

QF01/0408-4.0E	Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Artificial Intelligence Department
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Study plan No.	2024/2025	University Specialization	Data Science and Artificial Intelligence
Course No.	0135445	Course Name	Machine learning applications and deep learning 1
Credit Hours	3	Prerequisite Co-requisite	Machine Learning
Course Type	<input type="checkbox"/> Mandatory University Requirement <input type="checkbox"/> University Elective Requirements	<input type="checkbox"/> Faculty Mandatory Requirement <input type="checkbox"/> Support Course Family Requirements	<input checked="" type="checkbox"/> Mandatory Requirements <input type="checkbox"/> Elective Requirements
Teaching Style	<input type="checkbox"/> Full Online Learning	Blended Learning	<input checked="" type="checkbox"/> Traditional Learning
Teaching Model	<input type="checkbox"/> 2 Synchronous: 1 Asynchronous	1 Face to Face: 1 Synchronous	3 Traditional

**Faculty member and study divisions information (to be filled in each semester by the subject instructor)**

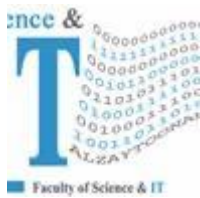
Name	Academic Rank	Office No.	Phone No.	E-mail	
Division Number	Time	Place	Number of Students	Teaching Style	Approved Model

**Brief Description**

The course revises student knowledge on how to use the basic Python libraries that are related to machine learning, such as Numpy, pandas, matplotlib, and Scikit-learn. The course allows students to perform machine learning projects that deal with real-life datasets obtained from official sources on the internet. Additionally, this course introduces foundational concepts in deep learning, providing students with the tools and knowledge to design, train, and deploy neural networks Using TensorFlow and Pytorch..

**Learning resources**

Course book information (Title, author, date of issue, publisher ... etc)	1- Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, by Aurélien Géron, 3rd Edition, O'Reilly, 2022.
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1- 1. Machine Learning with Python Cookbook Practical Solutions from Preprocessing to Deep Learning, by Chris Albon, 2nd edition, O'Reilly Media, 2023. 2- 2. Python Data Analytics, ISBN-13 (electronic): 978-1-4842-3913-1 January 2018. 3- Introduction to Computation and Programming Using Python with Application to Understanding Data, Third Edition, MIT Press, 2021.
Supporting websites	



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يئة لعلوم وتكنولوجيا المعلومات  
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"Tradition and Quality"

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The physical environment for teaching	<input checked="" type="checkbox"/> Class Room	<input type="checkbox"/> Labs	<input type="checkbox"/> Virtual Educational	<input type="checkbox"/> 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
<b>Knowledge</b>		
K1	Understanding the basic machine learning libraries such as Pandas, NumPy, matplotlib, and Scikit-learn.	MK2
K2	Understanding complete data preprocessing techniques before starting a new machine learning project.	MK2
K3	Understand the principles of Neural Networks	MK2
<b>Skills</b>		
S1	Using python libraries in speeding up programs for machine learning.	MS1
S2	Ability to implement the basics of machine learning algorithms (such as KNN and support vector machines) using the scikit learn library.	MS1
S3	Ability to Implement neural networks models using PyTorch and TensorFlow	MS2
<b>Competences</b>		
C1	Applying the gained knowledge in real-life projects and performing a complete machine learning project from scratch using Python.	MC1
C2	Design, train, and deploy deep learning models in real-world applications.	MC1

**Mechanisms for direct evaluation of learning outcomes**

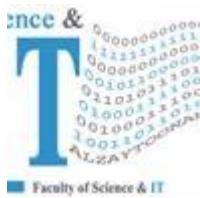
Type of Assessment / Learning Style	Fully Electronic Learning	Blended Learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
PBL				15%
Second / midterm exam				30%
Participation / practical applications				30%
Asynchronous interactive activities				0
final exam				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	- Review of Data science and Machine learning concepts	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
2	- Review of Numpy, Pandas and Matplotlib	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
3	Working with Real Data Look at the Big (initial Data Cleaning)	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
4	Exploratory Data Analysis – Uni-Variate Analysis	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
5	- Exploratory Data Analysis – Bi -Variate Analysis	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
6	- Exploratory Data Analysis – Bi-Variate Analysis	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
7	Removing outliers	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> </ul>	Textbook 1
8	<b>Midterm Exam 30%</b>		
9	- Feature Selection and feature scaling	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
Practical Sessions	- Choosing the machine learning model	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
11	Evaluating the model	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
12	Introduction to Neural Networks	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
13	- Building a real-world application with neural networks and evaluating it	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
14	Evaluating the neural network model	<ul style="list-style-type: none"> <li>Classroom lectures, discussions, and review of theoretical concepts</li> <li>Slides</li> </ul>	Textbook 1
15	Projects discussions (PBL (15%))	<ul style="list-style-type: none"> <li>Presentations</li> </ul>	-



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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.