



Al-AI Bayt University  
Prince Hussein bin Abdullah Faculty of Information Technology  
Computer Science Department

### Course Syllabus

<b>Course Title</b>	Expert Systems & Artificial Intelligence	<b>Course Code</b>	0901470
<b>Coordinator</b>	Dr. Mohammad El-Bashir	<b>Prerequisite(s)</b>	0901340
<b>E-mail</b>	mohdelb@aabu.edu.jo	<b>Credit Hours</b>	3
<b>Course Is</b>	<input checked="" type="checkbox"/> <b>Required</b> <input type="checkbox"/> <b>Elective</b>		

#### Course Description:

Artificial Intelligent (AI) focus on developing machine that can think. AI can be defined as a branch of computer science that is concerned in the automation of intelligent behavior. By Intelligent we mean that do the right thing given a set of inputs and a variety of actions. The AI fields begin formally in 1956. The hope at that time is to build a machine that can think like human in all aspects. However, until now that hope is not successful due to the lack of understanding of the human brain. In another point of view, we do have many successful AI applications that make computers even more intelligent than us. One example is the Deep Blue system which defeated the world chess champion.

The main research topics in AI include: problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, and machine learning, and so on. Of course, these topics are closely related with each other. For example, the knowledge acquired through learning can be used both for problem solving and for reasoning. In fact, the skill for problem solving itself should be acquired through learning. Also, methods for problem solving are useful both for reasoning and planning. Further, both natural language understanding and computer vision can be solved using methods developed in the field of pattern recognition.

In this course, we will study the most fundamental knowledge for understanding AI. We will introduce some basic search algorithms for problem solving; knowledge representation and reasoning; Genetic Programming; and neural networks as well as machine learning.

#### Course Learning Outcomes (CLO):

Understanding the foundations of Artificial Intelligence, this includes:

- Representing a problem as a search solving problem.
- Searching a space of answers for a solution to a problem in practical time.
- Representing problems in terms of logic and deduction.
- Representing intelligent behavior in terms of agent.
- Automated creation of complex plans in complex and unknown environments.
- Logical representations of uncertainty, and rational decision making in uncertain environments.
- Automated creation of new knowledge from examples and previous knowledge.

<b>Tentative Topics Covered</b>	
Week No	Topic
1	<b>Introduction and History of AI</b> a) What is AI b) A brief history c) The state of the art
2	<b>Intelligent Agents</b> a) Agents and environments b) Rationality
3	c) PEAS (Performance measure, Environment, Actuators, Sensors)
4	d) Environment types
5	e) Agent types
6	<b>Problem Solving and Search</b> a) Problem-solving agents b) Problem types
7	a) Problem formulation b) Example problems
8	c) Basic search algorithms
9	<b>Informed search algorithms</b> a) Best- First search b) A* search
10	a) Heuristics <b>Local search algorithms</b> a) Hill-climbing
11	a) Simulated annealing b) Local search in continuous spaces (very briefly)
12	a) Genetic algorithms (briefly) <b>Game playing</b> a) Games
13	b) Perfect play - minimax decisions - $\alpha$ - $\beta$ pruning c) Resource limits and approximate evaluation d) Games of chance Games of imperfect information
14	<b>Expert System</b> a) What Is an Expert System? b) Advantages of Expert Systems.
15	a) General Concepts of Expert Systems b) Characteristics of an Expert System. c) The Development of Expert Systems Technology.
16	a) Expert Systems Applications and Domains, Languages, Shells, and Tools. b) Elements of an Expert System, Production Systems.

<b>Textbook(s)</b>	
<b>Title</b>	<i>Artificial Intelligence: A Modern Approach</i>

Author(s)	<b><i>Stuart Russell and Peter Norvig</i></b>	Publisher	<b><i>Pearson</i></b>
Edition	<b><i>Third edition</i></b>	Year	2009

<b>References</b>	
Book Titles (Author(s), Title, Edition, Publisher, Year)	Website URL ( if available )

<b>Evaluation</b>	
Assessment Tool	Marks
- First Exam	20
- Second Exam	20
- Assignments (Reports, Quiz, Seminar, Tutorial, etc.) - Discipline, presence and participation	10
- Lab	
- Final Examination	50