Jordan University of Science and Technology

Faculty of Engineering

Chemical Engineering Department

CHE762 Process Analysis And Control - JNQF Level: 9

Second Semester 2021-2022

Course Catalog
3 Credit Hours. Introduction to practical and theoretical aspects of process control, process modeling, feedback control system, and instruments of the control system. Stability analysis tuning of controllers, frequency analysis, Bode stability, cascade control, feed-forward control. Adaptive control system. Multiple input multiple output (MIMO) system. Interaction and decoupling. Sampled-data control theory with applications in digital computer control systems. Nonlinear methods of dynamic process analysis. Optimal control via calculus of variations and the maximum principle. State space representation. This course includes lab/ simulation component
Teaching Method: On Campus

Text Book	
Title	Chemical Process Control An Introduction to Theory and Practice
Author(s)	George Stephanopoulos
Edition	3rd Edition
Short Name	Textbook
Other Information	P T R PRENTICE HALL

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#1	Process Dynamics and Control	D.E. Seborg, T.F. Edgar and D.A. Mellichamp	2nd Edition	John Wiley, 1989.
Ref#1	Process Dynamics and Control	D.E. Seborg, T.F. Edgar and D.A. Mellichamp	2nd Edition	John Wiley, 1989.
Ref#2	Process Analysis and Control	D.R. Coughanowr, S.E. LeBlanc	3rd Edition	McGraw-Hill?s, 2008.

Instructor

Name	**Prof. Mamdouh Allawzi**
Office Location	CH2 L2
Office Hours	
Email	mallawzi@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 13:00 - 14:30 Room: U

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Dynamic behavior of feedback control system	From **Textbook**
Weeks 3, 4	Design of feedback control system	From **Textbook**
Weeks 5, 6	design of feedback control system using frequency response	From **Textbook**
Weeks 5, 6	design of feedback control system using frequency response	From **Textbook**
Week 7	Dead time and inverse response compensator	From **Textbook**
Week 7	control system wit multiple loops	From **Textbook**
Week 8	Feedforward and ratio controller	From **Textbook**
Week 9	Adaptive and inferential control systems	From **Textbook**
Week 10	Multiple Input-Multiple output system (MIMO) control system	From **Textbook**
Week 11	Interaction and decoupling of control loops-Bristol array method	From **Textbook**
Week 12	Digital computer control loops- from continuous to discrete	From **Textbook**
Week 13	Z-Transforms	From **Textbook**
Week 14	Discrete time response	From **Textbook**
Week 15	Design of digital feedback control system	From **Textbook**
Week 16	Sate space representation	From **Textbook**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Apply the fundamentals of laplace transforms in order to perform dynamics of chemical systems. Analysis system interactions [1L9K1]	20%	
Apply fundamentals of mathematical modelling in order to perform system response analysis and characteristics for feedforward control system [1L9S3]	20%	

Apply fundamental knowledge of closed loop control system to determine system response using adaptive control system [1L9K1]	20%	
Analyzed multiple input and multiple output (MIMO) control systems. Check for interaction and design decoupler to avoid interaction [1L9C6]	20%	
Apply Z -transform in order to design a discrete control system [1L9K1]	20%	

Relationship to Program Student Outcomes (Out of 100%)						
1	2	3	4	5	6	7

Relationship to NQF Outcomes (Out of 100%)		
L9K1	L9S3	L9C6
60	20	20

Policy	
Attendance	Attendance will be checked at the beginning of each class. University regulations will be strictly followed for students exceeding the maximum number of absences.
Homework	Homework problems are assigned during lectures and usually due one week later. Late homework will not be accepted. Try to solve the problems independently. The assigned problems will be collected, graded, and returned to you in lecture.
Students conduct	It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Cheating will not be tolerated in this course. University regulations will be pursued and enforced on any cheating student.

Date Printed: 2024-10-30