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| **Course – 41 Title: Artificial Intelligence** |  |
| **Course No.: CIT-315** Credit : 3 Contact Hours: 3 | Total Marks: 100 |

**Rationale:**

To build modern IT solutions we need to include artificial intelligence so that it can interact dynamically facilitating customers or optimize the number of employee needed. So every computer science graduate needs sound knowledge in artificial intelligence.

**Objectives:**

* To understand intelligent agents and environments.
* To understand and implement informed and uninformed search algorithms.
* To understand neural networks.
* To acquire proper knowledge in reasoning.

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| **Learning Outcomes** | **Course Content** | **Teaching  Learning Strategy** | **Assessment Strategy** |
| * Explain AI, rationality. * Describe various agents * Identify kind of environment. | **Introduction:** Introduction to AI and intelligent agents. | * Lecture | * Short answer |
| * Explain various informed and uninformed search technique. * Implement various search algorithms. * Simulate different search technique for specific input set. * Analyze complexity and performance for various search technique. | **Problem Solving:** Solving Problems by Searching, Search Strategies, Heuristic search techniques, Game Playing. | * Lecture * Assignment * Exercise | * Assignment * Essay |
| * Explain logic, knowledge base and knowledge based agent. * Describe syntax, semantics & inference of propositional logic & first order logic. * Change sentences into first order logic. * Identify truth value for propositional logic sentences. * Justify satisfiability of sentence by resolution. | **Knowledge and Reasoning:** Building a Knowledge Base Agent, Propositional logic, First order logic, Inference in First order Logic | * Lecture * Assignment | * Essay * Viva voce |
| * Implement algorithm in PROLOG. | **Logic Programming:** Logic programming using PROLOG, LISP. | * Lecture * Exercise | * Essay |
| * Describe the differences and similarities between problem solving and planning. * Explain the process for generating predecessors in backward search. * Construct levels 0, 1,and 2 of the planning graph fora problem. * Prove assertions about planning graphs. | **Logical Action:** Planning, partial order planning, Knowledge Engineering for Planning, Conditional Planning, A Replanning Agent. | * Lecture * Assignment | * Assignment * Essay |
| * Prove that any probability distribution on a discrete random variable must sum to 1. * Generate reasonable conditional probability tables for nodes in a network. * Draw a Bayesian network for a domain. * Explain which network is the best. | **Uncertain Knowledge and Reasoning:** Uncertainty, Probabilistic Reasoning Systems, Fuzzy Logic, Making Simple Decisions | * Lecture * Exercise | * Essay |
| * Explain different forms of learning. * Draw decision tree for specific problem of deciding what to do. * Explain different components of neural network. Describe different types of neural network. * Simulate a two layer perceptron. * Explain self-organized feature map. * Train a model that identifies whether the word “Apple” in a sentence belongs to the fruit or the company. | **Knowledge Acquisition:** Overview of different forms of learning, Learning Decision Trees, Neural Networks, Genetic Algorithms, Intelligent Editors, Introduction to Natural Language Processing | * Lecture * Assignment * Exercise | * Essay * Assignment |
| * Write the priority research areas in developing an understanding on the relationship between wetlands and rangelands in a holistic manner. * Describe the components of expert systems. * Explain knowledge base, forward and backward chaining. * Differentiate between Robot System and Other AI Program. * Describe and explain Robot Locomotion. | **Selected topics in AI:** Expert consultation, Development of Expert Systems, Pattern recognition, Computer vision, Robotics | * Lecture * Assignment * Reading | * Essay * Viva voce |

**RECOMMENDED BOOKS AND PERIODICALS**

**Text Books**: