# The Hashemite University الجامعة الهاشمية الجامعة الهاشمية المحامعة الهاشمية 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 Intellig	gence	e <b>Course Code:</b> 151001460	
Semester: Second		Section: 1	
Department: Department of Computer Science		Core Curriculum: Mandatory	
Faculty: Faculty of Prince Al-H	ussein bin Abdullah		
II of Information Technology			
Day(s) and Time(s):Sunday, Tuesday andCredit Hours:3		Credit Hours: 3	
Thursday	У	Prerequisites: Data Structure 111001250	
11:00-12	:00		
Classroom: IT 201			
	COURSE DES	SCRIPTION	
This course is designed to give a	a solid understanding	of great collection of problems and methodologies	
studied by artificial intelligence	ce researchers. This	course focuses on teaching general knowledge	
representation techniques and pr	oblem solving strateg	gies such as search space, rule-based system, logic	
programming, prepositional logic	c, first order logic and	I fact representation in logic. In addition to discuss	
some important application areas	in AI such as machine	e learning, expert system, reasoning, neural network	
semantic web and natural language	ge processing.		
	DELIVERY N	METHODS	
The course will be delivered throug	h an active classroom ba	ased discussion using Power point slides, Videos,	
and group discussion for Prolog Pro	gramming Language		
The whole material is uploaded on I	Moodle and the quizzes	are held inside the class room using Moodle.	
NOTE!!! If there is any cancellation	n on formal announced s	chedule the lecture will be given Online through	
Microsoft teams.			
	FACULI I INF	OKMATION	
Name	Ebaa Fayyoumi		
Academic Title:	Associate Professor		
Office Location:	IT 325		
<b>Telephone Number:</b>	+962 5 390 3333 ex. 309		
Email Address:	enfayyoumi@hu.edu.jo		
Office Hours:	Sunday, Tuesda	<b>y and Thursday</b> 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.

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.	Give a solid understanding of great collection of problems and methodologies studied by artificial intelligence researchers.	SLO#1 and SLO#4	Quiz and Exam	
	SLO#2 Design, implement, and evaluate a computing-based solution to meet a given set of	Give the basic notions of AI, in particular search and knowledge representation. Use automated	SLO#2	Quiz and Exam	
	requirements in the	program to	SLO#2		

# **STUDENT LEARNING OUTCOMES MATRIX\***

content of the programs discipline.	deduce new facts and prove new things.		Quiz and Exam
SLO#3 Communicate effectively in a variety of professional contexts.	Understand games by applying a suitable search technique and heuristic function.	SLO#1 and SLO#2	Quiz and Exam
SLO#4 Recognize professional responsibilities and make informed iudgments in	Use automated reasoning to get a program to deduce new facts and prove new things.	SLO#2	Quiz and Exam
computing practice based on legal and ethical principles. SLO#5 Function effectively as a member or leader	Build machine learning to induce hypotheses from data and make new novel discoveries. Build a	SLO#2 and SLO#6	Quiz and Exam
of a team engaged in activities appropriate to the programs discipline. SLO#6 Apply computer	classification system by implementing a neural network, Identification tree, or Byes classifier	SLO#1 and SLO#2	Quiz and Exam
science theory and software development fundamentals to produce computing- based solutions [CS].			

## 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 <u>should</u> <u>not miss more than 15%</u> 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.

#### <u>The instructor has the right to fail the coursework or deduct marks where plagiarism is</u> <u>detected</u>

#### 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 7 <sup>th</sup> , 2022
Second Exam	20%	May 12 <sup>th</sup> , 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
А		3.75
A-		3.50
B+	Very Good	3.25
В		3.00
B-		2.75
C+	Good	2.50
С		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
Ι	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				
<u>Chapter 2</u> <u>The Predicate Calculus</u> (Luger Book)	Week 2/3/4	<u>7 lecture hours</u>		
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 3Prolog (Endriss Book)Week 5/64 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				
<u>Chapter 3</u> <u>Structure and Strategies for State Space (Luger Book)</u>	Week 7/8	<u>6 lecture hours</u>		
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					
<b>Chapter</b>	r 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				
<b>Chapter</b>	r 6 <u>Control and Implementation of S.S.S. (Luger Book)</u>	Week 10/11	2 lecture hours		
6.2	Production System				
<u>Chapter</u>	r21 Advance Topic: Identification Tree (Winston Book)	<u>Week 11</u>	<u>2 lecture hours</u>		
21.1	Introduction				
21. 2	Minimize Disorder				
21.3	Information Theory Supplies a Disorder Formula				
21.4	From Trees to Rules				
<u>Chapter</u>	r 8 <u>Strong Method Problem Solving (Luger Book)</u>	Week 12	2 lecture hours		
8.1	Introduction				
8.2	Expert Systems Technology				
8.3	Rule-Based Expert Systems				
	Second Exam				
<b>Chapter</b>	r 5 <u>Stochastic Methods (Luger Book)</u>	Week 13/14	4 lecture hours		
5.1	Elements of Counting				
5.2	5.2 Elements of Probability Theory				
5.3 Application of Stochastic Methodology					
5.4 Bayes' Theorem					
Chapte	r				
<b>Chapter</b>	r 11 Neural Networks (Luger Book)	Week 14	2 lecture hours		
11.1	Introduction				
11.2 Foundation of Connectionist Network					
11.3 Perceptron Learning					
<u>Review</u>		W <u>eek 15</u>			
Final Exam					