Course Syllabus

1	**Course title**	Artificial Intelligence	
2	**Course number**	0908485	
3	**Credit hours**	3	Obligatory Course
	Contact hours (theory, practical)	3 Theoretical Hours	
4	**Prerequisites/corequisites**	Digital Signals and System Analysis (0908483)	
5	**Program title**	B.Sc. in Mechatronics Engineering	
6	**Program code**	08	
7	**Awarding institution**	The University of Jordan	
8	**School**	Engineering	
9	**Department**	Mechatronics	
10	**Course level**	4	
11	**Year of study and semester (s)**	2nd Semester 2023/2024	
12	**Other department (s) involved in teaching the course**		
13	**Main teaching language**	English	
14	**Delivery method**	☐ Face to face learning ✓ Blended ☐Fully online	
15	**Online platforms(s)**	☐ Moodle ✓ Microsoft Teams ☐Skype ☐Zoom ☐Others…………	
16	**Issuing/Revision Date**	25/02/2024	

17 Course Coordinator:

Name: Dr. Adham Alsharkawi	**Contact Hours:** Sunday, Tuesday &Thursday from 11:00 – 13:00
Office: Mechatronics Eng. Dep.	**Phone Number:** 5355000 Ext. 23030
e-mail: a.sharkawi@ju.edu.jo	

18 Other instructors:

19 Course Description:

Students Explore the vast domain of artificial intelligence (AI) and its integral role in tackling intricate engineering challenges. This course delves into AI's foundational techniques such as artificial neural networks, fuzzy logic, and genetic algorithms, emphasizing their practical applications in modeling and control. Concluding with hands-on exposure, students will implement machine and deep learning strategies using Python, equipping them with both theoretical understanding and practical skills for engineering solutions.

20 Course aims and outcomes:

A. Aims:

The primary objective of this course is to provide a comprehensive introduction to the fundamental principles, methods, and real-world applications of Artificial Intelligence. To augment students' comprehension, we'll utilize Python as a primary tool for hands-on learning and reinforcement.

B. Student Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

SLO(s) \ SO(s)	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)
Distinguish the different types of artificial neural networks.							
Recognize the role of a fuzzy inference system.							
Describe the flowchart of a basic genetic algorithm.							
Update neural network models with new research insights for dynamic systems.							✔
Apply latest advancements to enhance fuzzy logic controllers.							✔
Design an adaptive neuro-fuzzy inference system.							

21. Topic Outline and Schedule:

Week	Lecture		SLO	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	• Python Basics • Python Data Structures					
	1.2	• Python Programming Fundamentals • Working with Data in Python					
2	2.1	Working with Numpy Arrays and Simple APIs					
	2.2	Machine Learning (I)					
3	3.1	Machine Learning (II)					
	3.2	Machine Learning (III)					
4	4.1	Machine Learning (IV)					
	4.2	Machine Learning (V)					
5	5.1	Machine Learning (VI)					
	5.2	Artificial neural networks (I)					
6	6.1	Artificial neural networks (II)					
	6.2	Artificial neural networks (III)					
7	7.1	Artificial neural networks (IV)					
	7.2	Artificial neural networks (V)					
8	8.1	Artificial neural networks (VI)					
	8.2	Fuzzy Expert Systems (I)					
9	9.1	Fuzzy Expert Systems (II)					
	9.2	Fuzzy Expert Systems (III)					

	10.1	Fuzzy Expert Systems (IV)					
10	10.2	Fuzzy Expert Systems (V)					
11	11.1	Fuzzy Expert Systems (VI)					
	11.2	Evolutionary Computation (I)					
12	12.1	Evolutionary Computation (II)					
	12.2	Evolutionary Computation (III)					
13	13.1	Evolutionary Computation (IV)					
	13.2	Evolutionary Computation (V)					
14	14.1	Evolutionary Computation (VI)					
	14.2	Problem Framing (I)					
15	15.1	Problem Framing (II)					
	15.2	Problem Framing (III)					

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLO(s) are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLO(s)	Period (Week)	Platform
Quiz	5	Python-based		4th Week	On Campus
Midterm Exam	30	ML & ANNs		9th Week	On Campus
Quiz	5	FESs		10th Week	On Campus
Project	10	ML, ANNs, and FESs		11th Week	On Campus
Final Exam	50	All topics			

23 Course Requirements

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

Every student is required to have a computer equipped with Python and a reliable internet connection.

24 Course Policies:

- **Attendance:**

Students are expected to attend EVERY class session. They are responsible for all materials, announcements, schedule changes, and other pertinent information discussed in class.

- **Make-up Examinations**

Make-up exams will not be offered for any scheduled exams throughout the course. Exceptions are limited to:

- o The passing of immediate family members (father, mother, sister, or brother).
- o Hospitalization (as an inpatient) at the time of the scheduled examination.

Any other circumstances will result in a score of zero for the respective exam.

25 References:

Required book:

- Negnevitsky, Michael. Artificial intelligence: a guide to intelligent systems. Pearson education, 2005.

Recommended books:

- Nguyen, Hung T., et al. A first course in fuzzy and neural control. CRC press, 2002.
- Driankov, Dimiter, Hans Hellendoorn, and Michael Reinfrank. An introduction to fuzzy control. Springer Science & Business Media, 2013.
- Mitchell, Melanie. An introduction to genetic algorithms. MIT press, 1998.

26 Additional information:

	Name	Signature	Date
Course Coordinator:	Dr. Adham Alsharkawi		
Head of Curriculum Committee/Department:			
Head of Department:			
Head of Curriculum Committee/Faculty:			
Dean:			