

College of Computer Science and Information Systems  
 Course Code : 361CSS-3  
 Contact Hour : 3(0)

Department of Computer Science  
 Artificial Intelligence  
 Prerequisite : N/A

Coordinator -

## 2. Course Description

This course will provide an introduction on the basic concepts and techniques of Artificial Intelligence. It gives an overview of underlying ideas such as search, knowledge representation and reasoning, expert systems, learning, natural language processing, robotics and uncertainty. To gain the experience of doing independent study and research.

## 3. Course Learning Outcomes

SL	By the end of this course, students should be able to:	Linkages to POs
1.	Explain the difference in "intelligence"™ and Artificial Intelligence™, and the land mark achievements in the development of AI evolution.	
2.	Describe Artificial Intelligence techniques in solving problems (i.e. expert systems, natural language processing, robotics, reasoning with uncertainty, game playing, prolog and computer vision)	
3.	Apply different search techniques (i.e. Depth First Search, Breadth first search, Iterative deepening search, Uniform Cost search, heuristic function, greedy search, A* search and iterative deepening A* search) to solve problems.	
4.	Use the knowledge representation techniques to represent the knowledge in different domain.	
5.	Implement the learning of this course in terms of a course project based on AI techniques.	

## 4. Learning Resources

Text	Stuart Russell, Peter Norvig. Artificial Intelligence: A Modern Approach, 2ndEdition, Prentice Hall: 2003, ISBN: 0-13-790395-2.
Reference	George F. Luger. Artificial Intelligence " Structures and Strategies for Complex problem solving, 6th Edition, Pearson International Edition, , 2009.
Reference	Ivan Bratko, Prolog Programming for Artificial Intelligence, 3rd Edition, Addison Wesley, 2000. ISBN-13: 978-0201403756
Reference	Wolfgang Erfel. Introduction to Artificial Intelligence, 2nd edition, Springer: New York, 2009. ISBN 978-0-85729-298-8

## 5. Course Content : The list below provides a summary of the material that will be covered during the course

Week	Topics	References Book / Others Source	Special Event	Tutorial Activities	Lab Activities
1.	Introduction to Artificial Intelligence: Definitions, Goals, Approaches, Applications and - History, Intelligent Agents; the Turing test, specify PEAS.	1, 2		N/A	N/A

2.	Searching Algorithms in AI: Uninformed Search: breadth-first, depth-first, depth-first iterative-deepening and bidirectional search; Heuristic Search: Greedy search, A*-search, and hill climbing.	3, 4	Quiz-1	Tutorial -1	N/A
3.	Searching Algorithms in AI: Uninformed Search: breadth-first, depth-first, depth-first iterative-deepening and bidirectional search; Heuristic Search: Greedy search, A*-search, and hill climbing.	3, 4	Assignment 1	Tutorial -2	N/A
4.	Searching Algorithms in AI: Uninformed Search: breadth-first, depth-first, depth-first iterative-deepening and bidirectional search; Heuristic Search: Greedy search, A*-search, and hill climbing.	3, 4		Tutorial -3	N/A
5.	Knowledge Representation: Predict and propositional logic, resolution and deductive proof techniques (e.g. Generalized modus ponens) Reasoning with uncertainty). Rules, Frames, Semantic Network (Web), Predicate Logic	5.6, 6.4, 9.3		Tutorial -4	N/A
6.	Knowledge Representation: Predict and propositional logic, resolution and deductive proof techniques (e.g. Generalized modus ponens) Reasoning with uncertainty). Rules, Frames, Semantic Network (Web), Predicate Logic	5.6, 6.4, 9.3		Tutorial -5	N/A
7.	Introduction to Prolog: Presentation of prolog (the program and query) and the facts (simple facts, facts with arguments and how to query).	Prolog Programming	Midterm-1	N/A	N/A
8.	Decision and Reasoning with uncertainty: Reasoning: Introduction to probability, Bayes Rule, Belief Networks and inference with them; Decision making basic concepts of decision theory, decision tree and decision network.	14.1,14.2, 14.4, 15.3,16.7			N/A

9.	Decision and Reasoning with uncertainty: Reasoning: Introduction to probability, Bayes Rule, Belief Networks and inference with them; Decision making basic concepts of decision theory, decision tree and decision network.	14.1,14.2, 14.4, 15.3,16.7		Tutorial -6	N/A
10.	Machine Learning: General concepts of learning with introduction to PAC theory, hypothesis space learning, and perceptions.  Agent interaction: Basic concepts of agent communication and coordination, including adversarial search and game theory.	18.1, 18.2, 18.3,18.5, 18.6,19.3 22.1,22.2	Assignment -2	Tutorial -7	N/A
11.	Machine Learning: General concepts of learning with introduction to PAC theory, hypothesis space learning, and perceptions.  Agent interaction: Basic concepts of agent communication and coordination, including adversarial search and game theory.	18.1, 18.2, 18.3,18.5, 18.6,19.3 22.1,22.2	Midterm-2		N/A
12.	AI Application: Game playing, Speech recognition, Natural language processing, Expert Systems, computer vision, Robotics and Heuristic Classification.	26		Tutorial -8	N/A
13.	AI Application: Game playing, Speech recognition, Natural language processing, Expert Systems, computer vision, Robotics and Heuristic Classification.	26		Tutorial -9	N/A
14.	Mini Project	Prolog			N/A

**6. Evaluation Scheme: The following list is the contribution of course components to the final grade for the course.**

Component	Weight (%)
Assignment1/Mini Project	10%
Quiz 1& 2	10%
Mid Term 1	15%
Mid Term 2	15%
Final Exam	50%
Total	100

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