

TEMPLATE FOR COURSE SPECIFICATION

Machine Learning

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Nahrain University – College of Science
2. University Department/Centre	Computer Science Department
3. Course title/code	Machine Learning
4. Modes of Attendance offered	Attendance is mandatory
5. Semester/Year	First / Fourth
6. Number of hours tuition (total)	4 (2 Theoretical +2 Practical)
7. Date of production/revision of this specification	2022-2023
8. Aims of the Course	<ul style="list-style-type: none">• Introduce the students to the concept of machine learning• Introduce the students to the reasons that make us resort to machine learning• Give a brief and adequate explanation of the main types of machine learning• Giving a brief and adequate explanation of most of the main headings within machine learning• Draw the student's attention to the applications of machine learning and its relationship to human activities• Strengthening the student's programming skills by designing and implementing machine learning algorithms

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals.

A1. The basics of the machine learning branch and its affiliation with the science of artificial intelligence and data science

A2- How to benefit from machine learning for the success of multiple applications in various fields

B. The skills goals special to the course.

B1. Ability to design and program algorithms using the Python language

B2 - The ability to implement built-in (library) algorithms using the Python language

Teaching and Learning Methods

Books and theoretical lectures in addition to laboratory work, discussion and asking questions that help students to analyze and conclude

Assessment methods

Monthly exams + homework

Classroom participations and discussions

Daily assessment of practical tasks in the laboratory

Determining a grade for the daily attendance

C. Affective and value goals

C1. Question: Looking for new information and raising questions

C2 - Conclusion and Deduction: Thinking about what is beyond the available information to fill the gaps

C 3 - Comparison: Note the aspects of similarities and differences between things

C4 - Classification: Putting things into groups according to common characteristics

C5- Make a decision based on the classification

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Analytical ability

D2 - The skill of simplifying and dividing the problem

D3- The skill of discussion and exchange of ideas

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		What is Machine Learning?		
2	2		Basic Concepts of Linear Algebra – Readings Linear Algebra Review and Reference by Zico Kolter (updated by Chuong Do)		
3+4	4		Supervised Learning Linear Regression (one and multiple variables) + Correlation Coefficient and Coefficient of Determination		
5	2		Supervised Learning K-Nearest Neighbor		
6	Mid Exam				
7	2		Supervised Learning Naïve Bayes		
8+9	4		Regularization and Model Selection (Overfitting + Underfitting)		
10	2		Model Evaluation (Confusion Matrix, Precision and Recall)		
11+12	4		Artificial Neural Network Architecture		
13	Mid 2 Exam				
14+15	4		Backpropagation algorithm		

11. Infrastructure	
1. Books Required reading:	<ol style="list-style-type: none"> 1. Stanford University Machine Learning CS229 Lecture notes by Andrew Ng 2. Machine Learning Yearning, by Andrew Ng, 2018 3. Hands-On Machine Learning with Scikit-Learn and TensorFlow Concepts, Tools, and Techniques to Build Intelligent Systems, Orielly, 2017

2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	
B-Electronic references, Internet sites...	Youtube –Andrew Ng

12. The development of the curriculum plan
<p>Implementing the projects of Eng. Deena Gergis (lead data scientist at Bayer) – Practical</p> <p>Adding new text book: Machine Learning Fundamentals by Hui Jiang 2021 Introducing the concept of Feature Extraction</p>