Course Description Form

1. Course Name:
Machine Learning
2. Course Code:
COMP441
3. Semester / Year:
Fourth / First Semester 2025-2026
4. Description Preparation Date:
15/10/2025
5. Available Attendance Forms:
Attendance Mandatory
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours (2 Hours Theoretical + 2 Hours Practical)*15/ 3 Credit
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Professor Dr. Khamael Al-Dulaimi Email :khamail.abbass@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	• I**ntroduce the concept of Machine Learning** what it is and why it matters. • **Explain the reasons we use Machine Learning,** such as handling big data, automation, and decision-making. • **Provide a brief overview of the main ML types,** supervised, unsupervised, and reinforcement learning. • **Summarize key topics within ML**, including classification, regression, clustering, overfitting, and model evaluation. • **Highlight real-world applications** to show how ML relates to human activities across industries. • **Strengthen students' programming skills** by guiding them to design and implement ML algorithms using tools such Python and Scikit-learn.

9. Teaching and Learning Strategies	
Strategy	I use theoretical lectures combined with class discussions and questioning to help students analyse concepts deeply and draw conclusions. I encourage critical thinking through techniques like Think-Pair-Share, open-ended questioning, and peer explanation. To support diverse abilities and learning styles, I design both group and individual activities from hands-on tasks and case studies to visual aids and reflective exercises.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Identify and understand the term machine learning and its various applications	What is Machine Learning?	Lectures	Questions during the lecture
2	2	A review of the most important Machine learning topics in	Basic Concepts of Machine learning types	Lectures	Questions during the lecture
3+4	4	Identify the different types of supervised machine learning and explain in detail the method of finding continuous outputs for one or several variables and then measuring the quality of the linear equation.	Supervised Learning Linear Regression (one and multiple variables)+Anova table +multiple linear regression	Lectures + Examples	Questions during the lecture+ Quiz
5+6	2	Students know how to classify the data outputs using a supervised machine learning algorithm	Correlation Coefficient and Coefficient of Determination +Supervised Learning K-Nearest Neighbor	Lectures + Examples	Questions during the lecture
7	2	Mid 1			
8	2	Students know how to classify outputs using a supervised machine-learning algorithm	Supervised Learning Support vector machine	Lectures + Examples+ Group Work	Questions during the lecture
9	4	Students Learn ways to solve various machine learning	Regularization and Model Selection (Overfitting + Underfitting)	Lectures + Examples+ Group Work	Quiz

		problems and apply cross-validation methods data in an effective way			
10	2	Students Learn ways to measure model quality using different units	Model Evaluation (Confusion Matrix, Precision and Recall)	Lectures + Examples + Group work	Questions during the lecture
11+12	4	Students Learn ANN term and its applications	Artificial Neural Network Architecture	Lectures + Example	Questions during the lecture
13	2	Mid 2			
14+15	4	Learn to update the ANN weights and produce output	Backpropagation algorithm	Lectures + Examples+ Group Work	Quiz

11. Course Evaluation

Assessment Type	Marks
Quizzes	5
HomeWorks	5
Attendance	5
Mid Exam	10
Lab Mid Exam	10
Lab Attendance and Assessment	5
Lab Final Exam	10
Final Exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Stanford University Machine Learning CS229 Lecture notes by Andrew Ng Machine Learning Yearning, by Andrew Ng, 2018
Main references (sources)	Hands-On Machine Learning with Scikit-Learn and TensorFlow Concepts, Tools, and Techniques to Build Intelligent Systems, Orielly, 2017
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	Youtube –Andrew Ng

Lab Structure

Instructors: Assist. Prof. Dr.Khamael Al-Dulaimi, Dr. Sawsan Kamal, Assist. Prof.Azhar Mawlood

Week	Subject Name
1	Python Introduction
2	Python Introduction
3 +4	Supervised Learning - Linear Regression
5+6	Supervised Learning - K-Nearest Neighbor Classification
7	Supervised Learning - K-Nearest Neighbor Regression
8	Mid 1
9	Supervised Learning -Support Vector Machine
10+11	Artificial Neural Network Architecture
12+13	Project
14	Review
15	Final Lab