Course Specification
(Bachelor)

Course Title:	Artificial Intelligence
Course Code:	423CCS-3
Program:	Bachelor of Science in Computer Science
Department:	Department of Computer Science
College:	Computer Science and Information Systems
Institution:	Najran University
Version:	2.0
Last Revision Date:	August 2022

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
3 (2, 2, 1) [Theory, Lab, Tutorial]					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 7 / Year 4)					
4. Course General Description:					
This course will introduce the basic concepts and techniques of Artificial Intelligence. It gives an overview of underlying ideas such as search, knowledge representation and reasoning, expert systems, learning, natural language processing, robotics, and uncertainty. To gain the experience of doing independent study and research.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Prepare the students with the basic concepts of Artificial Intelligence so that they can understand the underlying algorithms and develop the required skills to build Artificial Intelligence based software.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning		
3	Hybrid		

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Explain the difference between 'intelligence' and Artificial Intelligence', and the landmark achievements in the development of AI evolution.	K1	TS-1: Relate Course Learning Outcomes (CLOs) to the topics TS-2: Giving Lectures in PPT, recalling the lecture by asking Questions. Clarifying doubts on Lecture. TS-3: Conducting a discussion of real-life problems, among teachers, students	Quizzes, Midterm Exam, and Final Theory Exam
1.2	Describe Artificial Intelligence techniques in solving problems (i.e. expert systems, natural language	K1, K2, K3	TS-1: Relate Course Learning Outcomes (CLOs) to the topics TS-2: Giving Lectures in PPT, recalling the lecture	Midterm Exam, assignment, Lab assessment, Final Theory and Practical exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	processing, robotics, reasoning with uncertainty, game playing, prolong and computer vision)		by asking Questions. Clarifying doubts on Lecture. TS-3: Conducting a discussion of real-life problems, among teachers, students TS-4: Cooperative learning among the students. Encourage students to browse different journals.	
...				
2.0	**Skills**			
2.1	Apply different search techniques (i.e. Depth First Search, Breath First Search, Iterative deepening search, Uniform Cost search, heuristic function, greedy search, A* search and iterative deepening A* search) to solve problems.	S1, S3, S4, S5	TS-1: Conducting a discussion of real-life problems, among teachers, students TS-2: Cooperative learning among the students. Encourage students to browse different journals, seminars or websites in their leisure time to have a better understanding of the course	Quizzes, and Final Theory Exam
2.2	Use knowledge representation techniques to represent the knowledge in different domains.	S2, S4, S5	TS-1: Relate Course Learning Outcomes (CLOs) to the topics TS-2: Giving Lectures in PPT, recalling the lecture by asking Questions. Clarifying doubts on Lecture. TS-3: Conducting a discussion of real-life problems, among teachers and students.	Final Theory and Practical exam
2.3	Apply Artificial Intelligent techniques	S5	TS-4: Cooperative learning among the students.	Final Theory and Practical exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	in solving problems (Expert Systems, Natural Language Processing, Robotics).		Encourage students to browse different journals, seminars or websites in their leisure time to have a better understanding of the course.	
3.0	**Values, autonomy, and responsibility**			
3.1	Implement the learning of this course in terms of a course project based on AI techniques.	V1, V2	TS-1: Giving Lectures in PPT, recalling the lecture by asking Questions. Clarifying doubts on Lecture. TS-2: Conducting a discussion of real-life problems, among teachers, students	Midterm Exam, Lab assessment, Final Theory and Practical exam

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Artificial Intelligence: (Definitions, Goals, approaches, Applications and History), Intelligent Agents; the Turing test, specify PEAS.	10
2.	Searching Techniques: Uninformed search algorithms (breadth first and depth first with related strategies; branch-and-bound and optimal path; memory-bounded search strategies), Heuristic search (Greedy search, A*-search, and hill climbing).	10
3.	Knowledge Representation: Predicate and propositional logic, resolution and deductive proof techniques (e. g. generalized modus ponens) Reasoning with uncertainty.	10
4.	Planning: Planning operators/languages, planning algorithms including (partial-order planning, re-planning, and conditional planning).	10
5.	Reasoning with uncertainty, decision: Introduction to probability, Bayes Rule, Belief Networks and inference with them; basic concepts of decision theory and decision making (decision tree and decision network).	10

6.	Learning: General concepts of learning with introduction to PAC theory. Decision trees and decision lists, hypothesis space learning, and perceptions.	10
7.	Agent interaction: Basic concepts of agent communication and coordination, including adversarial search and game theory.	5
8.	Constraint Satisfaction Problems: Game playing, machine learning, natural language processing, expert Systems, vision and Robotics.	5
9.	Introduction to Prolog: Presentation of prolog (the program and query) and the facts (simple facts, facts with arguments and how to query).	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	TBD	10
2.	Mid-Lab Exam	8th week	10
3.	Assignment	5th week	10
4.	Mid-term Exam	6th week	20
5.	Final Lab	10th week	10
6.	Final TH Exam	12th or 13th week	40

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1. Stuart Russell, Peter Norvig. *Artificial Intelligence: A Modern Approach*, 4nd Edition, Prentice Hall: 2020, ISBN: 13: 978-0134610993 (US Edition)
Supportive References	1. George F. Luger. Artificial Intelligence – Structures and Strategies for Complex problem solving, 6th Edition, Pearson International Edition, 2009. 2. Ivan Bratko, Prolog Programming for Artificial Intelligence, 3rd Edition, Addison Wesley, 2012. ISBN- 13: 978-0321417466 3. Wolfgang Erfel. Introduction to Artificial Intelligence, 3rd edition, Springer: New York, 2019. ISBN 978-0-85729-298-8

Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms to accommodate 65 students per classroom with desks and chairs, labs to accommodate 25 students per lab with advanced computers.
Technology equipment (projector, smart board, software)	
Other equipment (depending on the nature of the specialty)	ACs for labs and classrooms, black curtains

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Collecting students' suggestions to facilitate more during the class.	Students	Verbal discussion
Student's questionnaire once during the semester about course learning outcomes.	Students	Indirect Survey
Achievement percentage of course learning outcomes, direct evaluation using CLO assessment sheet	Course Instructor	Direct evaluation using CLO achievement calculation
Teaching strategies	Quality unit	Indirect
Assessment methods	Quality unit	Indirect
Instructor performance	Quality unit	Indirect
Course content	Quality unit	Indirect

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Computer Science Departmental Council
REFERENCE NO.	14440203-0185-00002
DATE	1st Sep, 2022