

Institute/Department	UNIVERSITY INSTITUTE OF ENGINEERING (UIE)	Program	Bachelor of Engineering (Computer Science and Engineering) (Hons.) (with Specialization in Internet of Things) (In association with IBM) (Lateral Entry)(CS217)
Master Subject Coordinator Name:	Ankur Sharma	Master Subject Coordinator E-Code:	E13693
Course Name	Artificial Intelligence	Course Code	20CSD-385

Lecture	Tutorial	Practical	Self Study	Credit	Subject Type
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Course Type	Course Category	Mode of Assessment	Mode of Delivery
Program Elective	Graded (GR)	Theory Examination (ET)	Theory (TH)

Mission of the Department	<p>M1: To provide relevant, rigorous and contemporary curriculum and aligned assessment system to ensure effective learning outcomes for engineering technologies.</p> <p>M2: To provide platform for industry engagement aimed at providing hands-on training on advanced technological and business skills to our students.</p> <p>M3: To provide opportunities for collaborative, interdisciplinary and cutting-edge research aimed at developing solutions to real life problems</p> <p>M4: To imbibe quest for innovation, continuous learning and zeal to pursue excellence through hard work and problem-solving approach</p> <p>M5: To foster skills of leadership, management, communication, team spirit and strong professional ethics in all academic and societal endeavours of our students</p>
Vision of the Department	To be recognized as a center of excellence for Computer Science & Engineering education and research, through effective teaching practices, hands-on training on cutting edge computing technologies and excellence in innovation, for creating globally aware competent professionals with strong work ethics whom would be proficient in implementing modern technology solutions and shall have entrepreneurial zeal to solve problems of organizations and society at large.

Program Educational Objectives(PEOs)	
PEO1	To be able to explore areas of research, technology application & innovation and make a positive impact in different types of institutional settings such as corporate entities, government bodies, NGOs, inter-government organizations, & start-ups.
PEO2	To be able to design, and implement technology and computing solutions to the organizational problems, effectively deploy knowledge of engineering principles, demonstrate critical thinking skills&make the intellectual connections between quantitative and qualitative tools, theories and context to solve the organizational problems
PEO3	To be able to work with, lead & engage big and small teams comprising diverse people in terms of gender, nationality, region, language, culture & beliefs. To understand stated and unstated differences of views, beliefs & customs in diverse & inter disciplinary team settings
PEO4	To be able to continuously learn and update one's knowledge, engage in lifelong learning habits and acquire latest knowledge to perform in current work settings
PEO5	To continuously strive for justice, ethics, equality, honesty, and integrity both in personal and professional pursuits. Able to understand and conduct in a way that is responsible and respectful.

Program Specific Outcomes(PSOs)	
PSO1	The graduate student shall be able to work with a strong cognizance in the area of sensors, IoT, data science, controllers and signal processing through the application of acquired knowledge and skills
PSO2	The graduate student shall be able to apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	The graduate student shall be able to design and develop IoT applications using the principles of IoT and knowledge of cloud architectures and data analytics.
PSO4	The graduate student shall be able to apply advanced techniques and tools of sensing and computation to solve multi-disciplinary challenges in industry and society.

Program OutComes(POs)	
PO1	Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations
PO4	Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
PO5	Modern Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7	Environment and Sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO9	Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long 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 Change.

Text Books					
Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Artificial Intelligence: A Modern Approach	Stuart Russell and Peter Norvig	2nd Edition	Prentice-Hall	2003
2	Artificial Intelligence	Elaine Riche, Kevin Knight and Shivashankar B. Nai	3rd Edition	TMH Educations Pvt. Ltd	2008

Reference Books					
Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Artificial Intelligence and Expert Systems	Dan W. Patterson	2nd	Prentice Hall of India	1990
2	The Quest for Artificial Intelligence	Nils J. Nilsson	2nd Edition	Cambridge University Press	2009

Course OutCome	
SrNo	OutCome
CO1	Understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents capable of problem formulation
CO2	Apply different uninformed search algorithms on well formulate problems along with stating valid conclusions that the evaluation supports.
CO3	Design and Analyse search algorithms on well formulated problems.
CO4	Evaluate the problem using Propositional and First order logic.
CO5	Create and Plan Expert System for implementation

