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| **AMBO UNIVERSITY WOLISO CAMPUS** |  | **SCHOOL OF TECHNOLOGY AND INFORMATICS** |

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| Department: Computer Science | Program: CS (4th Year, I Semester) |
| Course: Intro to Artificial Intelligence | Course Code: CoSc 4142 |
| Instructor’s Name: Mr. Yared A. Ergu | ECTS: 6 |

***Course Description****:*

The purpose of this course is to give students an understanding of Artificial Intelligence methodologies, techniques, tools and results. Students will use at least one AI-language [Lisp, Prolog]. Students will learn the theoretical and conceptual components of this discipline and firm up their understanding by using AI and Expert System tools in laboratory sessions, projects and home assignments.

**Course Goals or Learning Outcomes:**

At the end of this course the students will be able to:

* Understand reasoning, knowledge representation and learning techniques of AI
* Evaluate the strengths and weaknesses of these techniques and their applicability to different tasks
* Assess the role of AI in gaining insight into intelligence and perception
* Know classical examples of artificial intelligence
* Know characteristics of programs that can be considered "intelligent"
* Understand the use of heuristics in search problems and games
* Know a variety of ways to represent and retrieve knowledge and information
* Know the fundamentals of AI prog techniques in a modern programming language
* Consider ideas and issues associated with social technical, and ethical uses of machines that involve artificial intelligence

***Prerequisites:***

Logic in Computer Science

***Assessment Method:***

Continuous assessments: Test 1: 20%, Assignment: 20%, Project/Lab: 20%. Final Exam: 40%.

***Course Content:***

**CHAPTER 1 – Introduction to Artificial Intelligence**

What is AI - Objectives of AI – Approaches of AI - Making Computer (Think like a Human, Act like a Human, Think rationally, Act rationally) – Foundations of AI – Bits of History.

**CHAPTER 2 – Intelligent Agents**

Introduction – Agents and Requirements – Acting of Intelligent Agents (Rationality) – Structure of Intelligent Agents – Agent Types (Simple reflex agent, Model based reflex agent, Goal based agent, Utility based agent, Learning agent) – Important concepts and terms.

**CHAPTER 3 – Problem Solving**

Problem Solving by searching – Problem solving agents – Problem Formulation – Search strategies (Uninformed Search, Informed Search) – Avoiding repeated states – Constraint satisfaction search – Games as search problem

**CHAPTER 4 – Knowledge and Reasoning**

Logical Agents – Propositional Logic – Predicate First Order Logic – Inference in First Order Logic – Knowledge representation – Knowledge based systems.

**CHAPTER 5 – Uncertain Knowledge and Reasoning**

Quantifying Uncertainty – Probabilistic Reasoning – Probabilistic Reasoning over time – Making simple decisions – Making complex decisions.

**CHAPTER 6 – Learning**

Learning from Examples and Observations – Knowledge in Learning – Learning Probabilistic models – Neural Networks.

**CHAPTER 7 – Communicating, Perceiving and Acting**

Natural Language Processing - Natural Language for Communication – Perception – Robotics.

***Reference:***

1. *Russell, S. & P. Norvig (1995) Artificial Intelligence: A Modern Approach Prentice-Hall.*
2. *Luger, G. (2002) Artificial Intelligence, 4th ed. Addison-Wesley.*
3. *Bratko, Ivan, PROLOG Prog for Artificial Intelligence, 2nd ed. Addison-Wesley, 1990.*
4. *Winston, P.H. (1992) Artificial Intelligence Addison-Wesley.*
5. *Ginsberg, M.L. (1993) Essentials of Artificial Intelligence. Morgan Kaufman.*

***General Information***

* Each and every student should have an attendance margin of as prescribe by AU to sit in final exam. **YOU ARE RESPONSIBLE** for any missed notes, handouts, assignments, announcements, etc.
* Students will not be entertained for any missed assessments without any valid reasons. No makeup exams/quizzes or tests will be given unless previous arrangements are made with your instructor or Head of the Department. Otherwise, a grade of zero will be recorded for any missed assessments.
* Neatness on exam/assignment/assessment or any submitted work is important. Work that is sloppy and/or contains spelling and grammatical errors will be penalized. You have been trained to become an **ENGINEER** not a story writer, hence you have to write the answers for any given exam point to point.
* All appeals for re-evaluation of a grade must be made within one week of the assignment/assessment/test/quiz being returned to you.
* You are responsible for being academically honest as defined by the rules of AU. **CHEATING WILL NOT BE TOLERATED**.