

## APT3010-INTRODUCTION TO ARTIFICIAL INTELLIGENCE

### Course Description

*Prerequisite - APT1020*

This is an introductory course on Artificial Intelligence. The main purpose of this course is to provide the most fundamental knowledge to the students so that they can understand what the AI is with minimal theoretic proofs and formal notations to enable students to get the full picture of AI easily. AI techniques and algorithms for solving those problems will be examined. Students will learn about the methods and tools that will allow them to build complete systems that can interact intelligently with their environment by learning and reasoning about the world. Programming languages such as Lisp, Python, and Theano among others may be used.

### Link to university mission outcomes & to program learning outcomes

<b>CLO</b>	<i>Aligned to the following university mission outcomes:</i>					
	Higher order thinking	Global understanding and multicultural perspective	Community service	Literacy	Preparedness for career	Leadership and Ethics
1. Describe Artificial Intelligence Techniques	✓			✓	✓	
2. Design intelligent artifacts	✓			✓	✓	
3. Implementing intelligent programs using logic programming.	✓			✓	✓	
4. Recognize the limitations of current Artificial Intelligence techniques.	✓			✓	✓	

### Link to Program Learning Outcomes

PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
	Develop integrated software for businesses/organizations/institutions using modern techniques	Conceptualize and implement integrated systems	Demonstrate competence in the use of modern computer tools and Techniques	Write programs using modern programming languages	Explain the concepts underlying computer information	Exhibit professional behavior and ethics	Develop skills to use tools, techniques and application skills in one of the following specializations: Computer Networks technology; Distributed and mobile computing;
APT3010 - INTRODUCTION TO ARTIFICIAL INTELLIGENCE	B		I	I			B

### Course learning outcomes

By the end of the course the student should be able to:

1. Describe Artificial Intelligence Techniques
2. Design intelligent artifacts

3. Implementing intelligent programs using logic programming.
4. Recognize the limitations of current Artificial Intelligence techniques.

## **Course content**

### **Week 1      Artificial Intelligence**

- 1 Introduction
- 2 Intelligent Agents

### **Week 2      Problem Solving**

- 3 Solving Problems by Searching
- 4 Beyond Classical Search

### **Week 3              5 Adversarial Search**

- 6 Constraint Satisfaction Problems

### **Week 4      Knowledge and Reasoning**

- 7 Logical Agents
- 8 First-Order Logic
- 9 Inference in First-Order Logic

### **Week 5              10 Classical Planning**

- 11 Planning and Acting in the Real World
- 12 Knowledge Representation

### **Week 7      Uncertain Knowledge and Reasoning**

- 13 Quantifying Uncertainty
- 14 Probabilistic Reasoning

### **Week 8              15 Probabilistic Reasoning over Time**

- 16 Making Simple Decisions
- 17 Making Complex Decisions

### **Week 8      Part V Learning**

18 Learning from Examples

**Week 10            19 Knowledge in Learning**

20 Learning Probabilistic Models

21 Reinforcement Learning

22 Game playing

**Week 11    Communicating, Perceiving, and Acting**

23 Natural Language Processing

**Week 12            24 Natural Language for Communication**

25 Perception

**Week 13            26 Robotics**

27 Computer Vision

**Teaching methods**

The course will be conducted through lectures, illustrations using computers, and practical labs exercises. Students are required to participate in group discussion, hands-on lab exercises and presentation to reinforce their understanding of the concepts learnt and their application to common AI programming tools in the industry

**Recommended Text**

*Course Text:*

- *Artificial Intelligence: A Modern Approach Third Edition by Russell & Norvig, 2010. Pearson Education Inc., ISBN:978-0-13-604259-4*

*Recommended Reading:*

- *Ethem Alpaydin, MIT Press, 2010 ISBN:978-0-262-01243-0*

## 1. Evaluation

Assignments & Lab Exercises	25%
Participation	5%
Quizzes	20%
Mid-Semester Exam	20%
Final Exam	30%
<b>Total</b>	<b>100%</b>

## 2. Key Institutional Academic Policies

Students should note the following are key policies as outlined in the University Catalogue and Students Handbook

### 1. Academic dishonesty

- Any intentional giving or use of external assistance during an examination without the express permission of the faculty member giving the examination.
- Fabrication:** any falsification or invention of data, citation or other authority in an academic exercise;
- Plagiarism:** any passing off of another's ideas, words, or work as one's own;
- Previously Submitted Work:** presenting work prepared for and submitted to another course;

### 2. Class Attendance

Students are expected to attend all classes. Upon being absent from **five** classes in a 3 unit course, the instructor will give a student an **"F"** grade for that course.

## 3. USIU grading

A	90 - 100
A-	87 - 89
B+	84 - 86
B	80 - 83
B-	77 - 79
C+	74 - 76
C	70 - 73
C-	67 - 69
D+	64 - 66
D	62 - 63
D-	60 - 61
F	0 - 59