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.	0135445		**Course Name**		Machine learning applications and deep learning 1	
Credit Hours	**3**		**Prerequisite Co-requisite**		Machine Learning	
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

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, 3nd 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	

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

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

			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	Understanding the basic machine learning libraries such as Pandas, NumPy, matplotlib, and Sciket-learn.	**MK2**
K2	Understanding complete data preprocessing techniques before starting a new machine learning project.	**MK2**
K3	Understand the principles of Neural Networks	**MK2**
	Skills	
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 t o Implement neural networks models using PyTorch and TensorFlow	**MS2**
	Competences	
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	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
2	- Review of Numpy, Pandas and Matplotlibe	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
3	Working with Real Data Look at the Big (initial Data Cleaning)	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
4	Exploratory Data Analysis – Uni-Variate Analysis	• Classroom lectures, discussions,and review of theoretical concepts Slides	Textbook 1
5	- Exploratory Data Analysis – Bi -Variate Analysis	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
6	- Exploratory Data Analysis – Bi-Variate Analysis	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
7	Removing outliers	• Classroom lectures, discussions, and review of theoretical concepts	Textbook 1
8	**Midterm Exam 30%**		
9	- Feature Selection and feature scaling	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
Practical Sessions	- Choosing the machine learning model	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
11	Evaluating the model	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
12	Introduction to Neural Networks	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
13	- Building a real-world application with neural networks and evaluating it	• Classroom lectures, discussions,and review of theoretical concepts Slides	Textbook 1
14	Evaluating the neural network model	• Classroom lectures, discussions,and review of theoretical concepts • Slides	Textbook 1
15	Projects discussions (PBL (15%))	• Presentations	-

16	**Final Exam 40%**

***** 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.