



Hashemite University
College of Engineering
Department of Mechatronics
Modeling and Simulation 110405311
(3 Credit Hours)



Instructor		Grading info		Class Info	
Name	Ayat Abdullah Al-Jarrah	Test 1	25	Days	Sun-Tue-Thu
Email:	Ayataljarrah@hu.edu.jo	Test 2	25	Time	10:00-11:00 am
Office:	E3115	Test 3	10	Location	E2022
Office hours:	09:00-10:00 Sun Tue Thu 11:00 – 12:00 08:30 – 09:30 Mon Wed 9:30 – 11:00	Final	40		

Course	
Course Number:	110405311
Prerequisite:	(409201) or (405211)
Textbook:	Nicolate Lobotiu “System Dynamics for Engineering Students: Concepts and Applications,” 1st Ed., Academic Press, 2010.
Course Description (as in the catalog):	This course aims to provide students with the principles and applications of modeling and simulation of multi-domain engineering systems at a level of detail suitable for design and control system implementation. Unified methods for modeling and simulating mechatronics systems with emphasis on mixed component systems containing electrical, mechanical, thermal and fluid elements; modeling of mixed physical systems by lumped-parameter linear elements, energy methods, linear graphs, bond graphs, system analogies, analytical and numerical solutions, time response, dynamic response specifications, stability considerations, case studies of mechatronics systems .
Specific Outcomes of Instruction (Course Outcomes):	By the end of this course students should be able to: <ol style="list-style-type: none"> 1. Analyze different various mechanical and electrical method using energy method. (Outcome a and e) 2. Analyze different systems using newton’s second law, Kirchoff’s law, first law or thermodynamics laws, and etc. (Outcome a and e) 3. Able to define analogous model. (Outcome e and c) 4. Use simulation program to solve, test and design various systems. (outcome c, g, i and k)
Important material	1. Brown, Forbes T. Engineering System Dynamics. New York, NY: CRC, 2001. 2. Ira Cochin and William Cadwallender, Analysis and Design of Dynamic Systems, Third Edition, Addison-Wesley Educational Publishers Inc., 1997.

References:

Major Topics Covered and Schedule in Weeks:		
Topic	# Weeks	# Contact hours
1. Introduction (Chapter 1)	1	3
2. Mechanical Systems (Chapter 2 and chapter 3)	2,3,4	9
3. Electrical Systems (Chapter 4)	5,6	6
4. First Exam	7	1
5. Fluid system (Chapter 5)	7,8,9	8
6. Thermal Systems (Chapter 6)	10	3
7. Second Exam	11	1
8. Coupled-Field Systems (Chapter 10)	11,12	5
9. Project Presentation	13,14,15	9
Total	15	45

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	<i>H</i>
(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	<i>L</i>
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	<i>H</i>
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	<i>L</i>
(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	<i>L</i>
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	<i>L</i>

H=High, M= Medium, L=Low

Course Policy

- A: Attendance is mandatory, absence is allowed up to 15% of the total classes
- B: Project Cheating is zero grade.
- C: There are no makeup for speeches and exams unless you demonstrate in advance (and I agree) that a significant life-event prevents you from attending class or if you have a documented emergency.
- First exam: February 21 ,2019
- Second exam: April 2, 2019