2023
TP-153

Course Specification
(Bachelor)

Course Title:	**Machine Learning 2**
Course Code:	**DSC 323**
Program:	**Applied Statistics & Data Management**
Department:	**Mathematics**
College:	**College of Science**
Institution: Institution:	**Majmaah University, Saudi Arabia**
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2+2)					
2. Course type					
A.	☐University	☐College	☐Department	☐Track	Others
B.	☒Required		☐Elective		
3. Level/year at which this course is offered: (Six)					
4. Course general Description:					
Computational Learning theory, mistake bound analysis, sample complexity analysis, VC dimension, Occam learning, accuracy and confidence boosting, Dimensionality reduction: Principal component Analysis, feature selection and visualization. Unsupervised Learning: Clustering, mixture models, k-means clustering, hierarchical clustering, distributional clustering, Reinforcement learning; Learning from heterogeneous, distributed, data and knowledge.					
5. Pre-requirements for this course (if any)**:**					
DSC 311 Machine learning I					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
- To understand the main Computational Learning. **- To capture the main topics Unsupervised Learning.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	75%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	10	25%
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	20
2.	**Laboratory/Studio**	0
3.	**Field**	0
4.	**Tutorial**	20
5.	**Others (specify)**	
Total		40

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Explain about the concepts of computational learning theory and dimensionality reduction	K2	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam E-exam Oral Exam
2.0	**Skills**			
2.1	Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning .	S3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam E-exam Oral Exam
3.0	**Values, autonomy, and responsibility**			
3.1				

C. Course Content

No	List of Topics	Contact Hours
1.	Computational Learning theory, Mistake bound analysis.	4
2.	Accuracy and confidence ,Occam learning ,VC dimension ,sample complexity analysis .boosting	8
3	Feature selection and ,Analysis component Principal :Dimensionality reduction and energy .visualization	8
4	Clustering, Mixture models.	4
5	Distributional clustering ,hierarchical clustering ,.k-means clustering	8
6	Reinforcement learning; Learning from heterogeneous, distributed, Data and knowledge.	8
	Total	**40**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm	7 th, week	30 %
2.	Activities	Through of semester	10 %
3.	Quizzes	Through of semester	%10
4	Electronic Test	10 th week	10 %
5	Final exam	End of semester	40 %
			100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Pattern Recognition and Machine Learning.
Supportive References	Artificial Intelligence: A Modern Approach.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students. Computer Lab of Mathematics Department
Technology equipment (projector, smart board, software)	Mathematical software packages like MATHEMATICA
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission) Verification of students' papers
Effectiveness of Students assessment		
Quality of learning resources	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)
The extent to which CLOs have been achieved	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among theteaching staffs)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	