

C.E. 3111, Analytical Mechanics II
M.E. 2033, Dynamics

University of Colorado at Denver and Health Sciences Center

Term: Fall 2007
Meeting Time: Monday and Wednesday from 4:00 to 5:15 PM in PL 213
Instructor: Joe Cullen
Office: NC 3518B
Office Hours: Monday: 7:00 PM to 8:30 PM
Tuesday: 3:30 PM to 6:30 PM
Wednesday: 7:00 PM to 8:30 PM
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Catalog Description

A vector treatment of dynamics of particles and rigid bodies, including rectilinear translation, central force, general motion of particles, kinematics of rigid bodies, the inertia tensor, plane motion of rigid bodies; energy and momentum methods for particles, systems of particles and rigid bodies. Prerequisite: C.E. 2121 or M.E. 2023.

Required Text

J. L. Meriam and L. G. Kraige, *Engineering Mechanics: Dynamics, 6th Edition*, John Wiley & Sons, 2006 (ISBN 978-0-471-73931-9).

Homework Assignments

Homework assignments will be handed out in class and homework will be due weekly. Homework assignment grades will be 25% of your grade for the course. You will be given a score from 0 to 100 points on each assignment. None of the homework will be dropped before your homework average is computed. The graded homework assignments will be returned in class.

Tests

There will be three tests and each test will be worth 25% of your grade for the course. The first test will be on September 26th and the second will be on October 31st. The third test will be given during the scheduled final exam time for the class. Each test is open book and open notes. Each test will be given a score from 0 to 100 points and each problem on a test has the same value (i.e., if there are seven problems on the test then each problem is worth $\frac{100}{7} = 14.3$ points). The first and second tests will be returned at the start of class on the following Monday. You will need to make arrangements with the instructor to collect the third test if you would like to have it returned to you. The third test will not be given early and everybody is expected to attend class the last week of the semester.

Grading

Homework Assignments	25%
Test #1	25%
Test #2	25%
Test #3	25%

Each homework assignment and each test is graded on a scale of zero to 100 points. Your grade in the course will be computed as a weighted average of your homework assignment and test averages using the following equation:

$$AVERAGE = 0.25 \times HW + 0.75 \times TEST$$

HW is the average of your homework assignment grades (0–100) and *TEST* is your average test grade (0–100). The following scale will be used to assign grades at the end of the semester:

Average	Grade
94 and above	A
90 to 93.9	A–
87 to 89.9	B+
83 to 86.9	B
80 to 82.9	B–
77 to 79.9	C+
73 to 76.9	C
70 to 72.9	C–
60 to 69.9	D
Below 60	F

Course Policies

There will be no extra credit work given to make up for missing homework assignments or poor performance on the tests. Late homework will not be accepted for grading. If you have a good reason why you could not turn in an assignment on time then you may, *with the instructor's permission*, turn in the completed assignment for consideration. If the reason is acceptable then the assignment will be examined for completeness and recorded as completed. These completed assignments will not be included in the computation of your homework average and will simply be excused. Solutions that are merely copies of the work of others or a copy of any kind of posted or published solutions will not be accepted for grading. Any work on a test that is not your own will result in a failing grade for the course.

Course Schedule

Week	Topics Covered
Week #1 August 20 and 22	Read 1/1 to 1/7 and 2/1 to 2/3 Units, Newton's law of gravitation, rectilinear motion, and Cartesian coordinates.
Week #2 August 27 and 29	Read 2/4 to 2/9 Rectangular, tangential & normal, and polar coordinates. Relative motion.
Week #3 September 5	Read 3/1 to 3/4 Newton's 2 nd law for a particle - rectilinear motion.
Week #4 September 10 and 12	Read 3/5 Newton's 2 nd law for a particle - curvilinear motion.
Week #5 September 17 and 19	Read 3/6 to 3/7 Work and energy for a particle. Conservation of energy for a particle.
Week #6 September 24 and 26	Read 3/9 Impulse and momentum for a particle. Test #1 will be on Wednesday, September 26 th .
Week #7 October 1 and 3	Read 3/10 and 3/12 Impact. Angular impulse and angular momentum.
Week #8 October 8 and 10	Read 4/1 to 4/5 Newton's 2 nd law for a system of particles. Work and energy for a system of particles. Conservation of energy and momentum.
Week #9 October 15 and 17	Read 5/1 to 5/4 Rigid body rotation. Absolute motion analysis. Relative velocity motion analysis.
Week #10 October 22 and 24	Read 5/5 to 5/6 Instantaneous center of rotation. Relative acceleration motion analysis.
Week #11 October 29 and 31	Read 5/7 Motion relative to rotating axes. Test #2 will be on Wednesday, October 31 st .
Week #12 November 5 and 7	Read 6/1 to 6/3 Newton's 2 nd law for a rigid body. Rigid body translation.
Week #13 November 12 and 14	Read 6/4 to 6/5 Fixed-axis rotation of a rigid body. General plane motion of a rigid body.
Week #14 November 26 and 28	Read 6/5 General plane motion of a rigid body.
Week #15 December 3 and 5	Read 6/6 to 6/7 Work and energy for a rigid body. Virtual work.
Week #16 December 10 or 12	Test #3