



Course Specifications

Course Title:	Intelligent Agents
Course Code:	CS462
Program:	Computer Science
Department:	Computer Science
College:	College of Computer and Information Sciences
Institution:	Majmaah University



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A. Course Identification

1. Credit hours: 3(3,1,0)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: Track
4. Pre-requisites for this course (if any): CS424
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	33
2	Laboratory/Studio	11
3	Tutorial	
4	Others (specify)	
	Total	44

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>One of the core abilities of an intelligent agent is to be able to solve problems. Search is a general-purpose technique for finding solutions to problems. However, these search spaces can be quite large and we need to be able to reduce the size of the search space in order to solve problems in a reasonable amount of time and space. We will be exploring several state-of-the-art techniques for reducing the size of these search spaces. A main theme in this field involves strategic agents where game theory is an important tool. We will be looking at the algorithmic and game-theoretic foundations of multi-agent systems in this course. Applications of multi-agent systems range from negotiation, cooperating robots, market and auction analysis, to security.</p>
<p>2. Course Main Objective</p> <p>The students will be able to:</p> <ol style="list-style-type: none"> 1. explain important challenges of MAS 2. phrase MAS scenarios using the language of game theory 3. understand current research papers in Heuristic Search 4. understand some of the tradeoffs involved in using current techniques to reduce the problem space sizes



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Understand what a multi-agent system (MAS) is and when they are useful	K1
1...		
2	Skills :	
2.1	Be able to apply some well-known distributed optimization algorithms	S4
2.2	Build simple agents and multi-agent systems using basic AI concepts	S2
2.3	identify or derive equilibria in normal form or extensive form games	S1
2...		
3	Values:	
3.1		
3...		

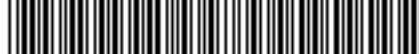
C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Multi-agent System	4
2	Distributed Optimization Problem	6
3	Agent Knowledge Representation, Reasoning, and Adaptability	4
4	Introduction to Game	5
5	Finding Equilibria in Game	5
6	Reinforcement Learning	5
7	Review of Search Techniques	5
8	Mobile Agents	5
9	Agent Applications	5
Total		44

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Understand what a multi-agent system (MAS) is and when they are useful	Classroom Teaching	Assignment, Quiz, Mid Exam, Final Exam
...			
2.0	Skills		
2.1	Be able to apply some well-known distributed optimization algorithms	Classroom Teaching	Quiz, Mid Exam, Final Exam
2.2	Build simple agents and multi-agent systems using basic AI concepts	Classroom Teaching	Assignment, Lab Exercises, Final Exam
2.3	identify or derive equilibria in normal form or extensive form games	Classroom Teaching	Quiz, Assignment Mid Exam, Final Exam



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.0	Values		
3.1			
3.2			
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	5,9	10%
2	Mid Term Exam	8	20%
3	Assignment	3, 6, 9	10%
4	Lab Based Exercises	Weekly	20%
5	Final Exam	11	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Each student is allotted to an academic advisor for guidance and counselling
- Available for a minimum of 4 hours per week/course, as communicated to the students.
- Student also contacts through social networking websites / D2L/ Email for advice and consultations

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	An Introduction to Multiagent Systems, Wooldridge, Wiley 2009. ISBN-13: 978-0470519462, ISBN-10: 9780470519462
Essential References Materials	Artificial Intelligence: a modern approach, Russel & Norvig, Prentice Hall 2015. ISBN-10: 9789332543515, ISBN-13: 978-9332543515
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom, PC Laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	PC or Laptop with Windows/Linux, Smart Board, Projector



Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Final Exam Answer Scripts Verification	Peer faculty members	Review
Course Learning Outcomes Feedback	Students	Survey
Final Exam evaluation	Students	Survey

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	CS Council
Reference No.	
Date	SEPT 2022