

**The University of Jordan
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Machine Design II	0904436	

2019 Course Catalog Description

Rolling contact bearings, selection, mounting and enclosure. Lubrication and journal bearings. Clutches, coupling and brakes. Gearing: Geometry, kinematics gear trains and force analysis. Design of spur, helical, bevel and worm gears. Multi-speed gear boxes. Design and analysis of belts, ropes, chains, term project. 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, 9 th SI

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/

Prerequisites

Prerequisites by topic	Calculus, Vector Analysis
Prerequisites by course	Machine Design (I) 0904435 + Mechanics of Machines 0904331
Co-requisites by course	-
Prerequisite for	Application in Mechanical Design 0904538

Topics Covered

Week	Topics	Chapter in Text	Sections
1-2	Rolling contact bearing: types, load/life relations, combined loading, mounting and enclosure.	Chapter 11	
3	Lubrication and journal bearings: Lubrication and viscosity, Hydrodynamic theory, design considerations, pressure fed bearings.	Chapter 12	
4-7	Gears: types, involutes, contact ratio, interference, bevel, helical and worm gears, tooth systems, gear trains and force analysis.	Chapter 13	
8-10	Design of gears: Spur helical, bevel and worm gears.	Chapters 14+15	
11-13	Clutches, brakes couplings and flywheels: analysis and design of different types of clutches and brakes, energy considerations and flywheel design.	Chapter 16	
14-15	Flexible mechanical elements: Different types of belts, roller chains, ropes and flexible shafts.	Chapter 17	

Mapping of Course Outcomes to ABET Student Outcomes							
SOs	Course Outcomes						
2	1.Design and analysis of Ball, Roller and Journal Bearings 2.Design and analysis of Spur, Bevel, Helical and Worm gear train systems. 3.Design and analysis brakes and clutches 4.Design and analysis belts, chains and ropes						
7	5.Ability to look up new machine elements and utilize them in a machine design.						
Evaluation							
Assessment Tools		Expected Due Date				Weight	
Quiz						10%	
First Midterm Exam						20%	
Second 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, 2021							