The Hashemite University

الجامعـــــة الهاشميـــــة

Deanship of Academic Development and International Outreach

عمادة التطوير الأكاديمي والتواصل الدولي

Syllabus*: Artificial Intelligence and Code (151001460)
Second Semester 2022 /2021.

COURSE INFORMATION	
Course Name: Artificial Intelligence **Semester:** Second **Department:** Department of Computer Science **Faculty:** Faculty of Prince Al-Hussein bin Abdullah II of Information Technology	**Course Code:** 151001460 **Section:** 1 **Core Curriculum**: Mandatory
Day(s) and Time(s): Sunday, Tuesday and Thursday 11:00-12:00 **Classroom:** IT 201	**Credit Hours:** 3 **Prerequisites**: Data Structure 111001250

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.

DELIVERY METHODS

The course will be delivered through an active classroom based discussion using Power point slides, Videos, and group discussion for Prolog Programming Language
The whole material is uploaded on Moodle and the quizzes are held inside the class room using Moodle.
NOTE!!! If there is any cancellation on formal announced schedule the lecture will be given Online through Microsoft teams.

FACULTY INFORMATION

Name	**Ebaa Fayyoumi**
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Office Hours:	**Sunday, Tuesday and Thursday** 12:00-13:00

	Please send an e-mail (enfayyoumi@hu.edu.jo) to meet at any other time. *The Microsoft teams is active for all my classes. They may chat me and call me at any time we previously agree about it.*

REFERENCES AND LEARNING RESOURCES

Required 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.

STUDENT LEARNING OUTCOMES MATRIX*

Core Curriculum Learning Outcomes	Program Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
	CS SLOs SLO#1 Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. SLO#2 Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the	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. Use automated reasoning to get a program to	SLO#1 and SLO#4 SLO#2 SLO#2	Quiz and Exam Quiz and Exam

	content of the programs discipline. SLO#3 Communicate effectively in a variety of professional contexts. SLO#4 Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. SLO#5 Function effectively as a member or leader of a team engaged in activities appropriate to the programs discipline. SLO#6 Apply computer science theory and software development fundamentals to produce computing-based solutions [CS].	deduce new facts and prove new things. Understand 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. Build a classification system by implementing a neural network, Identification tree, or Byes classifier	SLO#1 and SLO#2 SLO#2 SLO#2 and SLO#6 SLO#1 and SLO#2	Quiz and Exam Quiz and Exam Quiz and Exam Quiz and Exam Quiz and Exam

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.
Special Needs Section:
Tel:
Location:
Email:

COURSE REGULATIONS

Participation
Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance*. It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism
Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus

Assessment	Grade Weighting	Deadline Assessment
First Exam	20%	April 7th, 2022
Second Exam	20%	May 12th, 2022
Quizzes	20%	There are 4 quizzes
e.g. Final Exam (3)	40%	TBA

Description of Exams

Test questions will predominately come from material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of a combination of multiple choice, short answer, match, true and false and/or descriptive questions.

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Chapter 1	**Artificial Intelligence: Its Roots and Scope (Luger Book)**	**Week 1/2**	**4 lecture hours**
1.1 Attitudes toward Intelligence, knowledge, and Human Artifice.			
1.2 Turing Test			
1.3 Overview of AI Application Areas			
1.4 Characteristics of AI Programs			
Chapter 2	**The Predicate Calculus (Luger Book)**	**Week 2/3/4**	**7 lecture hours**
2. 1 The propositional Calculus			
2. 2 The predicate Calculus			
2. 3 Using Inference Rules to Produce Predicate Calculus Expression			
2.4 Unification			
2. 5 Application: A Logic-Based Financial Advisor			
Chapter 14	**Automated Reasoning (Luger Book)**	**Week 4/5**	**2 lecture hours**
14.1 Normal Forms			
14.2 Resolution Theorem Proving			
Chapter 1, 2 and 3	**Prolog (Endriss Book)**	**Week 5/6**	**4 Lecture hours**
1.1 Getting started: Example			
1.2 Prolog Syntax facts			
1.3 Simple Rules and Recursive rules			
1.4 Answering Queries			
1.5 Working with Numbers			
First Exam			
Chapter 3	**Structure and Strategies for State Space (Luger Book)**	**Week 7/8**	**6 lecture hours**
3. 1 Introduction			
3. 2 Graph Theory			
3. 3 The Finite State Machine			
3. 4 Data Drive Approach and Goal Driven Approach			
3. 5 Strategies for Search Space Backtracking , Depth and Breadth Algorithm			

3. 6	**Using the State Space to Represent Reasoning with predicate Calculus**		
Chapter 4	**Heuristic Search (Luger Book)**	**Week 9-10**	**5 lecture hours**
4. 1	**Why Heuristic?**		
4. 2	**The Best First Search**		
4. 3	**Admissibility, Monotonicity and Informedness**		
4. 4	**Using Heuristic in Games**		
4. 5	**Min-Max and Alpha-Beta Searches**		
Chapter 6	**Control and Implementation of S.S.S. (Luger Book)**	**Week 10/11**	**2 lecture hours**
6.2	**Production System**		
Chapter21	**Advance Topic: Identification Tree (Winston Book)**	**Week 11**	**2 lecture hours**
21. 1	**Introduction**		
21. 2	**Minimize Disorder**		
21. 3	**Information Theory Supplies a Disorder Formula**		
21. 4	**From Trees to Rules**		
Chapter 8	**Strong Method Problem Solving (Luger Book)**	**Week 12**	**2 lecture hours**
8. 1	**Introduction**		
8. 2	**Expert Systems Technology**		
8.3	**Rule-Based Expert Systems**		
Second Exam			
Chapter 5	**Stochastic Methods (Luger Book)**	**Week 13/14**	**4 lecture hours**
5.1	**Elements of Counting**		
5.2	**Elements of Probability Theory**		
5. 3	**Application of Stochastic Methodology**		
5. 4	**Bayes' Theorem**		
Chapter			
Chapter 11	**Neural Networks (Luger Book)**	**Week 14**	**2 lecture hours**
11.1	**Introduction**		
11.2	**Foundation of Connectionist Network**		
11.3	**Perceptron Learning**		
Review		***Week 15***	
Final Exam			