

**The University of Jordan  
School of Engineering**



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

**2005 Course Catalog Description**

Mechanisms and applications, mobility and linkages. Cams, gears and gear trains. Velocity and acceleration analysis in mechanisms. Inertia forces and dynamics of mechanisms.

**Instructors**

Name	E-mail	Sec	Office Hours		Lecture Time	

**Text Books**

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

**References**

<b>Books</b>	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
<b>Journals</b>	Mechanism and Machine Theory, <a href="http://www.elsevier.com/locate/mechmt">www.elsevier.com/locate/mechmt</a>
<b>Internet links</b>	<a href="http://nptel.ac.in/courses/112104121/">http://nptel.ac.in/courses/112104121/</a>

**Prerequisites**

<b>Prerequisites by topic</b>	Calculus, Vector Analysis, Statics
<b>Prerequisites by course</b>	Dynamics 0904222
<b>Co-requisites by course</b>	-
<b>Prerequisite for</b>	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
<b>Project</b>		10 %
<b>1<sup>st</sup> Midterm Exam</b>		25 %
<b>2<sup>nd</sup> Midterm Exam</b>		25 %
<b>Final Exam</b>		40 %

### 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
<b>Availability</b>	X	X					

### Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	MEPO2	MEPO3	MEPO4	MEPO5

### ABET Student Outcomes (SOs)

<b>1</b>	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
<b>2</b>	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
<b>3</b>	An ability to communicate effectively with a range of audiences
<b>4</b>	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
<b>5</b>	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
<b>6</b>	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
<b>7</b>	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

**Updated by ABET Committee, 2019**