



**Hashemite University**  
**College of Engineering**  
**Department of Mechatronics**  
**Mechanism and Machine Theory 110405411**  
**(Credit Hours 2)**

Instructor		Grading info		Class Info	
Name	Dr. Samer Mutawe			Days	Sun & Tue
Email:	samerk@hu.edu.jo	First	30	Time	1:00-2:00
Office:	E3106	Second	30	Location	E2024
Office hours:	Sun 11:00-12:00 Mon 12:30-1:30	Final	40		

**Course**

Course Number:	110405411
Prerequisite:	110405211
Textbook:	.Kinematics and Dynamics of Machinery, Robert Norton, McGraw-Hill, 3rd Ed
Course Description (as in the catalog):	This course introduces various techniques for mechanism analysis and synthesis. Design and fabricate a mechanical device to perform a desired task. Synthesis, analysis, and design of planar mechanisms, linkages, gear trains, and cams. The course emphasizes the practical design considerations of mechanisms and machines.
Specific Outcomes of Instruction (Course Outcomes):	<ol style="list-style-type: none"> <li>1. Gain clear knowledge about some of the basic mechanisms, such as four-bar and slider crank linkages (C).</li> <li>2. Demonstrate a clear understanding of the physical meaning of degree of freedom (E).</li> <li>3. Identify mechanical joints of mechanisms and visualize their mobility (C).</li> <li>4. Demonstrate the ability to draw the kinematic diagrams of actual mechanisms and determine their degrees of freedom, and perform kinematic analysis design of planar four-bar linkages (C)</li> <li>5. Demonstrate the ability to determine the position, velocity, and acceleration of various planar mechanisms using analytical methods(A,C)</li> <li>6. Demonstrate familiarity with standards in gear trains and cam components (A,C).</li> </ol>
Important material	

**References:**

Kinematics and Dynamics of Machinery, C. Wilson and J. Sadler, Harper Collins, 2003  
 Theory of Machines and Mechanisms, Uicker, Pennock and Shigley, Oxford 2003.

**Major Topics Covered and Schedule in Weeks:**

Topic	# Weeks	# Contact hours
1. Introduction	1, 2	4
2. Kinematics Fundamentals	3, 4, 5	5
3. Velocity Analysis	5, 6, 7	5
4. First Exam	7	1

5. Acceleration Analysis	8, 9, 10	5
6. Synthesis Problems: Function Generation, Path Generation	10, 11	3
7. Second Exam	12	1
8. Synthesis Problems: Motion Generation	12, 13	4
9. Cam and gear train Analysis and Design	14	2
<b>Total</b>	<b>15</b>	<b>30</b>
<b>Course Policy</b>		
- Attendance is mandatory and absence is allowed up to total 6 one-hour lectures -		

**Student Outcomes (SO) Addressed by the Course:**

#	<i>Outcome Description</i>	<i>Contribution</i>
(a)	an ability to apply knowledge of mathematics, science, and engineering	<b>M</b>
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	<b>H</b>
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	<b>M</b>
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	

**H**=High, **M**= Medium, **L**=Low