Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	Course Title	Design and control of hydraulic and pneumatic systems
2.	Course Number	0908446
3.	Credit Hours (Theory, Practical)	3 hours- Theory
	Contact Hours (Theory, Practical)	
4.	Prerequisites/ Corequisites	Thermal and Fluid Sciences – 0904248
5.	Program Title	B.Sc. in Mechatronics Engineering
6.	Program Code	08
7.	School/ Center	Engineering
8.	Department	Mechatronics
9.	Course Level	4th year
10.	Year of Study and Semester (s)	2nd Semester 2023/2024
11.	Other Department(s) Involved in Teaching the Course	
12.	Main Learning Language	English
13.	Learning Types	☐ Face to face learning ✓ Blended ☐Fully online
14.	Online Platforms(s)	✓ Moodle ✓ Microsoft Teams ☐Skype ☐Zoom
15.	Issuing Date	25/02/2024
16.	Revision Date	

17. Course Coordinator:

Name: Mohammad Mashagbeh Contact hours: Sun, Tues: 11:30 AM – 1:30 PM

Office number: 23023 Phone number:

Email: m.mashagbeh@gmail.com

18. Other Instructors:

19. Course Description:

The course provides students with an understanding of the theories and concepts used in the analysis of hydraulic and pneumatic fluid power systems and the skills needed to design those systems at a competitive level of efficiency, safety, and environmental footprint.

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1.

2.

3.

4.

21. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Recognize the advantages and limitations of fluid power transmission, and the applications suitable for this form of power transmission.
2. Identify the basic components of fluid power transmission systems, their operational principles and performance characteristics.
3. Design and construct fluid power circuits to satisfy certain functions, taking into consideration the aspects of efficiency, economy, safety, and noise [2].
4. Select fluid power circuit components and size them to satisfy given operational, safety and reliability constraints [2].
5. Analyze fluid power transmission circuits, and to predict their performance, efficiency and safety.

Course ILOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1	*	*				
2		*				
3		*	*			
4		*	*	*		
5				*	*	

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program ILOs / Course ILOs	ILO (1)	ILO (2)	ILO (3)	ILO (4)	ILO (5)
1					
2					
3		*			
4		*			
5					
6					
7					
8					

23. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1	Introduction to Fluid Power Systems.						
	1.2	Introduction to Fluid Power Systems.						
	1.3	Physical Properties of Hydraulic Fluids.						
2	2.1	Physical Properties of Hydraulic Fluids.						
	2.2	Energy and Power in Hydraulic Systems.						
	2.3	Energy and Power in Hydraulic Systems.						
3	3.1	Frictional Losses in Hydraulic Pipelines						
	3.2	Frictional Losses in Hydraulic Pipelines						
	3.3	Frictional Losses in Hydraulic Pipelines						
4	4.1	Frictional Losses in Hydraulic Pipelines						
	4.2	Hydraulic Pumps.						

	4.3	Hydraulic Pumps.						
5	5.1	Hydraulic Pumps.						
	5.2	Hydraulic Pumps.						
	5.3	Hydraulic Actuators.						
6	6.1	Hydraulic Actuators.						
	6.2	Hydraulic Actuators.						
	6.3	Hydraulic Actuators.						
7	7.1	Hydraulic Actuators.						
	7.2	Hydraulic Valves.						
	7.3	Hydraulic Valves.						
8	8.1	Hydraulic Valves.						
	8.2	Hydraulic Valves.						
	8.3	Hydraulic Valves.						
9		Midterm week						
10	10.1	Hydraulic Valves.						
	10.2	Hydraulic Circuit Design						
	10.3	Hydraulic Circuit Design						
11	11.1	Pneumatic Systems.						
	11.2	Pneumatic Systems.						
	11.3	Pneumatic Systems.						
12	12.1	Pneumatic Systems.						
	12.2	Digital Logic and PLC						
	12.3	Digital Logic and PLC						
13	13.1	Digital Logic and PLC						
	13.2	Digital Logic and PLC						
	13.3	Digital Logic and PLC						
14	14.1	Electrohydraulic systems						
	14.2	Electrohydraulic systems						
	14.3	Electrohydraulic systems						
15	15.1	Electropneumatic systems						
	15.2	Electropneumatic systems						
	15.3	Electropneumatic systems						

24. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	ILO/s Linked to the Evaluation activity	Period (Week)	Platform
Quiz	5			4th Week	On Campus
Quiz	5			7th Week	Online Moodle
Midterm Exam	30			9th Week	On Campus
Project	15			12th Week	On Campus
Quiz	5			13th Week	On Campus
Final Exam	40				

25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):

Textbook, class handouts, scientific calculator, and an access to a personal computer.

26. Course Policies:

A- Attendance policies:

1. Students are expected to attend EVERY class session. They are responsible for all materials, announcements, schedule changes, and other pertinent information discussed in class.
2. Seating plan will be given as the attendance sheet.

B- Absences from exams and submitting assignments on time:

No makeup exams will be offered for any exams during the course, except in the following cases:

1. In the event of the death of a first-order relative (father, mother, sister, or brother).
2. If the student is hospitalized (in-patient) during the exam.

For any other circumstances, the student will receive a grade of zero for the corresponding exam.

27. References:

A- Required book(s), assigned reading and audio-visuals:

Fluid Power with Applications by Anthony Esposito 7th ed. Pearson.

B- Recommended books, materials, and media: Fluid Power Theory and Applications by James Sullivan, Prentice Hall

28. Additional information:

Name of the Instructor or the Course Coordinator: Dr. Mohammad Mashagbeh	Signature: ……..……	Date: ……..……
Name of the Head of Quality Assurance Committee/ Department ……	Signature: ……..……	Date: ……..……
Name of the Head of Department ……	Signature: ……..……	Date: ……..……
Name of the Head of Quality Assurance Committee/ School or Center ……	Signature: ……..……	Date: ……..……
Name of the Dean or the Director ……	Signature: ……..……	Date: ……..……