COURSE DESCRIPTION

AI-2002 Artificial Intelligence (AI)

INSTITUTION: FAST School of Computing, National University of Computer and Emerging Sciences, Karachi

PROGRAM TO BE EVALUATED: BSCS/BCSCY/BSSE/BSAI (Batch 2023 and 2024)

COURSE DESCRIPTION

Course Code	AI2002
Course Title	Artificial Intelligence
Credit hours	3 + 0
Prerequisites	None
Grading Policy	Absolute Grading
Missed Assessments Policy	Retake of missed assessments will not be held except for final and sessional exams. For a missed sessional or final exam, an exam retake/pre-take application along with necessary evidence are required to be submitted to the concerned department. The examination assessment and retake committee will decide the exam re-take/ pre-take cases.
Plagiarism Policy	Plagiarism in any assessment will result in F grade in the course as per University Policy. Zero plagiarism tolerance policy.

Assessment Weightage

Theory

Assessment	% weightage
Final Exam	50
Sessional (1 and 2)	30 (15 each)
Quizzes	10 (Minimum: 03) To be designed by concerned teacher themselves Weightage of Quizzes will be 3, 3 and 4
Assignments	10 (Minimum: 03) Will be common for all sections Weightage of Assignment will be 3, 3 and 4
Project	To be given in Lab

Course Instructors:

Batch 2024

Dr. Shakil, Dr Farrukh Salim, Ms. Anaum Hamid, Mr. Farooq Zaidi, Ms. Abeeha Sattar

Batch 2023

Mr. Usama Antuley, Dr. Fahad Sherwani, Mr. Syed Faisal Ali, Ms. Javeria Farooq, Ms. Alina Arshad, Ms Sandesh Kumar

Course Coordinator: Dr. Shakil Ahmed/ Mr. Usama Antuley

Current Catalog Description This course introduces students to the basic knowledge representation, problem-solving, and learning methods of artificial intelligence. Upon completion, students should be able to develop intelligent systems by assembling solutions to concrete computational problems; understand the role of knowledge representation, problem solving, and learning in intelligent-system engineering; and appreciate the role of problem solving, vision, and language in understanding human intelligence from a computational perspective.

Textbook: Stuart Russell and Peter Norvig, Artificial Intelligence. A Modern Approach, 4th Global Edition, Prentice Hall, Inc.

A. COURSE LEARNING OUTCOMES (CLOS)

Sno. CLO (cognitive level) (PLO mapping)

1. Summarize the notions of rational behavior and intelligent agents. (2) (2)
2. Express appreciation of the goals, subareas, achievements, and difficulties of AI. (2)(2)
3. Apply methods of blind as well as informed search on the problem related to the programs (3) (3)
4. Summarize concepts and approaches in knowledge representation, planning, learning, robotics, and other AI areas. (6) (2)
5. Program AI applications by implementing the concepts learnt in the course (3) (4)

B. Program Learning Outcomes		
For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non-existent.		
PLO 1	Computing Knowledge	Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems.
PLO 2	Problem Analysis	Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences
PLO 3	Design/Develop Solutions	Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PLO 4	Investigation & Experimentation	Conduct investigation of complex computing problems using research-based knowledge and research-based methods

PLO 5	Modern Tool Usage	Create, select, and apply appropriate techniques, resources and modern computing tools, including prediction and modelling for complex computing problems.
PLO 6	Society Responsibility	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to context of complex computing problems.
PLO 7	Environment and Sustainability	Understand and evaluate sustainability and impact of professional computing work in the solution of complex computing problems.
PLO 8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.
PLO 9	Individual and Team Work	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
PLO 10	Communication	Communicate effectively on complex computing activities with the computing community and with society at large
PLO 11	Project Management and Finance	Demonstrate knowledge and understanding of management principles and economic decision

		making and apply these to one's own work as a member or a team.
PLO 12	Lifelong Learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes.

C. MAPPING OF CLOs TO PLOs

(CLOs: Course Learning Outcomes, PLOs: Program Learning Outcomes)

		PLOs											
		1	2	3	4	5	6	7	8	9	10	11	12
	1		✔										
	2		✔										
	3			✔									
	4		✔										
	5				✔								

TOPICS TO BE COVERED

List of Topics	Week	Chapter #	Contact Hours	CLO(s)
What is AI, Foundations of Artificial Intelligence, ***History of Artificial Intelligence, State of the Art***, Risks and Benefits of AI Intelligent Agents: Agents and Environments, Good Behavior: The concept of Rationality	**1**	1.1-1.5 (1.3-1.4 may be *self study) 2.1-2.2	3	1
The Nature of Environments, The Structure of Agents. Solving Problems by Searching: Problem Solving agents, Example Problems, Search Algorithms	**2**	2.3-2.4 3.1-3.3	3	1,2,3
Uninformed Search Strategies, informed Search Strategies, Heuristics Functions Search in Complex Environments: Local Search and optimization problems, Local Search in Continuous Spaces	**3**	3.4-3.6 4.1-4.2	3	1,2,3
Constraint Satisfaction Problems: Defining CSPs, Constraint Propagation: Inferences in CSPs Backtracking Search for CSPs, **Quiz1/ Assignment 1** (1 Lecture)	**4**	5.1-5.2 5.3	3	
Local Search for CSPs Revision before Sessional 1. (1 Lecture)	**5**	5.4	3	2,3
Sessional 1 Exam	**6**			

**: Can be included in any assessment*