

## Artificial Intelligence

### Course Description

<b>Course Code Number</b>	CS-521 Second Semester	<b>Course Title</b>	Artificial Intelligence
<b>Semester Hours</b>	1.5 hours	<b>No. of Credit Units</b>	3
<b>Prerequisite</b>	None	<b>Course Coordinator</b>	Dr. Win Lelt Lelt Phyu Dr. Phyu Hnin Myint

### Course Description

This course is intended to the post graduate diploma level in a curriculum and to introduce the basic principles, techniques, and applications of the field of artificial intelligence: some basic search algorithms for problem solving, representation of knowledge, inference and reasoning etc. Students will have experience in prolog programming as AI language tool.

### Course Aim

The aim of this course is

- To provide the most fundamental concept of Artificial Intelligence.
- To provide the ability to analyze and design intelligent systems
- To apply this knowledge in programming assignments and in real world Intelligent applications.

### Reference Book

- Artificial Intelligence- A Modern Approach (Third Edition) by Stuart Russell & Peter Norvig
- Prolog Programming for Artificial Intelligence by IvanBratko

### Learning Outcomes

Upon the successful completion of this course, Student will be able to:

- have a knowledge and understanding of the basic concepts of Artificial Intelligence
- understand the importance of representation and search in AI and to be able to describe key representation strategies and search algorithms.
- apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- use a well-known declarative language (Prolog) and to construct simple AI systems.

## Course Organization

Student participation in this course will involve the following activities:

1. Attending the lectures & practical
2. Preparing for and participating in the recitations
3. Practical assignments
4. Moodle (LMS) / Quiz (After each lecture)
5. Exams

## Assessment plan for the course

Exam	50%
Assignment	10%
Class participation	10%
Moodle	10%
Quiz/Tutorial	10%
Presentation/ Mini Project	10%

## Grading System

UCSY follows a letter grade system comprising of grades A, A-, B+, B, B-, C+, C, C-, D and F. All marks obtained by students during the semester will be used in the grading process.

The grading scale for this course is:

Marks obtained	Letter Grade	Grade Point
$\geq 90$	A	4
85-89	A-	3.75
80-84	B+	3.25
75-79	B	3
70-74	B-	2.75
65-69	C+	2.25
60-64	C	2
55-59	C-	1.75
50-54	D	1
0-49	F	0

**Fail Grade: C-, D, F (Grade point <2)**

### **Class Attendance and Participation Policy:**

- **Attendance**  
Class attendance is mandatory. Most of the material you will learn will be covered in the lecturers, so it is important that you not miss any of them. You are expected to show up on time for class and stay for the whole lecture. Students are expected to attend each class, to complete any required preparatory work (including assigned reading) and to participate actively in lectures, discussions and exercises.
- Mobile phones must be silenced and put away for the entire lecture unless use is specified by the instructor. You may not make or receive calls on your cell phone or send or receive text messages during lectures.
- You are responsible for all materials sent as email. Ignorance of such material is excuse. You are responsible for all materials presented in the lectures.
- Your conduct in class should be conducive towards a positive learning environment for your classmates as well as yourself.
  
- **Assignment, Quizzes, Moodle Test and Labs**  
We will take a short 3 to 5 quiz for every lecture and 30 points quiz moodle test after one or two chapters. Any assignment or quiz is simply missed, regardless of the reason why (e.g. illness, work, traffic, car trouble, computer problems, death, etc), and earns a grade of zero. You are strongly encouraged to complete all assignments and attend all quizzes so that you can check that you understand the material and can throw out bad grades, or grades for which you had to miss an assignment or quiz for a valid reason. Late submissions will not be accepted for any graded activity for any reason.
- There are no extra credit opportunities.  
Students may not do additional work nor resubmit any graded activity to raise a final grade.

### **Tentative Lecture Plan**

<b>No.</b>	<b>Topic</b>	<b>Week</b>	<b>Remark</b>
1.	Introduction to Artificial Intelligence	1	
	<ul style="list-style-type: none"> <li>• What is artificial intelligence?</li> <li>• A brief review of AI history</li> <li>• Related research fields</li> <li>• Scope of this course</li> <li>• Installation steps for Prolog environment</li> </ul>		Quiz/Assignment
2.	Introduction to Prolog	2+3+4	
	<ul style="list-style-type: none"> <li>• Defining relations by facts</li> <li>• Defining relations by rules</li> <li>• Recursive rules</li> <li>• How Prolog answers questions</li> <li>• Declarative and procedural meaning of programs</li> </ul>		Lab/Quiz/Assignment
3.	Syntax and Meaning of Prolog Programs	5+6+7	
	<ul style="list-style-type: none"> <li>• Data Objects</li> <li>• Matching</li> <li>• Declarative meaning of Prolog programs</li> <li>• Procedural meaning</li> <li>• Example : monkey and banana</li> </ul>		Lab/Quiz/Assignment

No.	Topic	Week	Remark
4.	<b>Logical Agents</b>	8+9	
	<ul style="list-style-type: none"> <li>• Knowledge-Based Agents</li> <li>• Logic</li> <li>• Propositional Logic: A Very Simple Logic</li> <li>• Propositional Theorem Proving</li> <li>- Resolution</li> <li>- CNF</li> </ul>		Quiz/Assignment
5.	<b>First-Order Logic</b>	10+11+12	
	<ul style="list-style-type: none"> <li>• Syntax and Semantics of First-Order Logic <ul style="list-style-type: none"> <li>- Models for First-Order Logic</li> <li>- Symbols and interpretations</li> <li>- Terms</li> <li>- Atomic Sentences</li> <li>- Complex Sentences</li> <li>- Quantifiers</li> <li>- Equality</li> </ul> </li> <li>• Using First-Order Logic <ul style="list-style-type: none"> <li>- Assertions and Queries in First-Order Logic</li> <li>- The kinship domain</li> <li>- Numbers, sets, and lists</li> </ul> </li> </ul>		Quiz/Assignment
6.	Inference in First-Order-Logic	13+14+15	
	<ul style="list-style-type: none"> <li>• Propositional Vs. First-Order Logic</li> <li>• Resolution</li> <li>- Conjunctive normal form for First-Order Logic</li> <li>- The resolution inference rule</li> <li>- Completeness of resolution</li> </ul>		Quiz/Assignment/ Presentation/Mini Project
7.	Solving Problems by Searching	16+17+18	
	<ul style="list-style-type: none"> <li>• Uninformed Search Strategies <ul style="list-style-type: none"> <li>- Breadth-first search</li> <li>- Uniform-cost search</li> <li>- Depth-first search</li> </ul> </li> <li>• Informed (Heuristic) Search Strategies <ul style="list-style-type: none"> <li>- Greedy best-first search</li> <li>- A* search : Minimizing the total estimated solution cost</li> <li>- Memory-bounded heuristic search</li> </ul> </li> </ul>		Quiz/Assignment
8	• Revision	19	