Faculty of Engineering & Technology

Actuators and Power Electronics

Information :

Course Code :	EPR 442	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Mechatronics Engineering

Instructor Information :

Title	Name	Office hours
Professor	Naser Mohammed Bayoumy AbdelRahim	
Lecturer	Sayed Ahmed Zaki Ahmed	3
Assistant Lecturer	Mohamed Abdallah Mahmoud Shaheen	

Area Of Study :

To be familiar with the different sensors, signal conversion methods, actuators and final control elements and the design of process control and instrumentation systems used in industrial process including analogue and digital signal conditions.

Description :

Analog signal conditioning, Digital signal conditioning, Sensors, Signal conversion methods, Power electronics, Actuators and Final control elements

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Select the suitable final control element and describe the difference between three control valve types
2 -	Actuators
3 -	Signal Conversion
4 -	Sensors
5 -	Design analog and digital signal conditioning circuits
b.Intellectual Skills: :	
1 -	Problem Solving
2 -	Creative thinking
3 -	Storing, manipulating, and retrieving information
4 -	Comparing and contrasting
5 -	Classifying and Summarizing
6 -	Interpreting and Analyzing
c.Professional and Practical Skills: :	
1 -	Ability to identify the problem.
2 -	Ability to diagnose.

3 -	Engineering skills.
d.General and Transferable Skills: :	
1 -	Act through a teamwork in preparing a report on design problem using technological tools
2 -	Brainstorming inside the class in replying to the questions

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Analog Signal Conditioning	2	1	1
Digital Signal Conditioning	2	1	1
Thermal Sensors	6	3	3
Displacement, Location or Position Sensors	2	1	1
Strain Sensors	2	1	1
Motion Sensors	2	1	1
Pressure Sensors	2	1	1
Flow Sensors	4	2	2
Optical Sensors	6	3	3
Fiber Optic Sensors	4	2	2
Electrical and Pneumatic Signal Conversion	4	2	2
Switching Devices: SCR, GTO,TRIAC, DIAC	4	2	2
Controlling Devices: BJT, MOSFET, IGBT	4	2	2
Electrical Actuators	4	2	2
Pneumatic Actuators	4	2	2
Hydraulic Actuators	4	2	2
Final Control Elements	4	2	2

Teaching And Learning Methodologies :

Interactive Lecturing
Problem Solving
Discussion
Experiential learning
Project
Research

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
1st Assignments, Participation, & Quizzes	10.00		
1st Mid term	15.00	7	

2nd Assignments, Participation, & Quizzes	10.00		
2nd Mid term	15.00	11	
Final-term Exam	40.00	16	
Project	10.00	13	

Course Notes :

Course Notes (in MS Power Point or PDF format)

Recommended books :

ÅProcess Control Instrumentation Technology, Curtis D. Johnson, 8th edition or higher, 2006, Prentice Hall.
Industrial Process Sensors, David M. Scott, 1st edition, 2008 CRC Press
Condensed Handbook of Measurement and Control, N. E. Battikha, 3rd Edition, 2007 ISAï The Instrumentation, Systems and Automation Society
Fundamental of Industrial Instrumentation and Process Control, William C. Dunn, 1st edition, 2005 McGraw-Hill

Periodicals :

Periodicals, Web Sites, é etc

Web Sites :

Any web site on control systems