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| **Unity University** | | | | | | | | | | | |
| 1 | Course Name | | | | **INTRODUCTION TO ARTIFICIAL INTELLIGENCE** | | | | | | |
| Course Code: | | | | **Cosc4061** | | | | | | |
| 2 | Synopsis: | | | | This course is an introductory course on Artificial Intelligence (AI) that presents an overview of AI principles and approaches. It will introduce the basic principles in artificial intelligence research, simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. Areas of application such as knowledge representation, programming in logic, inference and reasoning mechanism, natural language processing, expert systems, vision and robotics will be explored. The PROLOG and others AI programming language will also be introduced. | | | | | | |
| 3 | Credit Hour: | | | | 4 | | | | | | |
| 4 | Course Learning Outcome ( CLO): At the end of the course the student will be able to do: | | | | | | | | | | |
| CLO1 | | | Discuss the basic principles of AI and different types of AI agents. | | | | | | | |
| CLO2 | | | Identify various AI search algorithms. | | | | | | | |
| CLO3 | | | Apply knowledge representation, reasoning, and machine learning techniques to real-world problems. | | | | | | | |
| CLO4 | | | Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information. | | | | | | | |
| CLO5 | | | Develop a simple knowledge-based system. | | | | | | | |
| 5 | Transferable Skills (if applicable)  (Skills learned in the course of study which can be useful and utilized in other settings) | | | | | | | | | | |
| 1 | | Machine Learning | | | | | | | | |
| 2 | | Robotics | | | | | | | | |
| 3…etc. | | Expert Systems | | | | | | | | |
| Chapter 1: **Introduction to Artificial Intelligence**  1.1Definitions and Views of Artificial Intelligence (Intelligence, AI, AI Thoughts), | | | | | | | | | | |
| 1.2 Brief History and foundations of AI | | | | | | | | | | |
| 1.3 Roles of AI | | | | | | | | | | |
| 1.4 Main Areas of AI | | | | | | | | | | |
| 1.5 Achievements and Big Open Questions | | | | | | | | | | |
| Chapter 2: **Intelligent Agents** 2.1 Definitions(Agent, Intelligent Agent | | | | | | | | | | |
| 2.2 Agent Types(Rational, Omniscience Agent, Ideal Rational Agent, etc.), Properties of an Agent | | | | | | | | | | |
| 2.3 Parts of an Agent | | | | | | | | | | |
| 2.4 Factors to measure rationality of Agents | | | | | | | | | | |
| 2.5 Structure of Intelligent Agents | | | | | | | | | | |
| 2.6 Agent types based on their memory and Actions, and Nature of Agent Environments | | | | | | | | | | |
| Chapter 3: **Problem Solving** 3.1 Solving Problems by Searching (informed, Uninformed) | | | | | | | | | | |
| 3.2 Beyond Classical Search(Simulated Annealing, Genetic algorithms) | | | | | | | | | | |
| 3.3 Legitimacy of Intellectual Property Protection for Software | | | | | | | | | | |
| Chapter 4: **Knowledge and Reasoning**  4.1 Logical Agents | | | | | | | | | | |
| 4.2 First-Order Logic | | | | | | | | | | |
| 4.3 Inference in First-Order Logic | | | | | | | | | | |
| 4.4 Classical Planning,  Planning and Acting in the Real World | | | | | | | | | | |
| 4.5 Knowledge Representation | | | | | | | | | | |
| Chapter 5: **Uncertain Knowledge and Reasoning**  5.1 Quantifying Uncertainty | | | | | | | | | | |
| 5.2 Probabilistic Reasoning | | | | | | | | | | |
| 5.3 Probabilistic Reasoning over Time | | | | | | | | | | |
| 5.4 Making Simple Decisions, Making Complex Decisions | | | | | | | | | | |
| Chapter 6: **Learning**  6.1 Learning from Examples, Knowledge in Learning | | | | | | | | | | |
| 6.2 Learning Probabilistic Models, Reinforcement Learning, or Machine | | | | | | | | | | |
| Chapter 7: C**ommunicating, Perceiving and Acting**  **7.1** Natural Language Processing | | | | | | | | | | |
| 7.2 Natural Language for Communication | | | | | | | | | | |
| 7.3 Perception, Robotics | | | | | | | | | | |
| Assessment | | | | | | | | | | |
| 1 | Mid Exam | | | | | | 20% |  |  |  |
| 2 | Quiz 1 | | | | | | 10% |  |  |  |
| 3 | Quiz 2 | | | | | | 10% |  |  |  |
| 3 | Project | | | | | | 20% |  |  |  |
| 4 | Final | | | | | | 40% |  |  |  |
| 6 | Special requirements and resources to deliver the course (e.g. software, computer lab, simulation room …etc.) | | | | | 1 | Software | | | | |
| 2 | Computer Lab | | | | |
| 3 | Choose an item. | | | | |
| 4 | Choose an item. | | | | |
| 5 | Choose an item. | | | | |
| 7 | Text book and reference:  (note: ensure the latest edition /publication)  Software | | | | | 1 | 1. Russell and P. Norvig. Artificial Intelligence: A Modern Approach. 6th edition. Prentice Hall, 2016. 2. Introduction to Artificial Intelligence, Rajendra Akerkar; Prentice Hall of India, 2009. 3. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, George Luger; Benjamin Cummings, 2004 4. Introduction to AI and Expert Systems, D. W. Patterson; PHI, 2012. | | | | |
|  | **[SWI-Prolog](http://www.swi-prolog.org/)**. Use the stable versions and the self-installing executable for Windows. For this course we need only the basic components.  Reference: [The World Wide Web Virtual Library: Logic Programming (Prolog)](http://vl.fmnet.info/logic-prog/" \l "Prolog) | | | | |