

**The University of Jordan
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Machine Design I	0904435	

2019 Course Catalog Description

Meaning, phases, evaluation, considerations of design, stress analysis, deflection analysis, static strength and theories of failure, fatigue strength. Design of fasteners and connections, riveted joints, bolts and screws, force-deflection diagrams of bolted connections. Welded joints. Mechanical springs, helical, leaf, torsional spring shafts. Case studies and applications.

Instructors

Name	E-mail	Sec	Office Hours	Lecture Time

Text Books

Title	Shigley's Mechanical Engineering Design	
Author(s)	R. G. Budynas and J. K. Nisbett	
Publisher, Year, Edition	McGraw Hill, 2011, 10 th ed., (SI Units)	

References

Books	1. R. C. Juvinall and K. M. Marshek (2006) Fundamentals of Machine Component Design, 4 th Ed. John Wiley & Sons. 2. R. L. Mott (1999) Machine Elements in Mechanical Design, 3 rd Ed. Prentice Hall.
Journals	ASME Journal of Mechanical Design
Internet links	http://highered.mcgraw-hill.com/sites/0073529281/student_view0/ (publisher web site)

Prerequisites

Prerequisites by topic	Strength of Materials
Prerequisites by course	Strength of Materials, 0904372
Co-requisites by course	-
Prerequisite for	Machine Design II (0904436)

Topics Covered

Week	Topics	Chapter in Text	Sections
1-4	Introduction to Mechanical Engineering Design, Load and Stress Analysis.	Chapter 1 Chapter 3	All sections All Sections except 3.3
5-6	Deflection and Stiffness	Chapter 4	4.1,2,4,7,8,10,11,12,13
7-8	Failures Resulting from Static Loading	Chapter 5	5.1,2,3,4,5,7,8,10,11
9-10	Fatigue Failure Resulting from Variable Loading	Chapter 6	6.1,2,3,4,7,8,9,10,11,12,13,14
11-12	Screws, Fasteners, and the Design of Nonpermanent Joints	Chapter 8	8.1-8.9
13-14	Welding, Bonding, and the Design of Permanent Joints	Chapter 9	9.1-9.6
15-16	Springs	Chapter 10	10.1-10.7

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Ability to perform load, stress-strain, deflection and stiffness design analysis. 2. Ability to conduct static and fatigue failure analysis and recognize the differences between the different failure theories
2	3. Ability to design power screws and spring. 4. Ability to perform design analysis for bolted, screwed, riveted and welded joints.

Evaluation

Assessment Tools	Expected Due Date	Weight
Quiz		10%
1 st Midterm Exam		20%
2 nd Midterm Exam		20%
Final Exam		50 %

Contribution of Course to Meet the Professional Components

The course contributes to building the skills of design and selection of basic machine components, dealing with engineering standards and converting open-ended problems into a set of design specifications.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	X	X					

Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	MEPO2	MEPO3	MEPO4	MEPO5

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated by ABET Committee, 2024