Jordan University of Science and Technology

Faculty of Engineering

Aeronautical Engineering Department

AE464 Automatic Control - JNQF Level: 7

Second Semester 2022-2023

Course Catalog
3 Credit Hours. This course aims to introduce students to the fundamental knowledge of control system theories and applications. Topics include mathematical modeling and state variables models, feedback control system characteristics and performance, stability of linear feedback systems, design steps of PID controller, and control design using the root-locus method, frequency response methods, stability in the frequency domain, and design of feedback control systems.

Text Book	
Title	Modern Control Systems
Author(s)	R. C. Dorf and R. H. Bishop
Edition	13th Edition
Short Name	Textbook
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref. 1	Feedback Control of Dynamic Systems	G.F. Franklin, J.D. Powell and A. Emami-Naeini	6th Edition	
Ref. 2	Control Systems Engineering	Nise	2nd Edition	
Ref. 3	Modern Control Engineering	K. Ogata	4th Edition	
Ref. 4	Automatic Control Systems?,	Farid Golnaraghi and Benjamin C. K	9th Edition	
Ref. 5	Schaum?s outline of theory and problems of feedback and control systems	J. J. Distefano, A. R. Stubberud and W. J. Williams	2nd Edition	

Instructor	
Name	**Prof. Tariq Darabseh**
Office Location	N1 L2
Office Hours	Sun : 10:00 - 12:00 Mon : 11:30 - 12:30 Tue : 11:00 - 12:00 Wed : 11:30 - 12:30 Thu : 11:00 - 12:00
Email	darabseh@just.edu.jo

Class Schedule & Room
Section 2: Lecture Time: Mon, Wed : 10:00 - 11:30 Room: CH2110

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
714610	AE461 Mechanical Vibrations	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction to Control Systems	From **Textbook**
Week 2	Mathematical Models of Systems	From **Textbook**
Week 3	State Variable Models	From **Textbook**
Week 4	Feedback Control System Characteristics	**Chapter 4** From **Textbook**
Weeks 5, 6, 7	The Performance of Feedback Control Systems	**Chapter 5** From **Textbook**
Week 8	The Stability of Linear Feedback Systems	**Chapter 6** From **Textbook**
Weeks 9, 10	The Root Locus Method	**Chapter 7** From **Textbook**
Weeks 11, 12	Frequency Response Methods	**Chapter 8** From **Textbook**
Week 13	Stability in the Frequency Domain	**Chapter 9** From **Textbook**
Week 14	The Design of Feedback Control Systems	**Chapter 10** From **Textbook**
Weeks 15, 16	The Design of State Variable Feedback System	**Chapter 11** From **Textbook**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method

Apply mathematical modeling techniques to represent physical systems in the context of control theory. [1SO1] [1L7K1]	25%	First Exam, Assignments, Final Exam
Identify fundamental concepts in control system theories, including mathematical modeling, state variables models, and feedback control system characteristics. [1SO1] [1L7K1]	10%	First Exam
Analyze the performance of feedback control systems, considering stability in both time and frequency domains. [1SO 6] [1L7S3]	20%	2ed exam, Final Exam
Evaluate the effectiveness of PID controllers in achieving desired control system performance. [1SO 4] [1L7C2]	20%	2ed exam, Assignments, Final Exam
Design feedback control systems based on specified performance criteria, incorporating various control techniques. [1SO 2] [1L7S2]	25%	Final Exam

Relationship to Program Student Outcomes (Out of 100%)							
SO1	SO 2	SO 3	SO 4	SO 5	SO 6	SO 7	SO 8
35	25		20		20		

Relationship to NQF Outcomes (Out of 100%)			
L7K1	L7S2	L7S3	L7C2
35	25	20	20

Evaluation	
Assessment Tool	**Weight**
First Exam	25%
2ed exam	25%
Assignments	10%
Final Exam	40%

Policy	
Attendance	The class attendance is a must and absentee check at the beginning of almost every class is checked.

Date Printed: 2023-12-06