



JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
MECHANICAL ENGINEERING DEPARTMENT
ME 311 Mechanics of Machinery
Semester

Catalog Data- 2013 : 3 Credit hours (3 h lectures). Kinematic analysis of mechanisms. Velocity and acceleration polygons. Static and inertia force analysis of machinery. Dynamic analysis of cams, gear and gear trains. Balancing of machines.

Text Book(s): Norton, R., Kinematics and Dynamics of Machinery, 1st edition in SI Units, McGraw-Hill.

References:

- Erdman, A. G., and Sandor, G. N. (2001). Mechanism Design: Analysis and Synthesis, Volume 1. 4th ed. New Jersey, Prentice Hall.
- Shigley, J.E. and J. J. Uicker, J.J. (1995), Theory of Machines and Mechanisms, McGraw-Hill.
- Wilson, C. and Sadler, J. (1993), Kinematics and Dynamics of Machinery, Harpen Collins.

Instructor: _____

Class Schedule: _____

Office Hours: _____

Pre/Co-Requisites: ME 212 Dynamics

Objectives:

- 1- Familiarize students with basic types of mechanisms, joints and motion.
- 2- Determine degree of freedom (mobility) and equivalent linkages.
- 3- Perform position, velocity and acceleration analyses using graphical and analytical methods.
- 4- Perform force analysis in linkages using static and dynamic analyses.
- 5- Analyze and design cam-follower mechanisms.
- 6- Analyze gear mechanisms and gear trains.
- 7- Perform balancing of rotating machines.

Topics Covered:

1. Introduction to mechanisms.
2. Kinematics pairs and mobility of planar mechanisms
3. Displacement and velocity analyses in planar mechanisms
4. Acceleration analysis in planar mechanisms
5. Static force analysis in planar mechanisms
6. Dynamic force analysis in planar mechanisms
7. Cam motions and dynamics
8. Gears and gear trains
9. Balancing of rotating machines

Computer Usage: Students are encouraged to solve some assigned homework problems using the available engineering software, such as MATLAB and Excel.

Design Activities/Project(s): Teams' group work will be conducted by groups of four students. The team should share and distribute responsibility. The group will submit a professional report and make an oral presentation. Making use of all resources, e.g., patents, journal publications, internet, labs, etc., is encouraged. The report must be typed; hand-written reports are not accepted. The report should not exceed 5 pages. Late Reports will be penalized.

Lab. Experiment(s):

Scientific Visit(s):

Evaluation: Quizzes, Homework and Group work : 10 %
 1st Exam : Tuesday 10/11/2015 25 % From 3:45 – 4:45 PM
 2nd Exam : Tuesday 08/12/2015 25% From 3:45 – 4:45 PM
 Final Exam 40 %

Relationship of the Course to ME Outcomes:

ABET a – k	√	Mechanical Eng. Program Outcomes
a	√	a. Apply knowledge of mathematics (including multivariate calculus and differential equations), basic science, and principles of engineering to ME practice.
b		b. Design and conduct experiments as well as analyze and interpret data.
c	√	c. Design, model, analyze and realize physical components, processes, or systems and work professionally in both thermal and mechanical systems to meet the desired needs.
d		d. Function within multidisciplinary teams.
e	√	e. Identify, formulate, and solve engineering problems.
f		f. Understand professional and ethical responsibilities of mechanical engineers.
g		g. Communicate effectively with written, oral, or visual means.
h, j		h. Obtain broad knowledge to understand the implications of engineering solutions within global and societal contexts and knowledge of contemporary issues.
i		i. Recognition of the need for, and possess the ability to engage in, lifelong learning.
k	√	k. Use the techniques, skills, and modern engineering tools necessary for engineering practice.

ABET Category:

Engineering Science 3 Credits
 Engineering Design 0 Credits

Prepared By: _____

Date: _____