



JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
MECHANICAL ENGINEERING DEPARTMENT
ME 332 Mechanical Design
Semester

Catalog Data - 2013: 3 Credit hours (3 h lectures). Introduction to design process. Design considerations. Tolerances and fits. Stress analysis and deflection of mechanical elements. Energy methods. Statistical considerations in machine design. Failure of machine elements. Fatigue.

Text Book(s): **Shigley's Mechanical Engineering Design, SI Edition, 10th Edition**

- References:**
1. Avallone, E. A. and Maumeister III, T. B., Mark's Standard Handbook for Mechanical Engineers, Mc-Graw Hill.
 2. Juvinall, R. C. and Marshek, K. M., Fundamentals of Machine Component Design, John Wiley & Sons.
 3. Mott, R. L., Machine Elements in Mechanical Design, Prentice Hall.
 4. Hamrock, B. J., Jacobson, B. and Schmid, S. R., Fundamentals of Machine Elements, Mc-Graw Hill.
 5. Norton, R. L., Machine Design: An Integrated Approach, Prentice Hall.

Instructor: _____

Class Schedule: _____

Office Hours: _____

Pre/Co-Requisites: ME 214 Mechanics of Materials
ME 202 Mechanical Drawing

- Objectives**
1. To review of the concepts on stress, strain, elastic and plastic ranges of material behavior, stress-strain relationship, and engineering materials.
 2. Stress calculations under axial loading, torsion, bending, and transverse loading.
 3. Brief review of deflection analysis.
 4. To understand the importance of using and interpreting Mohr's circle to determine principal stresses and maximum shear stresses.
 5. To obtain a working knowledge in the use of the proper failure theories under steady and variable loadings.

- Outcomes:** After successfully completing this course, the students should be able to:
1. use free-body diagrams, equilibrium equations, force, moment and torque diagrams, and analyze resulting stresses and strains in machine elements. (Define the most critically stressed point in a machine component, and analyze strains and deflections.) [a,e]
 2. find relevant properties of materials/cross-sections from various sources. [e]
 3. design thin- and thick-walled cylinders, shrink fitted assemblies, and curved members. [a,c,e]
 4. apply multidimensional static failure criteria in the analysis and design of mechanical components. (Knowledge of various multidimensional static failure criteria for different materials, and apply multidimensional static failure criteria in the design and analysis of machine components.) [a,c,e]
 5. apply multidimensional fatigue failure criteria in the analysis and design of mechanical components. (Knowledge of fatigue failure and load-life relation, Knowledge of various multidimensional fatigue failure criteria, and apply multidimensional fatigue failure criteria in the design and analysis of machine components under various loading conditions.) [a,c,e]

- Topics Covered:**
- Chapter 1: Introduction.
 - Chapter 2: Materials.
 - Chapter 3: Load & Stress Analysis.
 - Chapter 4: Deflection and stiffness
 - Chapter 5: Failures Resulting from Static Loading.
 - Chapter 6: Fatigue Failure Resulting from Variable Loading.
 - Chapter 7: Shafts and shaft components.

Attendance: Attendance is MANDATORY and will be checked often. Late coming is not encouraged as it disturbs students and instructor. Excuses for absence should be approved by the Deanship of Engineering and submitted to me within a week following the last day of absence. Bonus marks will be given from the student who has no absences.
 A regular student will not be allowed to continue in the course and take the final examination and will be given a DN grade if his absences are more than 20% of the lecture scheduled for the course regardless of his performance.

HW & Quizzes It is your responsibility to solve the Home Work (HW) as soon as the material is covered in the class. HW problems will be posted on e-learning. All HW problems assigned during a given week are due in class one week from date of assignment, unless otherwise stated. Late HW is not accepted. Quizzes will be given regularly based on the lectures.

Major and Final Exams All Exams will be OPEN BOOK Only.

Evaluation:	HW & Quizzes	10%
	1 st Exam (October 25 th , 2016)	25%
	2 nd Exam (November 29 th , 2016)	25%
	Final Exam	40%

Relationship of the Course to ME Outcomes:

ABET a – k	√	Mechanical eng. Program Outcomes
a	√	a. Apply knowledge of mathematics, science, and engineering in practice.
b		b. Design and conduct experiments as well as analyze and interpret data.
c	√	c. Design a system, components, or process to meet desired needs.
d		d. Function on multidisciplinary teams.
e	√	e. Identify, formulate, and solve engineering problems.
f		f. Understanding of professional and ethical responsibility of an engineer.
g		g. Communicate effectively.
h		h. Broad education to understand the impact of engineering solutions in global and societal context.
i		i. Recognition of the need for, and possess the ability to engage in, lifelong learning.
j		j. Possess knowledge of contemporary issues.
k		k. Use the techniques, skills, and modern engineering tools necessary for engineering practice.

ABET Category: Engineering Science 0 Credits
 Engineering Design 3 Credits

Prepared By: _____ **Date:** _____