The University of Jordan

School of Engineering

Computer Engineering Department

Fall Term 2018/2019

Course	Special Topics in Computer Engineering – 0907779 (3 Cr. – Elective Course)
	Machine Learning
Catalog Description	The course helps the student gain an advanced level understanding of Machine Learning (ML) applications and algorithms. It also covers neural networks and deep learning. The course concentrates on the practical skills to use 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	None
Prerequisites by Topic	Students are assumed to have good background in mathematics, particularly, calculus, linear algebra, statistics, and probability. Additionally, the students should have good programming skills, preferably, using Python.
Textbook	Aurélien Géron, Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts: Tools, and Techniques to Build Intelligent Systems, O'Reilly Media, 2017.
References	1. Prateek Joshi, Artificial Intelligence with Python, Packt Publishing, 2017. 2. Theodoridis S, Koutroumbas K, Pattern Recognition, 3rd ed. Academic Press, 2006. 3. Richard O. Duda, Peter E. Hart and David G. Stork, Pattern Classification, 2nd ed. Wiley Interscience, 2001.
Course Website	http://www.abandah.com/gheith/?page_id=1990
Facebook group	https://www.facebook.com/groups/315669882258644/
Schedule & Duration	15 or 12 weeks; 45 lectures, 50 minutes each; or 30 lectures, 75 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, 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 [e]. 2. Communicate the development of a ML system through a detailed technical report and a short presentation [g].

3. Use Python and its specialized libraries to develop programs for solving ML problems [k].

Course Topics
- Introduction
- Python programming language
- Data preparation
- Classification
- Recommender systems (Ref. 1)

Midterm Exam
- Neural networks
- Deep neural networks
- Convolutional neural networks
- Recurrent neural networks
- Reinforcement learning

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

Important Dates

Date	Event
Sun 9 Sep, 2018	Classes Begin
Sun 4 Nov, 2018	Midterm Exam
Sun 11 Nov, 2018	Term project proposal is due
Sun 9 Dec, 2018	Term project report is due and start of project demonstrations
Sun 16 Dec, 2018	Last Lecture
Sun 23 Dec, 2018	Final Exam

Policies
- Attendance is required. Class attendance will be taken every class and the university's polices will be enforced in this regard.
- All submitted work must be yours
- Cheating will not be tolerated
- Open-book exams
- Join the Facebook group of this course
- Check department announcements at: https://www.facebook.com/Master-in-Computer-Engineering-and-Networks-in-the-University-of-Jordan-257067841079897/ for the program announcements.

Assessments Exams and term project

Grading policy

Term project report and presentation   30%
Midterm Exam   30%
Final Exam   40%

Instructors **Prof. Gheith Abandah**, abandah@ju.edu.jo
Homepage: http://www.abandah.com/gheith
Office Hours: Tue & Thu: 11:00 – 12:00
                  Mon & Wed: 11:00 – 12:00

Time and Location Section 1:   Sun: 4:00–7:00, CPE 001

Last Updated: Sep 4, 2018

Program Outcomes (PO)

a	An ability to apply knowledge of mathematics, science, and engineering
b	An ability to design and conduct experiment as well as to analyze and interpret data.
c	An ability to design a system, component, or process to meet desired needs , within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d	An ability to function on multidisciplinary teams
e	An ability to identify, formulate, and solve engineering problems
f	An understanding of professional and ethical responsibility.
g	An ability to communicate effectively
h	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i	A recognition of the need for, and an ability to engage in life-long learning
j	Knowledge of contemporary issues
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice