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QF01/0408-4.0E	**Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Artificial Intelligence Department**

Study plan No.	**2024/2025**			**University Specialization**	Data Science and Artificial Intelligence
Course No.	**0135203**			**Course Name**	Data Science and Artificial Intelligence programming 2
Credit Hours	**3**			**Prerequisite Co-requisite**	0135233
Course Type	☐ Mandatory University Requirement	☐ University Elective Requirements	☐ Faculty Mandatory Requirement	☐ Support Course Family Requirements	✓ Mandatory Requirements ☐ Elective Requirements
Teaching Style	☐ Full Online Learning		Blended Learning		☐ Traditional Learning
Teaching Model	☐ 2 Synchronous: 1Asynchronous		1 Face to Face: 1 Synchronous		3 Traditional

Faculty member and study divisions information (to be filled in each semester by the subject instructor)
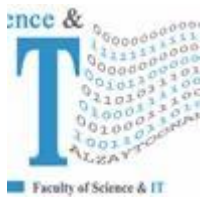
Name	Academic Rank	Office No.	Phone No.	E-mail

Division Number	Time	Place	Number of Students	Teaching Style	Approved Model

Brief Description

This is an advanced course in Python language for AI students. This course covers topics related to OOP in Python. Additionally, it introduces basic machine learning libraries such as NumPy, pandas, matplotlib, and Scikit-learn. Students will gain proficiency in programming languages commonly used in data science and artificial intelligence, such as Python and R, enabling them to write and understand code for data analysis, machine learning, and deep learning. They will gain expertise in various data analysis techniques, including data visualization, statistical analysis, and exploratory data analysis. By the end of the course, students should be able to design, implement, and evaluate machine learning models for tasks such as classification, regression, clustering, and natural language processing. They will also understand the theory and mathematics behind these models. Moreover, Students will develop practical skills in artificial intelligence, including neural networks, deep learning, and reinforcement learning.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	1- Gayathri Rajagopalan, "A Python Data Analyst's Toolkit Learn Python and Python-based Libraries with Applications in Data Analysis and Statistics", APRESS, 2022.
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1- Dan Bader, Joanna Jablonski and Fletcher Heisler, "Python Basics: A Practical Introduction to Python 3", 4th ed, Ron Holland Designs, 2021. 2- Python Data Analytics, ISBN-13 (electronic): 978-1-4842-3913-1 January 2018.

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Supporting websites				
The physical environment for teaching	✓ Class Room	☐ Labs	☐ Virtual Educational	☐ Others

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		Platform	
Necessary equipment and software			
Supporting people with special needs			
For technical support			

Course Learning Outcomes (S= *Skills, C= Competences K= Knowledge,)*

No.	Course Learning Outcomes	The Associated Program Learning Output Code
	Knowledge	
K1	Understand the advanced topics in object-oriented programming in Python, including defining classes, invoking methods, using class libraries, etc.	**MK2**
K2	Knowledge of the structure and model of the Python programming language.	**MK2**
	Skills	
S1	Have the ability to use the rich libraries in python that are related to artificial intelligence to write programs for machine learning	**MS2**
S2	Write python programs using NumPy, matplotlib and pandas.	**MS2**
	Competences	
C1	The ability to implement programs using OOP concepts	**MC1**
C2	The ability to write programs using common libraries used for AI	**MC1**

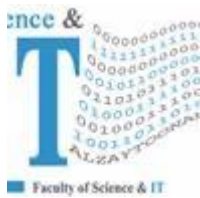**Mechanisms for direct evaluation of learning outcomes**

Type of Assessment / Learning Style	Fully Electronic Learning	Blended Learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam				
Second / midterm exam			30%	
Participation / practical applications			30%	
Asynchronous interactive activities			0	
final exam			40%	

Note: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc., which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Schedule of simultaneous / face-to-face encounters and their topics

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Week	subject	learning style*	Reference **
1	Exploring Classes, and Objects	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
2	Exploring Classes, and Objects. HW 1	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
3	Exploring Classes, and Objects	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
4	Exploring Classes, and Objects HW 2	• Classroom lectures, discussions,and review of theoretical concepts Slides	Textbook 1
5	Exploring Classes, and Objects	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
6	Exploring Classes, and Objects. Quiz	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
7	**Midterm Exam 30%**		
8	File processing	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
9	File processing. HW 3	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
10	Working with NumPy Arrays	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 2
11	Working with NumPy Arrays Working with NumPy Arrays, HW 4	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 2
12	Prepping Your Data with Pandas Prepping Your Data with Pandas, HW 5	• Classroom lectures, discussions,and review of theoretical concepts Slides	Textbook 2
13	Data Visualization with Python Libraries	• Classroom lectures, Slides	-
14	Presentations and Quiz		-
15	Presentations		-
16	**Final Exam 40%**		

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* Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.

** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.