented.
 Teaching assistant takes attendance. **Students leaving early will be marked absent.**
 Questions are entertained on reading assignment, previous or current homework and quiz.
 Possible quiz is given over reading assignment
 New material is presented, example problems are solved and questions are encouraged.

Possible quiz is given on material just presented.

The goal of several of these activities is to encourage the students to be active in the learning process not simply passive.

General Policies:

1. Makeup quizzes or makeup tests will normally not be given and will be assigned the grade of zero. This policy has been slightly modified for those with *documented* excused absences as defined by The University of Toledo Missed Class Policy adopted 1/22/02. At the discretion of the instructor, the missed quiz or test will either be assigned an average of the other tests or quizzes or a make-up quiz or test will be given.
2. No grades of DR, PR or I will be given. It is your responsibility to withdraw from the class by **March 27, 2009** if you do not wish to receive a grade.
3. Assignments will not be accepted after the start of the period on which it is due. Students may discuss assignments but each should do his/her own work. All persons submitting identical or very similar assignments **will receive twice the negative value of the assignment**. For example all those submitting the same work on a 10 point homework assignment will received -20 points.
4. There will generally be two or more problems assigned for homework each period. At the start of the next period it will be announced which problem should be submitted for grading. All home problems will have their solutions posted on the web site so those not collected can be checked by the students.
5. **Any person cheating on a test or quiz will receive an F in the course.**
6. The College and University policies on academic dishonesty may be found in the appendices of the MIME Undergraduate Handbook on the web at:

<http://www-mime.eng.utoledo.edu/undergrads/handbook/>
7. Reading assignments, as given on the Tentative Course Schedule, should be completed before coming to class. Pop quizzes will be given over this material during the lecture period.
8. **All cell phones, pagers and all electronic communication devices must be turned off before entering the lecture room.**
9. **Any person talking or creating a disturbance during a lecture, quiz, test or other time when other students are concentrating will be removed from the class.**

Comments on Homework:

1. Homework should be neatly done. Engineering is a profession and all work done should be a source of professional pride. **Messy work will not be graded and will receive a grade of zero.**
2. Problem solutions should be presented in an orderly manner proceeding downward on the page and should consist of

Problem number, student name and date at the top of the page (**No grade if name is not legible.**)

Problem statement and figure (optional)

Coordinate System (points will be lost if coordinate system is not given)

Diagram - free body diagram (FBD), kinetic diagram (KD) or velocity diagram (points will be lost if diagrams are not given on kinetics problems)

General equations should be given first.

Then the equations should be given with values substituted and assumptions stated.

Finally, results with units should have a circumscribing box .

Points will be deducted if the procedure outlined previously is not followed.

3. All graphs or diagrams should be neatly done. A straight edge, circle template and French curve are recommended for students who cannot sketch well.
4. Use 8.5" x 11" paper with straight edges (not torn from a spiral notebook) and do not fold.
5. Problems should be presented in the order in which they are assigned.
6. All papers must be stapled in the upper left corner. Points will be deducted if papers are not stapled
7. One suggestion, to avoid overlooking problem details and to improve the ease of using homework for reference and test review, is to copy the problem statement to the top of the solution page.
8. In general, one problem from each set will be graded more carefully and the others will be check for effort.

General Philosophy:

Questions and comments are welcome and encouraged at anytime! Please don't be bashful!

I do not lecture strictly from the textbook. I endeavor to provide a second point of view. Therefore it is advantageous for you to read the textbook prior to class so you may compare the author's approach with my approach and be prepared to question and differences. A detailed topic and reading assignment is provided on the course web page.

I am willing to meet with students anytime I am available and welcome e-mail questions and discussion.

Use of Web:

This course syllabus, course schedule, lecture notes, homework solutions and other information will be available on the web at:

www.utoledo.edu/dl

Note the web page is not on the MIME server. It is on the Distance Learning and eLearning server which tends to be more reliable.

To login use your UTAD ID which is the first letter of your first name followed by the next six of your last name, with a numerical addition for duplicates (all in lower case). The password is your UTAD password

Instructions for obtaining your UTAD ID and setting the password are given on the web site if one clicks on the myutaccount link.

Every effort will be made to post the lecture notes at least 24 hours before the lecture is to be given.

Regularly check the web for changes and updates and each document contains the revision time and date at the top of the document so you can easily tell if you have read or printed the most current version.

Revisions:

7/23/08 Policy on leaving early