

**The University of Jordan
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Mechanics of Machines	0944331	

2019 Course Catalog Description

Mechanisms and applications, mobility and linkages. Cams, gears and gear trains. Velocity and acceleration analysis in mechanisms. Inertia forces. Principles of balance in rotating & reciprocating masses.

Instructors

Name	E-mail	Sec	Office Hours	Lecture Time

Text Books

Title	Design of Machinery	
Author(s)	Norton, R. L.	
Publisher, Year, Edition	McGraw Hill, Third Edition, (SI Units)	

References

Books	1. Charles E. Wilson, J. Peter Sadler (1993) Kinematics and Dynamics of Machinery, Second Edition. Harper Collins. 2. Waldron, Kinzel (2004) Kinematics, Dynamics, and Design of Machinery, second Edition. John Wiley & Sons
Journals	Mechanism and Machine Theory, www.elsevier.com/locate/mechmt
Internet links	http://nptel.ac.in/courses/112104121/

Prerequisites

Prerequisites by topic	Calculus, Vector Analysis, Statics
Prerequisites by course	Dynamics 0904222
Co-requisites by course	-
Prerequisite for	Machine Design 2

Topics Covered

Week	Topics	Chapter in Text	Sections
1	Introduction: Mechanisms and machines, applications.	Chapter 1	All Sections
2	Links, Joints, Degree of Freedom (Mobility)	Chapter 2	2.0-2.6, 2.11, 2.13
3-4	Vector loops & Position analysis: graphical and analytical.	Chapter 4	4.0-4.12
5-6	Velocity analysis: graphical and analytical.	Chapter 6	6.0-6.1, 6.3-6.7, 6.9
6-7	Acceleration analysis: graphical and analytical.	Chapter 7	7.0-7.1, 7.3, 7.5-7.7
7-8	Static & Dynamic force analysis of mechanisms.	Chapter 11	11.0-11.6, 11.8
9-10	Cams: types of followers and motion programs.	Chapter 8	8.0-8.3, 8.6
11-14	Gears' geometric parameters and different types of gear trains.	Chapter 9	9.0-9.9, 9.11-9.12
14-15	Introduction to balancing	Chapter 12	12.0-12.2

Mapping of Course Outcomes to ABET Student Outcomes							
SOs		Course Outcomes					
1		1. Ability to perform kinematic analysis of planar mechanisms and gear train including mobility, position, velocity, acceleration analysis, and force analysis.					
2		2. Ability to perform dynamic analysis of planner mechanisms and perform static and dynamic balancing. 3. Ability to perform design of CAM-Follower systems and gear trains and planar mechanisms.					
Evaluation							
Assessment Tools		Expected Due Date				Weight	
Project						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 fundamental concepts of motion and force analysis and basic design of linkages and machine components.							
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							