MCA 2nd Semester

Course: 201: Artificial Intelligence

Course Code	201
Course Title	**Artificial Intelligence**
Credit	4
Teaching per Week	4 Hrs
Medium of Instruction	English
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)
Effective From	June 2020
Purpose of Course	The purpose of the course is to make the student capable of implementing the concepts, methods, and tools of Artificial Intelligence and learn their implementation in Knowledge-Based Systems Course Objective To acquaint students with concepts of Artificial Intelligence and its applications.
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Course Outcome	CO1 : Explain students the insight of the historical and fundamental aspects the artificial intelligence. CO2 : Train students to represent declarative knowledge in the form of symbolic knowledge through various Knowledge Representation (KR) techniques like First Order Predicate Logic (FOPL), Semantic Network, Conceptual Graphs, Scripts, and Frames. CO3 : Train students to apply various searching algorithms fall under informed and uninformed search methods to solve complex problem of AI domain. CO4 : Explain and train students to deal with the uncertainty that inherently lies within many AI problem. CO5 : Expose the students with the analysis and development process of the knowledge based system development. CO6 : Explain students to utilize the AI problem solving techniques in the advanced AI problem domain like Natural Language Processing (NLP) and Computer Vision (CV)

Mapping between COs with PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
	CO1	X							
	CO2	X		X					
	CO3	X	X	X		X			
	CO4		X	X	X		X	X	X
	CO5	X		X			X		
	CO6	X	X		X		X	X	X

Pre-requisite	Basics of Mathematics, Data Structures

Course Content	**Unit 1:**
	 1.1 Introduction to Artificial Intelligence
	     1.1.1 Definition of Artificial Intelligence
	     1.1.2 History of Artificial Intelligence
	     1.1.3 Application of Artificial Intelligence
	     1.1.4 Introduction to Knowledge-Based System
	 1.2 Turing Problem
	 1.3 Knowledge Representation
	     1.3.1 knowledge and Knowledge Base
	     1.3.2 First Order Predicate Logic (FOPL)
	     1.3.3 Inference Rules
	
	 Unit 2:
	 2.1 Structured Knowledge Representation
	     2.1.1 Associative network and Conceptual graphs
	     2.1.2 Frames and Scripts
	     2.1.3 Conceptual Dependencies

	2.2 Searching
	2.2.1 Search Problem
	2.2.2 Initial State, action, transition model, goal test, the cost function
	2.2.3 Uninformed Search
	2.2.3.1 Depth First Search
	2.2.3.2 Breadth-First Search
	2.2.3.3 Iterative Deepening Search
	2.2.4 Informed Search
	2.2.4.1 Heuristics
	2.2.4.2 A* Search
	2.2.4.3 Minimax
	2.2.4.5 Hill-Climbing Method
	2.2.4.6 Constraint Satisfaction Search
	Unit 3:
	3.1 Uncertainty
	3.1.1 Probability
	3.1.2 Conditional Probability
	3.1.3 Baye's Rule
	3.1.4 Joint Probability
	3.1.5 Probability Rules
	3.2 Introduction to Hidden Markov Model
	Unit 4:
	4.1 Knowledge Acquisition
	4.1.1 Knowledge gathering
	4.1.2 Learning Models
	4.1.2.1 Introduction to Supervised Learning
	4.1.2.2 Introduction to Unsupervised Learning
	4.1.2.3 Reinforcement Learning
	4.1.3 Performance of Learning Model
	Unit 5:
	5.1 Expert System
	5.2 Characteristics of Expert System
	5.3 Architecture of Expert System
	5.4 Application of AI in Natural Language Processing
	5.5 Application of AI in Computer Vision
Reference Books	1. Artificial intelligence, 3rd Edition, Kevin Knight, Elaine Rich, B. Shivashankar Nair, McGraw Hill
	2. Russell Stuart Jonathan and Norvig Peter, Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice-Hall, 2010
	3. A First Course in Artificial Intelligence, Deepak Khemani, McGraw Hill
	4. Introduction to artificial intelligence, Akerkar, Rajendra, PHI Learning
	5. Foundation of Artificial Intelligence and Expert Systems by V.S. Janakiraman, K. Sarukesi, P. Gopalakrishnan, Mc Millan
	6. Expert Systems Principles and Programming (3rd Edition) by Giarratano & Riley, Thomson (Vikas Publishing House)
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc.
	70% External based on semester end University examination