الجامعـــــــــة الهاشـــميـــــــــة
كلية الاميـر الحسين بـــــن عبدالله الثاني لتكنولوجيا المعلـــومات

The Hashemite University
Prince Al-Hussein Bin Abdullah II Faculty for Information Technology
Department of Computer Science and Application
Course Syllabus
Second Semester 2018/2019

Course Title: Artificial Intelligence **Course Number:** 151001460 **Prerequisite:** Data Structure (111001250).	**Assessment and Course Grade:** • First Exam 20% • Second Exam 20% • Prolog exam/ Quizzes 20% • Final Exam 40%
Instructors: Dr. Ebaa Fayyoumi **Office NO**: IT 325 **Contact Info**: enfayyoumi@hu.edu.jo	
Lectures: Section 1: Sun., Tues., and Thurs.9:00-10:00 303IT Section 2: Mon., Wednesday 9:30-11:00 302 IT **Office Hours**: Sun., Tues, and Thur. (10:00-11:00) and Mon. and Wed. (8:30-9:300)	

Course Description

This course is designed to give a solid understanding of great collection of problems and methodologies studied by artificial intelligence researchers. This course focuses on teaching general knowledge representation techniques and problem solving strategies such as search space, rule-based system, logic programming, prepositional logic, first order logic and fact representation in logic. In addition to discuss some important application areas in AI such as machine learning, expert system, reasoning, neural network, semantic web and natural language processing.

Textbook

George Luger, Artificial Intelligence structure and strategies for complex problem solving, 6th edition, Addison Wesley, 2009.

Additional Reading

1. Stuart Russell and Peter Norvig, Artificial Intelligence A Modern Approach, 3rd edition, Prentice Hall, 2009.
2. Elain Rich and Kevin knigh, Artificial Intelligence, 2nd edition, McGraw-Hill, 2004.
3. Ulle Endriss, Lecture Notes, An Introduction to Prolog Programming, University of Amsterdam, 2007.
4. Winston, Patrick H. *Artificial Intelligence*. 3rd ed. Reading, MA: Addison-Wellsley, 1992.
5. Gerhard Weiss, Multi-agent Systems: A Modern Approach to Distributed Artificial Intelligence, New edition, The MIT Press, 2000.

Course Objectives

- Give a solid understanding of great collection of problems and methodologies studied by artificial intelligence researchers.
- Give the basic notions of AI, in particular search and knowledge representation.
- Develop new games by applying a suitable search technique and heuristic function.
- Use automated reasoning to get a program to deduce new facts and prove new things.
- Build machine learning to induce hypotheses from data and make new novel discoveries.
- Apply evolutionary approaches to evolve programs for intelligent tasks by breeding them using crossover and mutation.
- Build a classification system by implementing a neural network, Identification tree, or Byes classifier.

Course Plan

Week no.	Topic	Chapters
1	Introduction: What is AI? The Turing Test, Overview of AI application Areas, and Characteristics of AI Programs.	1
2 and 3	The Predicate Calculus: Propositional Calculus, Predicate Calculus, Inference Rules, unification, and Resolution Theorem Proving.	2, 14
4	Prolog: Fundamental of Logic Programming, and Structure of Prolog descriptive programming Language. Presenting Facts and Rules, Recursive Rules, and List in Prolog.	1,2,3 in Endriss book
5 and 6	Structure and Strategies for State Space Search: Graph Theory, Structure Search Space, The Finite State Machine, Data Drive Approach and Goal Driven Approach, Strategies for State Space Search (Backtracking, Depth and Breadth Algorithm) and Using the State Space to Represent Reasoning with the Predicate Calculus.	3
First Exam		
7 and 8	Heuristic Search: The Best First Search Algorithm, hill climbing and dynamic Programming, Admissibility, Monotonicity and Informedness and Using Heuristics in Games (Min-Max and Alpha-Beta Procedure).	4
9	Stochastic Methods: Elements of Counting, Element of Probability Theory, Application of Stochastic Methodology, Bayes' Theorem.	5
10	Control and Implementation of State Space Search: Production Systems.	6
11	Knowledge Representation: Issues in Knowledge Representation, AI Representational Schemes, Conceptual Graphs, Explicit Representation and Production Systems.	7
Second Exam		
12	Strong Methods Problem Solving: Expert Systems, and Model-Based, Case-Based and Hybrid Systems, Planning.	10
13 and 14	Advance Topics: Identification Tree, Neural Network, Machine Learning	11 Ch.21 In Winston book
15	Newly Published Paper in Artificial IntelligencePpresentations	
Final Exam		