Faculty of Engineering & Technology

Control Systems 1

Information :

Course Code :	CMP 371	Level	:	Undergraduate	Course Hours :	3.00- Hours

Department :	Department of Electrical Engineering

Instructor Information :

Title	Name	Office hours
Professor	Said Fouad Mohamed Mekhemar	3
Assistant Lecturer	Mohamed Abdallah Mahmoud Shaheen	1
Assistant Lecturer	Mohamed Essam Abd El Aziz Abd El Aal	
Assistant Lecturer	Ahmed Moreab Hussien Mohamed	

Area Of Study :

˝Enrich the students knowledge about theory of classical control systems.
˝Train the students to analyze and enhance the performance of control systems.
˝Train students to apply Matlab software for solving automatic control systems problems.

Description :

Introduction to control systems, Advantages of closed-loop feedback systems, The role of the system mathematical model, Block diagrams and signal flow graphs, The basic control system design problem, stability in control systems, Frequency response analysis techniques, Root-locus analysis, Examples on continuous control systems, Transient response, Static error analysis, Frequency response, Bode plots, Relative stability, Introduction to concept of state space representation.

Course outcomes :

a.Knowledge and Understanding: :

1 -	a1. Explain the performance of closed loop feedback control systems.
2 -	a2. Illustrate the mathematical modeling of different analog control system.
3 -	a3. Explain the different time and frequency response analysis techniques.
4 -	a4. Discuss the modeling and analysis using state space representation.

b.Intellectual Skills: :

1 -	b1. Think in a creative way to solve control systems problems.
2 -	b2. Apply appropriate mathematical models to design control system.
3 -	b3. Analyze control systems using appropriate methods.

c.Professional and Practical Skills: :

1 -	Design Matlab sub-programs to solve automatic control problems.

d.General and Transferable Skills: :

1 -	Effectively manage tasks, time, and resources.
2 -	Demonstrate efficient IT capabilities.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Mathematical Modeling of Electrical and Mechanical Systems	8	6	2
Transient and Steady-State Response Analysis	10	6	4
The Root Locus Analysis	10	6	4
Design Based on The Root Locus Methods	10	6	4
Bode Diagrams	10	6	4
Design Based on Bode Diagrams	6	4	2
State Space Representation and Analysis	5	3	2
Solve problems using Matlab facilities	6	4	2
Basics of Mathematical Modeling of Control Systems	10	6	4

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion.
Problem Solving

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final exam	40.00		
In Class Quizzes	10.00		
Mid-Term exams	30.00		
Participations	10.00		
Reports	10.00		

Course Notes :

1. K. Ogata, " Modern Control Engineering", 5th edition, 2015, Prentice Hall.
2. S. Hasan Saeed, "Automatic Control Systems with Matlab Programs", 2013, S. K. Kataria & Sons.
3. B. C. Kuo and F. Golnaraghi, "Automatic Control Systems", 9th edition, 2010, John Wiley & Sons, Inc.
4. R. C. Dorf, R. H. Bishop, "Modern Control Systems", 12th edition, 2010, Prentice Hall.

Recommended books :

1. K. Ogata, " Modern Control Engineering", 5th edition, 2015, Prentice Hall.
2. S. Hasan Saeed, "Automatic Control Systems with Matlab Programs", 2013, S. K. Kataria & Sons.
3. B. C. Kuo and F. Golnaraghi, "Automatic Control Systems", 9th edition, 2010, John Wiley & Sons, Inc.
4. R. C. Dorf, R. H. Bishop, "Modern Control Systems", 12th edition, 2010, Prentice Hall.

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