Hashemite University
College of Engineering
Department of Mechatronics
Automatic Control 110405331
(3 Credit Hours)

Instructor

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Office hours:	10:00-11:00 (Mon – Wed) 2:00-3:00 (Sun – Tue) 10:30-1:30 (Thu)

Grading info

Test 1	**5**
Test 2	25
Test 3	5
Test 4	25
Final	40

Class Info

Days	**Sun, Mon, Tue, Wed**
Time	(11:00-12:15) am (12:30 – 1:45) Pm
Location	Theatre E1

Course

Course Number:	**110405331**
Prerequisite:	(0404201 or 0409220) or (0409200 and 0409202)
Textbook:	Richard C. Dorf, and Robert H. Bishop "Modern Control Systems," 12th Ed., Pearson Education Inc., 2011.
Course Description (as in the catalog):	This course aims to provide students with the principles of control systems and understanding of control concepts. Modeling of physical systems: electrical/mechanical systems. System representations: block diagrams, transfer function, signal flow graph, state-variable models. Feedback control system characteristics. Performance of feedback control systems. Routh-Hurwitz stability. Root locus method, and PID controllers.
Specific Outcomes of Instruction (Course Outcomes):	1.Analyze linear system using Laplace transforms. (Outcomes A) 2.Construct a transfer function model for electromechanical systems involving linear or rotating motion. (Outcome A and E) 3.Construct a detailed block diagram model for a feedback control system. (Outcome A) 4.Write performance specifications for a control system in terms of its transient response, steady-state error, and disturbance response. (Outcomes A and C) 5.Determine the stability of a feedback system using the Routh-Hurwitz stability tests. (Outcome A, C, and K) 6.Construct Root Locus to analyze a feedback control systems. (Outcomes A, C, and K)
Important material	On Moodle

References:

Major Topics Covered and Schedule in Weeks:

Topic	# Weeks	# Contact hours
1. Introduction (Chapter 1)	1	2.5
2. Systems Modeling (Chapter 2)	1, 2	5
3. Laplace Transform and Transfer Functions (Chapter 2)	2, 3	6.25
4. Block Diagrams (Chapter 2)	3, 4	3.75
5. Signal Flow Graph (Chapter 2)	4	2.5
6. First Exam	5	1
7. Feedback Control Systems Characteristics (Chapter 4)	5	4

8. Performance of Feedback Control Systems (Chapter 5)	6	5
9. Second Exam	7	1
10. Stability of Linear Systems – Routh-Hurwitz (Chapter 6)	7	4
11. Root Locus and PID Control (Chapter 7)	8	5
Total	**8**	**40**

Exams Dates

- ***Test 1: July 12th, 2020***
- ***Test 2: July 30th ,2020***
- ***Test 3: Aug 4th, 2020***
- ***Test 4: Aug 13th, 2020***

Student Outcomes (SO) Addressed by the Course:

#	*Outcome Description*	*Contribution*
(a)	an ability to apply knowledge of mathematics, science, and engineering	***H***
(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	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	***M***
(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***

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