

University of Computer Studies (Thaton)
2024-2025 Academic Year
Fourth Year (B.C.Sc.)
Lecture Plan

CS-4214 Advanced Artificial Intelligence

Second Semester

Textbooks : [1] Artificial Intelligence- A Modern Approach (Third Edition) by Stuart Russell & Peter Norvig
 [2] Ronald J. Brachman and Hector J. Levesque, Knowledge Representation and Reasoning, Elsevier/Morgan Kaufmann 2004. ISBN 1-55860-932-6.
 [3] Introduction to Machine Learning with Python: A Guide for Data Scientist by Andreas C. Muller and Sarah Guido

Prerequisite : CST-3113(Artificial Intelligence)

Credit Unit : 3 ACUs

Periods : 64 periods for 16 weeks (4 periods * 16 weeks) (1 period -1 hr.)

No.	Topics	Week	Remarks
	Knowledge Representation and Reasoning		
1	Knowledge Representation		
	<ul style="list-style-type: none"> • Knowledge representation in AI • Kinds of Knowledge Represented in AI Systems • Types of Knowledge • Approaches of Knowledge Representation 	Week 1-2	Quiz/Assignment/Tutorial
2	Basic Probability and Reasoning		
	<ul style="list-style-type: none"> • Quantifying Uncertainty <ul style="list-style-type: none"> • Acting under Uncertainty • Basic Probability Notation • Inference Using Full Joint Distributions. • Independence • Bayes' Rule and Its Use • Probabilistic Reasoning in AI <ul style="list-style-type: none"> • Why this matter? • Brief Introduction to Bayesian networks • Semantics of Bayesian networks • Example 	Week 3-6	Quiz/Assignment/Tutorial
	Foundation of Machine Learning		
1	Introduction to Machine Learning		
	<ul style="list-style-type: none"> • Introduction • Problems Machine Learning • Knowing Task and Data • Essential Libraries and Tools • Kinds of machine learning 	Week 7-8	Quiz/Assignment/Lab

No.	Topics	Week	Remarks
2	Supervised Learning (Classification)		
	<ul style="list-style-type: none"> • Example of supervised machine learning • Generalization, Overfitting and Underfitting • Supervised Machine Learning Algorithms • Naive Bayes Classifiers 	Week 9-11	Quiz/Assignment/Lab
3	Unsupervised Learning (Clustering)		
	<ul style="list-style-type: none"> • Challenges of Unsupervised Learning • Preprocessing and Scaling • Applying Data Transformation • k-Means Clustering 	Week12-15	Quiz/Assignment/Lab
4	REVISION	Week 16	

Assessment Plan for the Course

Assignment	10 %
Quiz/Moodle	10 %
Tutorial	10 %
Lab	10 %
Exam	60 %