اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Advanced Artificial Intelligence
Course Code:	504PMAI-3
Program:	Professional Master of Artificial Intelligence
Department:	Computer Science
College:	Computer Science and information systems
Institution:	Najran University

Table of Contents

A. Course Identification

1. Credit hours:3

2. Course type

a.   University ☐   College ☐   Department √   Others ☐

b.   Required √   Elective ☐

3. Level/year at which this course is offered: 2ⁿᵈ level/ 1ˢᵗ year

4. Pre-requisites for this course (if any)**:**

5. Co-requisites for this course (if any)**: NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	50	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	20
3	Tutorial	
4	Others (specify)	
	Total	50

B. Course Objectives and Learning Outcomes

1. Course Description:

The course exposes students to advanced topics in Artificial Intelligence with a focus on constraint satisfaction problems, advanced search methods, meta-heuristics methods, advanced knowledge representation and reasoning, theorem proving, software agents, machine learning, planning, use of uncertainty in problem solving, and belief systems. The practical sessions will be devoted to the application of these concepts and methods using suitable AI programming language or software tools.

2. Course Main Objective

The main objective of this course is to provide an in-depth understanding of the advanced principles, techniques, and applications of Artificial Intelligence.

3. Course Learning Outcomes

CLOs	Aligned PLOs

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	describe the key concepts of artificial intelligence and their role in solving real problems;	K1
1.2	explain artificial intelligence techniques, including heuristics search , knowledge representation, automated planning and agent systems, machine learning, and probabilistic reasoning;	K2
1.3		
1...		
2	**Skills**	
2.1	apply AI techniques to a wide range of problems, including complex problem solving via search, knowledge-base systems, machine learning, probabilistic models, agent decision making, etc.	S1, S4
2.2	analyze the computational trade-offs involved in applying different AI techniques and models.	S2
2.3	develop appropriate AI solution for solving complex real-world problems	S2, S4
2.4		
2.5		
3	**Competences:**	
3.1	Communicate clearly and effectively using the technical language of the field	C2
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Problem Solving (Search)	3
2	Problem Solving (Search)	3
3	Problem Solving (Constraint Satisfaction Problem)	3
4	Knowledge, Reasoning, and Planning (First-Order Logic)	3
5	Knowledge, Reasoning, and Planning (Knowledge Representation)	3
6	Knowledge, Reasoning, and Planning (Automated Planning)	3
7	Uncertain Knowledge and Reasoning (Quantifying Uncertainty)	3
8	Uncertain Knowledge and Reasoning (Probabilistic Reasoning)	3
9	Uncertain Knowledge and Reasoning (Making Complex Decisions)	3
10	Uncertain Knowledge and Reasoning (Multi-agent Decision Making)	3
11	Machine Learning (Learning from Examples)	8
12	Machine Learning (Learning Probabilistic Models)	3
13	Machine Learning (Reinforcement Learning)	3
14	Communicating, Perceiving, and Acting (Natural Language Processing)	3
15	Communicating, Perceiving, and Acting (Computer Vision)	3
Total		50

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	Explain the key concepts of the artificial intelligence and its role in solving real problems;	• Giving Lectures in PPT, recalling the lecture through asking Questions. Clarifying doubts on Lecture. • Discussions of real life problems, among teacher, students	Quiz Midterm Examination Final Examination
1.2	describe artificial intelligence techniques, including search heuristics, knowledge representation, automated planning and agent systems, machine learning, and probabilistic reasoning;		
…			
2.0	**Skills**		
2.1	apply AI techniques to a wide range of problems, including complex problem solving via search, knowledge-base systems, machine learning, probabilistic models, agent decision making, etc.	• Giving Lectures in PPT, recalling the lecture through asking Questions. Clarifying doubts on Lecture. • Conducting a discussion of real life problems, among teacher, students • Cooperative learning among the students. • Encourage students to browse different journals, seminars or websites at their leisure time to have a better understanding about the course	Quiz Lab Assignments Midterm Examination Final Examination,
2.2	analyze the computational trade-offs involved in applying different AI techniques and models.		Quiz, Final Examination
2.3	develop appropriate AI solution for solving complex real-world problems		Quiz Midterm Examination Min-project Final Examination
2.4			
2.5			
3.0	**Competences**		
3.1	Communicate clearly and effectively using the technical language of the field		Mini Project presentation
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz1	3rd week	5%
2	Midterm	6th week	20%
3	Mini-Project	9th week	15%
5	Lab Assignments	2nd ,4th ,7th , 10th week	15%
6	Quiz2	10th week	5%
8	Final Exam	12th or 13th week	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 :

- Weekly office hours
- Pre-booked Appointments
- Additional office hours prior exams
- Weekly academic advising hours

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• *Stuart Russell and Peter Norvig, **Artificial Intelligence - A Modern Approach,** Fourth Edition, Prentice Hall 2020*
Essential References Materials	• Artificial Intelligence: Structures and Strategies for Complex Problem Solving, George F. Luger, Addison Wesley - Publisher, (6th Edition) 2016. • Nils J. Nilsson, Artificial Intelligence: A New. Synthesis. Morgan Kaufmann 1998
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Room B-59 Laboratory B-113L
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, PCs.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• Printer is important in the lab to print reports and some snapshots. • Projector and PC for the lab instructor is required

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Online course survey	Students	Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
course learning outcomes achievement survey	Students	Indirect
achievement of course learning outcomes	instructor	Direct

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	Computer Science Departmental Council
Reference No.	14440203-0185-00002
Date	1st Sep, 2022