

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING - AI & ML

COURSE MODULE FOR THE SESSION 2024-2025 (EVEN SEM)

Course Syllabi with CO's

Faculty Name: Ms. Apoorva S M				Academic Year: 2025 - 2026			
Department: Computer Science and Engineering (AI and ML)							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BAD402	Artificial Intelligence	IPCC		3	-	2	40hrs Theory + 8-10 lab slots
Course Learning Objectives	This course will enable students to: CLO 1. Gain a historical perspective of AI and its foundations. CLO 2. Become familiar with basic principles of AI toward problem solving CLO 3. Get to know approaches of inference, perception, knowledge representation, and learning.						
Topics Covered as per Syllabus							RBT
Module-1 Introduction: What is AI? Foundations and History of AI Intelligent Agents: Agents and environment, Concept of Rationality, The nature of environment, The structure of agents.							L1,L2,L3
Module-2 Problem-solving: Problem-solving agents, Example problems, Searching for Solutions Uninformed Search Strategies: Breadth First search, Depth First Search, Iterative deepening depth first search;							L1,L2,L3
Module-3 Informed Search Strategies: Heuristic functions, Greedy best first search, A*search. Heuristic Functions Logical Agents: Knowledge-based agents, The Wumpus world, Logic, Propositional logic, Reasoning patterns in Propositional Logic.							L1,L2,L3
Module-4 First Order Logic: Representation Revisited, Syntax and Semantics of First Order logic, Using First Order logic. Inference in First Order Logic : Propositional Versus First Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution.							L1,L2,L3
Module-5 Uncertain Knowledge and Reasoning: Quantifying Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference using Full Joint Distributions, Independence, Baye's Rule and its use. Wumpus World Revisited Expert Systems: Representing and using domain knowledge, ES shells. Explanation, knowledge acquisition.							L1,L2,L3
Practical Component of IPCC <ol style="list-style-type: none"> 1. Implement and Demonstrate Depth First Search Algorithm on Water Jug Problem. 2. Implement and Demonstrate Best First Search Algorithm on Missionaries-Cannibals Problems using Python. 3. Implement A* Search algorithm. 4. Implement AO* Search algorithm. 5. Solve 8-Queens Problem with suitable assumptions. 6. Implementation of TSP using heuristic approach. 7. Implementation of the problem solving strategies: either using Forward Chaining or Backward Chaining 8. Implement resolution principle on FOPL related problems 9. Implement Tic-Tac-Toe game using Python 10. Build a bot which provides all the information related to text in search box. 11. Implement any Game and demonstrate the Game playing strategies. 							L1,L2,L3

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List of Text Books	
Suggested Learning Resources:	
Text Books:	
<ol style="list-style-type: none"> 1. Stuart J. Russell and Peter Norvig , Artificial Intelligence, 3rd Edition, Pearson,2015. 2. Elaine Rich, Kevin Knight, Artificial Intelligence, 3rd edition,Tata McGraw Hill,2013. 	
List of Reference Books	
<ol style="list-style-type: none"> 1. George F Luger, Artificial Intelligence Structure and strategies for complex, Pearson Education, 5th Edition, 2011 2. Nils J. Nilsson, Principles of Artificial Intelligence, Elsevier, 1980 3. Saroj Kaushik, Artificial Intelligence, Cengage learning, 2014 	
List of URLs, Text Books, Notes, Multimedia Content, etc	
<ol style="list-style-type: none"> 1. https://www.kdnuggets.com/2019/11/10-free-must-read-books-ai.html 2. https://www.udacity.com/course/knowledge-based-ai-cognitive-systems--ud409 3. https://nptel.ac.in/courses/106/105/106105077/ 	
Course Outcomes (CO's)	<p>At the end of the course, the student will be able to:</p> <p>CO1: Apply knowledge of agent architecture, searching and reasoning techniques for different applications.</p> <p>CO 2. Compare various Searching and Inferencing Techniques.</p> <p>CO 3. Develop knowledge base sentences using propositional logic and first order logic.</p> <p>CO 4. Describe the concepts of quantifying uncertainty.</p> <p>CO5: Use the concepts of Expert Systems to build applications.</p>
Assessment Details (both CIE and SEE)	
<p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>CIE for the theory component of the IPCC (maximum marks 50)</p> <ul style="list-style-type: none"> ● IPCC means practical portion integrated with the theory of the course. ● CIE marks for the theory component are 25 marks and that for the practical component is 25 marks. ● 25 marks for the theory component are split into 15 marks for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and 10 marks for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus. 	

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CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

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The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BAD402	TITLE: ARTIFICIAL INTELLIGENCE (AI)										
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	-	-	3	-	-	-	-	-	-	3
CO-2	3	2	-	-	3	-	-	-	-	-	-	3
CO-3	3	2	-	-	3	-	-	-	-	-	-	3
CO-4	3	2	-	-	3	-	-	-	-	-	-	3
CO-5	3	2	-	-	3	-	-	-	-	-	-	3

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	BAD402	TITLE: ARTIFICIAL INTELLIGENCE (AI)	
List of Course Outcomes	Program Specific Outcomes		
	PSO1	PSO2	
CO-1	-	3	
CO-2	-	3	
CO-3	-	3	
CO-4	-	3	
CO-5	-	3	