ME 306- Dynamics, Spring 2012

Prerequisites: CE 202 Statics, Math 264L Calculus III
Instructor: Dr. Juan. C. Heinrich, heinrich@unm.edu
                         Office Hours: T 2:00-3:00, W 9:00-10:00 or by appointment
Teaching Assistant: Daniel Irving, dirving25@gmail.com
Schedule, room: T-R 8:00-9:15, ME 218
Recitations: Th 2:00-3:00, ME 218 and F 9:00-10:00, ME 310

Catalog description:

Principles of dynamics. Kinematics and kinetics of particles, systems of particles, and rigid bodies.

Textbooks/required:

Dynamics by R. C. Hibbeler, Pearson Prentice Hall 12th edition.

Course topics:

1. Kinematics of Particles
2. Kinetics of Particles: Force and Acceleration
3. Kinetics of Particles: Work and Energy
4. Kinetics of Particles: Impulse and Momentum
5. Planar Kinematics of Rigid Bodies
6. Planar Kinetics of Rigid Bodies: Force and Acceleration
7. Planar Kinetics of Rigid Bodies: Work and Energy
8. Planar Kinetics of Rigid Bodies: Impulse and Momentum

Course Objectives:

1. Understand the basic concepts of engineering dynamics.
2. Model and analyze three-dimensional motion of particles.
3. Model and analyze plane two-dimensional motion of rigid bodies.
4. Interpret results from the mathematical analysis in a physical context.
5. Have a basic understanding of the use of Work-Energy and Impulse-Momentum methods in dynamics.
6. Learn to identify which method to use in a given physical situation.
7. Apply the concepts learnt to the modeling of simple engineering situations.

Assessment Tools:

1. Homework 10%
2. Exam 1   30%, Thursday February 16 (8:00 AM)
3. Exam 2   30%, Thursday April 5 (8:00 AM)
4. Exam 3*   30%, Thursday May 10 (7:30 AM)
     (*) This is not a final but a third exam

Course Outcomes

1.1 Students develop qualitative and quantitative understanding of kinematics of particles and rigid bodies in plane motion.
2.1 Students understand the basic concepts of kinematics and kinetics of particles.
3.1 Students understand the concepts associated with kinematics of plane rigid bodies and relative motion analysis in two dimensions.
4.1 Students understand the concepts of work and energy, and impulse and momentum as applied to the kinetics of particles and rigid bodies in plane motion.
5.1 Students understand which method to use in a given physical situation and can derive useful design information from their analysis.

Tentative schedule

January 17	12.2, 12.3, 12.4
January 19	12.5, 12.6, 12.7
January 24	12.8, 12.9, 12.10
January 26	13.1, 13.2
January 31	13.3, 13.4
February 2	13.5, 13.6
February 7	14.1, 14.2, 14.3
February 9	14.4, 14.5, 14.6
February 14	REVIEW
February 16	EXAM 1
February 21	15.1, 15.2
February 23	15.3,15.4
February 28	15.5, 15.6
March 1	15.7
March 6	16.1, 16.2, 16.3
March 8	16.5
March 13	SPRING BREAK, NO CLASS
March 15	SPRING BREAK, NO CLASS
March 20	16.6, 16.7
March 22	16.8
March 27	17.1
March 29	17.2, 17.3
April 3	Review
April 5	EXAM 2
April 10	17.4, 17.5
April 12	18.1, 18.2
April 17	18.3, 18.4
April 19	18.5
April 24	19.1
April 26	19.2, 19.3
May 1	19.4
May 3	REVIEW
May 10	EXAM 3 (**7:30 AM**)

ME-306 Spring 2012 Home Work Assignments

Problems are from the text book: R. C. Hibbeler, Engineering Mechanics Dynamics, twelfth edition

HW # 1: 12-7, 12-10, 12-20, 12-29, 12-46, 12-50, 12-57, 12-69
Due Tuesday January 24

HW # 2: 12-75, 12-87, 12-93, 12-101, 12-131, 12-155, 12-170, 12-183
Due Tuesday January 31

HW # 3: 12-198, 12-209, 12-222, 12-229, 13-5, 13-23, 13-30, 13-35
Due Tuesday February 7

HW # 4: 13-57, 13-67, 13-75, 13-83, 13-91, 13-94, 13-106, 13-113
Due Tuesday February 14

Exam 1: Thursday February 16, 8:00 - 9:15 am

HW # 5: 14-5, 14-12, 14-30, 14-35, 14-50, 14-62, 14-81, 14-83
Due Tuesday February 28

HW # 6: 14-86, 14-95, 15-5, 15-12, 15-14, 15-21, 15-26, 15-30
Due Tuesday March 6

HW # 7: 15-35, 15-42, 15-48, 15-50, 15-62, 15-69, 15-75, 15-89
Due Tuesday March 20

HW # 8: 15-93, 15-98, 15-101, 15-105, 16-4, 16-11, 16-25, 16-33
Due Tuesday March 27

HW # 9: 16-59, 16-65, 16-71, 16-88, 16-99, 16-104, 16-111, 16-119
Due Tuesday April 3

Exam 2: Thursday April 5, 8:00 - 9:15 am

HW # 10: 16-129, 16-131, 16-137, 16-145, 16-150, 17-13, 17-28, 17-22
Due Tuesday April 17

HW #11: 17-31, 17-45, 17-47, 17-53, 17-59, 17-70, 17-79, 17-86
Due Tuesday April 24

HW #12: 17-100, 17-109, 17-122, 18-4, 18-19, 18-31, 18-49, 18-60
Due Tuesday May 1

HW # 13: 19-6, 19-13, 19-21, 19-30, 19-37, 19-44, 19-49, 19-55
Not Graded

Exam 3: Thursday May 10, 7:30 AM

Homework is due on Tuesdays at the time of the class.