Introduction to Applied Hydraulic & Pneumatic

Lecture_ 00

Module Name – Code	Applied Hydraulics and Pneumatics-3157
Module Language:	English
Responsible:	Dr. Chalang H. R. Mohammed
Lecture:	Dr. Chalang H. R. Mohammed
College:	College of Engineering – Salahaddin University
Duration:	15 week – 1 semester (hrs 4/23)
Course outcomes:	Upon the completion of this course, the students will be able to: Explain the fluid power and operation of different types of pumps. Summarize the features and functions of Hydraulic motors, actuators, and flow control valves. Explain the different types of Hydraulic circuits and systems. Explain the working of different Pneumatic systems and circuits. Summarize the various troubleshooting methods and applications of Hydraulic and Pneumatic systems.

Course objectives:	1- To know the advantages and applications of Fluid Power Engineering and Power Transmission System. 2- To learn the Applications of Fluid Power System in automation of Machine Tools and others Equipments.
Course Content:	The course begins with studying Applied Hydraulics and Pneumatics systems. The main topics include fluid power systems and fundamentals, Hydraulic systems and components, Design Hydraulic circuits, Pneumatic systems and components, and finally the Design of Pneumatic circuits.
Literature:	Applied hydraulic and pneumatic, V. Jayakumar, LAKSHMI publications, 2010. *Textbook* Introduction to Hydraulics and Pneumatics, S. Ilango and V. Soundararajan, revised edition, 2009. Fluid power with applications, Anthony Esposito, Pearson edition 2005.
Type of Teaching:	Face to Face learning 4 hrs in lectures
Pre-requisites:	Background in Fluid mechanics and electrical engineering is needed

Frequency:	Yearly in Spring semester
Requirements for credit points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: Written (Written 90 min for med & 120 min final] Written exam – Med term : 28% quizzes : 5 % Report (or Poster): 5% HW & assignments: 2% Written exam- Final exam: 60% Student's attendance is required in all classes. Students with more than 10% absence and/or less than 15% effort in continuous exams are NOT allowed to attend the final exam.
Credit point:	unit theory **5/19**
Grade Distribution:	The Grade is generated from the examination result(s) with the following weights (w): Theoretical Part "w": 100% [28% midterm exam + 60% final Exam + 7% HW, report, quizzes and assignments]

The Academic Season Program

	Control Engineering
1.	Introduction to Fluid Power, Advantages & disadvantage, & Applications
2.	Properties of Fluids, & Types of Hydraulic Fluids(Examples
3.	Basics of Hydraulics, Pascal's Law, & Fluid Energy in Motion(Examples
4.	Pumping Theory, Pump Classification, positive Displacement Pumps (Examples)
5.	Piston Pumps , Pump Performance, & Pump Characteristics [QUIZ]
6.	Hydraulic Actuators, linear (Example)
7.	Motors, and rotary [QUIZ]
8.	Hydraulic Valves, & Configuration (Examples)
9.	Directional Control Valves (Examples) [QUIZ]
10.	Accumulator & Intensifiers, circuits, & sizing (Examples)
11.	Pneumatic Components: Properties of air – Compressors – Filter, Regulator
12 .	Speed control circuits, synchronizing circuit, Penumo hydraulic circuit [QUIZ]
13.	Sequential circuit design for simple applications using cascade method.
14 .	Servo systems – Hydro Mechanical, Electro-hydraulic, and proportional valves. (Examples) [QUIZ]
15.	Introduction to Electro Hydraulic Pneumatic logic circuits, Fluid power circuits; failure and troubleshooting. (Examples)

Due to a number of unforeseen reasons that may lead to shifting of the academic year program, it may be subjected to modifications. Also extra curriculum hours may be needed to cover all the topics. The students shall be notified of the changes if and when they may occur.