Faculty of Engineering & Technology

Fluid Systems Control

Information :

Course Code :	MPR 479	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Mechatronics Engineering

Instructor Information :

Title	Name	Office hours
Professor	Abdelaziz Morgan Abdelaziz Ahmed	9
Assistant Lecturer	Moustafa Raafat Aziz Shousha	
Assistant Lecturer	Rana Mohamed Abdel Rahman Saleh	8

Area Of Study :

This course aims to:
ÅEnrich the student's basic theoretical knowledge about the pneumatic and hydrau-lic control systems.
ÅTrain students to build a sequential control system based on pneumatic components.
ÅTrain students to build a sequential control system based on hydraulic components.

Description :

Basic characteristics, analysis and design of hydraulic and pneumatic Systems; Control devices; Directional, pressure and flow control valves; Motion control:
pneumatic, hydraulic and electro-mechanical actuation systems; Pneumatic and hydraulic motors; Pneumatics and electro-pneumatics circuits; Fans and compressors;
Power transmission and power amplification Sequence diagram; Applied circuits for
direct and indirect control.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Describe different components of pneumatic and hydraulic systems.
2 -	Select the appropriate components for a specific control operation.
3 -	Explain the sequence of operations according to the sequence diagram.
4 -	Identify different electro-pneumatic components.
b.Intellectual Skills: :	
1 -	Evaluate the performance of pumps and compressors used in hydraulic and pneu-matic systems.
2 -	Analyze various sequential control circuits according to the sequence diagram for both mechanical and electromechanical systems.
3 -	Develop the ladder diagram of the PLC for a certain application.
c.Professional and Practical Skills: :	
1 -	Construct the hydraulic and pneumatic circuits for a certain application using the available software
2 -	Analyze the motion of the actuating cylinders during the experiments of sequential control applications.

d.General and Transferable Skills: :	
1 -	Work coherently and successfully as a part of a team in assignments.
2 -	Write reports in accordance with the standard scientific guidelines.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to hydraulics and pneumatics : essential components for both circuits	2	2	0
Actuating cylinders	2	2	0
Directional valves	8	6	2
Pressure control valves	2	2	0
Flow control valves	2	2	0
Memory and delay circuits	4	2	2
Sequence diagram	5	3	2
Applications to mechanical circuits	10	6	4
Electro-pneumatics	2	2	0
Applications to mechanical and electrical circuits	7	3	4
Lab: Handling of pneumatic, hydraulic and electro-pneumatic components- Operation of single acting cylinder ï Operation of double acting cylinder - Time delay circuit - Memory cir-cuit - Sequential control of two double acting cylinders ac-cording to sequence diagram	16		16

Teaching And Learning Methodologies :

Interactive Lecturing
Problem based learning
Discussion
Experimental learning
Project based learning
Research

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	5.00	14	ALWAYS
Final Exam	40.00	16	
Lab Exper.	10.00	11	
Mid- Exam 1I	15.00	11	
Mid- Exam I	15.00	6	
Participation	5.00	15	
Project B.L.	5.00	12	
Quizzes	5.00	4	

Recommended books :
Bolton, W; ñMechatronics: Electronic Control Systems in Mechanical and Electrical Engi-neeringò, Pearson; 6 edition, 2016.