

Branch Name:	Artificial Intelligence & Data Science
Program Code	ET108
Course Title:	Introduction to Artificial Intelligence and Machine Learning
Course Code:	2ET1080302T
Pre-requisite:	Knowledge of Programming, Algorithms, Data Structures

Course Objective:

The field of AI and its techniques are being used in many areas which directly affect human life. Various techniques for encoding knowledge in computer systems such as Predicate Logic, Production rules, Semantic networks find application in real world problems. The fields of AI such as Game Playing, Natural Language Processing, and Connectionist Models are also important. Student should know some programming language for AI.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

SubjectContents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction to AI: The AI Problems, AI Techniques, The Level of The Model, Examples.	02	10
2	State Space Search & Heuristic Search Techniques: Defining The Problems as a State Space Search, Production Systems, Production Characteristics, Production System Characteristics, Issues in the Design of Search Programs, Additional Problems. Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction.	06	15
3	Knowledge Representation Issues and Approaches: Representations And Mappings, Approaches To Knowledge Representation. Representation Simple Facts In Logic, Representing Instance and Is-A Relationships, Computable Functions and Predicates, Resolution. Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning.	07	15
4	Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Semantic Analysis, Discourse and Pragmatic Processing, Spell Checking	04	15

5	Connectionist Models: Introduction: Hopfield Network, Learning in Neural Network, Application of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI and Symbolic AI.	06	15
6	Introduction To Machine Learning: Learning Problems, designing a learning system, Issues with machine learning. Concept Learning, Version Spaces and Candidate Eliminations, Inductive bias.	06	12
7	Supervised and Unsupervised learning: Decision Tree Representation, Decision tree learning, Issues in Decision tree learning. K- Nearest Neighbor Learning, Locally Weighted Regression, Radial Bases, Functions, Case Based Reasoning.	06	18

Course Outcome:

After learning the course the students should be able to:

- To understand working of different algorithms, AI based techniques.
- Understand various search methods.
- Use various knowledge representation methods.
- Use Prolog Programming language using predicate logic.

List of Reference Books:

1. Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig, PHI.
2. PROLOG Programming For Artificial Intelligence–By Ivan Bratko (Addison-Wesley).
3. Programming with PROLOG–By Klocksin and Mellish.
4. Peter Harrington, “Machine Learning in Action”, Dream Tech.

E-Resources (If any):

1. <http://www.journals.elsevier.com/artificial-intelligence/>
2. <https://www.technologyreview.com/s/534871/our-fear-of-artificial-intelligence/>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand working of different algorithms, AI based techniques.	2 Understanding
CLO2	Understand various search methods.	2 Understanding
CLO3	Understand various search methods.	2 Understanding,
CLO4	Design and Concrete implementations of various machine learning algorithms to solve a given problem using languages such as Python	3 Applying, 2 Understanding
CLO5	Use Prolog Programming language using predicate logic.	5 Evaluate, 4 Analyze
CLO6	Evaluate performance of various machine learning algorithms on various data sets of a domain.	5 Evaluate, 3 Applying, 4 Analyze
CL07	Develop a good understanding of fundamental principles of machine learning	6 Creating 2 Understanding

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes(POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M				M								H			
CLO2	M	L		H					M		L		L			
CLO3	M		L	M										M		
CLO4	M	L	M	L				H	L		L		L			
CLO5				M	L									M		
CLO6	H	M									L	M				
CLO7	M	L		L				H	L		L			L		

H:High, M:Medium, L:Low