

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Machine Learning Basics		Module Delivery
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	AI206		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	GII	Semester of Delivery	4
Administering Department	AI	College	CIT
Module Leader	Asst. Prof. Dhia Ahmed	e-mail	Diaa.A.Ibrahim@uofallujah.edu.iq
Module Leader's Acad. Title	Associate Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Omar Dhafer Madeeh	e-mail	omar.dhafer@uofallujah.edu.iq
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Scientific Committee Approval Date	1/06/2023	Version Number	2.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Machine Learning Course aims to equip students with a solid foundation of learning algorithms concepts and theories, including supervised and unsupervised learning. Students are expected to have a comprehensive understanding of the fundamental concepts and techniques of machine learning, regression modules, naive bayes, and more advance concepts including support vector machine and neural networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1- Understanding core concepts of machine learning, including supervised and unsupervised learning, neural networks, and various algorithms. 2- Developing a strong foundation in mathematics and statistics, which are essential for understanding machine learning algorithms. 3- Gaining hands-on experience in implementing machine learning algorithms and models using programming languages like Python. 4- Learning how to preprocess and clean data effectively, as high-quality data is crucial for accurate machine learning model training. 5- Understanding how to evaluate the performance of machine learning models, including metrics like accuracy, precision, recall, and F1-score, and techniques like cross-validation. 6- Exploring practical applications of machine learning across various domains, such as healthcare, finance, natural language processing, and computer vision.
Indicative Contents المحتويات الإرشادية	Linear Algebra Probability and Statistics Hypothesis Testing

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Hands-on Practical Exercises Case Studies and Real-World Examples Collaborative Learning Continuous Assessment and Feedback

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects / Lab.	1	15% (15)	Continuous	All
	Report	1	5% (5)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Inferential Statistics
Week 2	Hypothesis Testing
Week 3	Introduction to Machine Learning (supervised, unsupervised, reinforcement learning)
Week 4	Linear Regression Module
Week 5	Logistic Regression
Week 6	Naive Bayes
Week 7	Model Selection + (Skill test)
Week 8	Support Vector Machine (SVM)

Week 9	Tree Models
Week 10	Random Forests
Week 11	Boosting
Week 12	Time Series Analysis and Forecasting using ARIMA models
Week 13	Advanced Model Evaluation (Cross-validation and Performance metrics)
Week 14	Capstone Project
Week 15	Case Study + (Skill test)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Install Python and essential libraries (e.g., NumPy, scikit-learn). Verify your environment with a "Hello, World!" ML program.
Week 2	Implement a simple linear regression model. Perform data preprocessing and visualize results.
Week 3	Implement a logistic regression model for binary classification. Evaluate the model using accuracy, precision, recall, and F1-score.
Week 4	Implement decision tree models for classification and regression. Explore tree visualization and interpretability.
Week 5	Understand the concept of ensemble learning. Build and evaluate Random Forest models.
Week 6	Learn about boosting algorithms, like AdaBoost and Gradient Boosting. Implement a boosting model for classification.
Week 7	Explore cross-validation methods (e.g., k-fold cross-validation). Learn about various performance metrics (e.g., accuracy, precision, recall).

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Machine Learning Algorithms	No
Recommended Texts	Machine Learning Concepts	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				