The University of Jordan

School of Engineering

Computer Engineering Department

Spring Term 2020/2021

Course	AI and Machine Learning – 0917451 (3 Cr. – Core Course)
Catalog Description	The course helps the student gain understanding and skills in Artificial Intelligence (AI) and Machine Learning (ML) applications and algorithms. It also covers the basics of data preparation, training, and evaluation. The course concentrates on the practical skills to use AI and ML to solve real-life problems and includes a term project on designing and implementing a ML solution to solve a problem of the student choice.
Prerequisites by Course	Computer Applications Lab (0907311) and Linear Algebra (0301241)
Prerequisites by Topic	Students are assumed to have good background in mathematics, particularly, calculus, linear algebra, and statistics. Additionally, the students should have good programming skills using Python.
Textbooks	1. Aurélien Géron, Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlow: Concepts: Tools, and Techniques to Build Intelligent Systems, 2nd Edition, O'Reilly Media, Oct 2019. 2. Prateek Joshi, Artificial Intelligence with Python, Packt Publishing, 2017.
References	1. François Chollet, Deep Learning with Python, Manning Pub. 2018. 2. Theodoridis S, Koutroumbas K, Pattern Recognition, 3rd ed. Academic Press, 2006.
Course Website	http://www.abandah.com/gheith/?page_id=2675
Microsoft Team	Link
Schedule & Duration	15 weeks; 45 lectures, 60 minutes each (including exams)
Student Material	Textbook, class handouts, some instructor keynotes, selected YouTube videos, and access to a personal computer and the internet.
College Facilities	Classroom with whiteboard and projection display facilities with speakers, library, and computer laboratory.
Course Objectives	The objectives of this course are: 1. Introduce students to the techniques used in ML including data preparation, training models, classification, neural networks, and deep learning. 2. Introduce students to the practical techniques used in developing ML systems including sample collection, training, and evaluation. 3. Introduce students to the programming techniques and libraries used in ML (Python, Scikit-Learn, Keras, and TensorFlow).
Course Outcomes and Relation to ABET Program Outcomes	Upon successful completion of this course, a student should be able to: 1. Solve an AI problem by developing an appropriate ML system [1]. 2. Communicate the development of a ML system through a detailed technical report [3]. 3. Use Python and its specialized libraries to develop programs for solving ML problems [2].

Course Topics

- Introduction to AI
- Introduction to ML
- Data preparation and regression
- Classification
- Training models
- Classical techniques: SVM, decision trees and ensembles
- Unsupervised learning and clustering

Midterm Exam

- Neural networks
- Deep neural networks
- Convolutional neural networks
- Recurrent neural networks
- Reinforcement learning
- Recommendation systems

Computer Usage

Practical aspects of the course are covered in class and through the term project.

Important Dates

Date	Event
Mon 22 Feb, 2021	Classes Begin
TBA, 2021	Midterm Exam
Wed 21 Apr, 2021	Term project proposal is due
Mon 24 May, 2021	Term project report is due
Sun 30 May, 2021	Last Date to Withdraw
Mon 31 May, 2021	Last Lecture
Jun 1 - 14, 2021	Final Exam Period

Policies

- Attendance is required. Class attendance will be taken every class and the university polices will be enforced in this regard.
- All submitted work must be yours
- Cheating will not be tolerated
- Open-book exams
- Check department announcements at: http://www.facebook.com/pages/Computer-Engineering-Department/369639656466107 for general department announcements.

Assessments

Reports, participation, and exams

Grading policy

Participation	10%
Term project report	10%
Midterm Exam	30%
Final Exam	50%

Instructors

Prof. Gheith Abandah

Email: abandah@ju.edu.jo
Homepage: http://www.abandah.com/gheith
Office Hours: Sun through Thu: 8:00 am – 4:00 pm

Time and Location

Section 1: Mon and Wed: 8:30–10:00, CPE 001, Microsoft Teams

Last Updated

Feb 19, 2021

Program Outcomes (PO)

1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	an ability to communicate effectively with a range of audiences
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.