الجامعة الافتراضية السورية
SYRIAN VIRTUAL UNIVERSITY

Machine Learning

Course Definition

Information

Technology

Engineering

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Syrian Arab Republic		الجمهورية العربية السورية
Ministry of Higher Education and scientific research		وزارة التعليم العالـــي والبحث العلمي
Syrian Virtual University		الجامعة الافتراضية السورية

1. Basic Information:

Course Name	Machine Learning
Course Code	AML601
Number of Presentational Sessions*	20
Number of Synchronous Sessions**	10
Number of Shorter Tests***	4
Number of Exams***	1
Theoretical Sessions Work Load (hrs.)	60
Practical Sessions Work Load (hrs.)	30
Credit Hours	6

***Each presentational session comprises both recorded lecture (1.5 hrs.) and interactive learning content (1.5 hrs.).**

****Each synchronous session comprises the interactive lecture carried out in real time in a virtual class (1.5 hrs.).**

*****Each shorter test is 0.5 hr. long. The final exam is 2 hrs. long.**

N.B.

Generally, each chapter requires two presentational sessions: one for the recorded content and one for the interactive content (unless the chapter is too long, in which case it may require more sessions (. This note applies to synchronous sessions as well, where each chapter requires one synchronous session generally.

2. Prerequisites courses:

Course	Code
Statistics	BPS601
Artificial Intelligence	BAI501
Natural Languages Processing	ANL601

3. Course Objectives:

The main aims of this course "Machine Learning" are:

- Study machine learning problems
- Study supervised learning
- Study unsupervised learning
- Study Reinforcement learning
- Study Time Series

4. Learning Outcomes (LO):

By the end of this course, the learner is expected to acquire and learn the following subjects:

- Data Processing and wrangling for Machine Learning models
- Comparing and choosing best learning model
- Learning models evaluation
- Results interpretation

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5. Assessment Results:

Chapter Number	Chapter Title	General Objectives	Assessment Type				
			Interactive Content & Recorded Sessions	Applied Activities (Synch. Sessions)	Final Exam*/ Shorter Tests**	Presentations and Interviews***	Reports ***
CH1	**Machine Learning Basics**	Comprehension –Analytical Thinking –Tools and Application Hands– On	√	√	√	√	√
CH2	**Supervised learning**	Comprehension –Analytical Thinking –Tools and Application Hands– On	√	√	√	√	√
CH3	**Unsupervised learning**	Comprehension –Analytical Thinking –Tools And Application Hands– On	√	√	√	√	√
CH4	**Reinforcement Learning Processing**	Comprehension –Analytical Thinking –Tools	√	√	√	√	√

		And Application Hands– On					
CH5	**Time Series**	Comprehension –Analytical Thinking –Tools And Application Hands– On	√	√	√	√	√

***The final exam is two hours long and is given at the end of the course.**

****Shorter tests are about 30 minutes long and are given after three or four lectures throughout the semester during synchronous sessions.**

*****Presentations, interviews, and reports are submitted once after each three or four lectures throughout the semester during synchronous sessions.**

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6. Course Syllabus:

Chapter	Subject	Content	Number of Learning Objects	Number of synchronous Learning Objects
CH1	**Machine Learning Basics**	1. Artificial Intelligence and Machine Learning 2. Machine learning Hierarchy 3. Machine Learning Tools 4. Scikit-learn	4	2
CH2	**Supervised learning**	1. Linear Regression 2. Non-Linear Regression 3. Logistic Regression 4. Decision Trees 5. Bayes Classifier 6. K-Neighbors 7. Support Vector Machine 8. Evaluation Methods	8	4
CH3	**Unsupervised learning**	1. Clustering by division 2. Agglomerative Clustering 3. Association rules discovery	3	1
CH4	**Reinforcement Learning Processing**	1. Reinforcement learning 2. Q-learning 3. Taxi driver problem	3	1

CH5	**Time Series**	1. Time Series 2. Rolling averages	**2**	**1**

7. Practical Activity:

- **Tools and Labs:**

Tool Name	Description
Python	Programming language

- **Practical Activities per Chapters:**

Chapter	Activities Type	Remarks
CH1	☑ Exercises ☑ Homework ☐ Webinars ☐ Project ☐ Experiment ☐ Other	
CH2	☑ Exercises ☑ Homework ☐ Webinars ☐ Project ☐ Experiment ☐ Other	

CH3	☑ Exercises ☑ Homework ☐ Webinars ☐ Project ☐ Experiment ☐ Other	
CH4	☑ Exercises ☑ Homework ☐ Webinars ☐ Project ☐ Experiment ☐ Other	
CH5	☑ Exercises ☑ Homework ☐ Webinars ☐ Project ☐ Experiment ☐ Other	

8. References:

1. T. Point, Machine Learning with Python, 2019.
2. B. Klein, Machine Learning with Python Tutorial, bodenseo, 2021.
3. Machine Learning with Python, Tutorialspoint, 2019.
4. M. K. K. P. Jiawei Han, Data Mining Concepts and Techinques, Elsevier, 2012.
5. R. B. T. S. Dipanjan Sarkar, Practical Machine Learning with Python, Apress, 2018.