Department Of Computer Science and Engineering
Kathmandu University
Dhulikhel, Kavre

Subject: Artificial Intelligence   **Course: COMP 472**

Level: B.E./B.Sc 4th Year   **Credit Hours: 3**

Course Objective:

The main purpose of this course is to provide the most fundamental knowledge to the students so that they can understand what AI is. Due to limited time, we will try to eliminate theoretic proofs and formal notations as far as possible, so that the students can get the full picture of AI easily. Students who become interested in AI may go on to graduate school for further study.

Prerequisites:

Students should have a good enough knowledge of different programming languages like C, C++ or Java. They also must have a good concept of data structure and algorithm.

Contents:

1. **Introduction:**   [6 Hrs.]
   1.1   Introduction to AI, Roots, Applications and sub domains
   1.2   Agents, its structure and its Environments, Behavior and Performance Measures

2. **Problem Solving:**   [12 Hrs]
   2.1   Well defined Problems and solutions, ProblemFormulations
   2.1   Uninformed search techniques- depth first search, breadth first search, depth limit search, iterative deepening search and search strategy comparison,
   2.3   Informed search techniques-hill climbing, best first search, greedy search, A* search,
   2.4   Local search Algorithm and optimization- Hill climbing, simulated annealing, Genetic Algorithm
   2.5   Adversarial search techniques-minimax procedure, alpha beta procedure
3. **Knowledge and Reasoning:**   [9 Hrs]
   3.1   Formal logic-connectives, truth tables, syntax, semantics, tautology, validity, well- formed-formula,

   3.2   Propositional logic, predicate logic, FOPL, interpretation, quantification, horn clauses,
   3.3   Rules of inference, unification, resolution refutation system (RRS), answer extraction from RRS, rule based deduction system,
   3.4   Statistical Reasoning-Probability and Bayes' theorem and causal networks, reasoning belief network

4. Structured Knowledge Representation: [6 Hrs.]

    4.1   Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge, Representation, Semantic nets, frames, conceptual dependencies and scripts

5. Artificial Neural Network [15 Hrs.]

    5.1   Neural Network and its structure, Applications, Perceptron Model, Back Propagation

    5.2   Adaline network, Boltzmann Machines, Hopfield network, Kohonen network

    5.3   Concepts of Learning, different approach of learning, Fuzzy learning, Learning decision trees, Deep learning.

TEXT BOOKS:

1. Artificial Intelligence: A Modern Approach 3rd Edition, Stuart Russel, Peter Norvig, Prentice Hall Press Upper Saddle River, NJ, USA ©2009, ISBN:0136042597 9780136042594

REFERENCES:

1. Artificial Intelligence (Third Edition),Elaine Rich, Kevin Knight, Shivashankar B. Nair,ISBN 13: 9780070087705,Tata McGraw-Hill Education Pvt. Ltd., 2008
2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, George F. Luger, 6th Edition, Addison-Wesley Publishing Company , USA ©2008, ISBN:0321545893780321545893