Lecture Plan Preview-Theory

Unit No	LectureNo	ChapterName	Topic	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Numer (s)
1	1	Introduction to AI	History of Artificial Intelligence	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO1
1	2	Introduction to AI	The Foundations of Artificial Intelligence	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO1
1	3	Introduction to AI	The History of Artificial Intelligence	,T- Artificial Intelligence: A Mo,R- Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO1
1	4	Introduction to AI	Intelligent Agents	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex	PPT	CO1
1	5	Introduction to AI	Agents Environments	T- Artificial Intelligence: A Mo	PPT	CO1
1	6	Searching techniques	Solving Problems by Searching	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex	PPT	CO2
1	7	Searching techniques	Formulating Problems	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex	PPT	CO2
1	8	Searching techniques	Searching for Solutions	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO2
1	9	Searching techniques	Search Strategies	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO2
1	10	Searching techniques	Uniformed or Blind Search	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO3
1	11	Informed search	Best-First Search	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO3
1	12	Informed search	Production system characteristics	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-The Quest for Artificial Intel	PPT	CO1
1	13	Informed search	Generate and test, Hill climbing	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	Infographics, PPT	CO3
1	14	Informed search	A* search AO*	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	Infographics, PPT	CO3
1	15	Informed search	Constraint Satisfaction Search	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO3
2	16	FOPL & Knowledge representation	First-Order Logic, Syntax and Semantics	T- Artificial Intelligence: A Mo	PPT	CO4
2	17	FOPL & Knowledge representation	Functional and predicate expressions	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO4
2	18	FOPL & Knowledge representation	Inference in First-Order Logic	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO4
2	19	FOPL & Knowledge representation	Forward and Backward Chaining	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO4
2	20	FOPL & Knowledge representation	The resolution inference rule	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO4

2	21	Reasoning based Programming	Reasoning under uncertainty	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO2
2	22	Reasoning based Programming	Probabilistic Reasoning Systems	,T- Artificial Intelligence: A Mo,R- Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO2
2	23	Reasoning based Programming	Bayes' Logic probabilistic interferences	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO4
2	24	Reasoning based Programming	Sensing in uncertain worlds	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO2
2	25	Reasoning based Programming	Dampster Shafer theory	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO4
2	26	Knowledge representation	Knowledge representation issues	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO3
2	27	Knowledge representation	Weak slot filler	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO1
2	28	Knowledge representation	Constraint propagation	T- Artificial Intelligence: A Mo	PPT	CO1
2	29	Knowledge representation	Representing knowledge using inference/Deduction rules	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO2
2	30	Knowledge representation	rule based Inference Method	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO3
3	31	Game playing	Introduction to Game playing	,T-Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO2
3	32	Game playing	Min-Max Search	,T-Artificial Intelligence,R-Artificial Intelligence and Ex	PPT	CO2
3	33	Game playing	Alpha-Beta Pruning	,T-Artificial Intelligence,R-Artificial Intelligence and Ex	PPT	CO2
3	34	Game playing	Rationality, Zero Sum, and Other	,T-Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO3
3	35	Expert systems	Expert systems: - Introduction, basic concepts	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-The Quest for Artificial Intel	PPT	CO1
3	36	Expert systems	Structure of expert systems	,T-Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO5
3	37	Expert systems	Nonproduction System Architecture	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO5
3	38	Expert systems	problem areas addressed by expert systems	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex	PPT	CO3
3	39	Expert systems	Knowledge Acquisition and Validation	,T-Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO5
3	40	Expert systems	Knowledge System Building Tool	,T-Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	PPT	CO5
3	41	Application in IoT	AI application in IoT	R-The Quest for Artificial Intel	Case Study,PPT	CO5
3	42	Application in IoT	decision making	R-The Quest for Artificial Intel	PPT	CO5

3	43	Application in IoT	Predictive analysis	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-The Quest for Artificial Intel	PPT	CO5
3	44	Application in IoT	adaptive analytics	T- Artificial Intelligence: A Mo,T- Artificial Intelligence	PPT	CO5
3	45	Application in IoT	case study Smart city	,T- Artificial Intelligence: A Mo,T- Artificial Intelligence,R-Artificial Intelligence and Ex,R-The Quest for Artificial Intel	Case Study	CO5

Assessment Model			
Sr No	Assessment Name	Exam Name	Max Marks
1	20EU01	External Theory	60
2	20EU01	Assignment	10
3	20EU01	Attendance Marks	2
4	20EU01	Mid-Semester Test-1	20
5	20EU01	Quiz	4
6	20EU01	Surprise Test	12
7	20EU01	Mid-Semester Test-2	20

CO vs PO/PSO	PSO3	PSO4	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	2	2	3	3	2	1	1	2	1	1	2	1	2	1	3
CO2	3	3	2	3	2	3	3	2	2	2	2	1	1	2	3
CO3	2	3	1	3	3	2	3	1	2	1	1	1	1	2	3
CO4	1	3	1	2	3	2	1	2	2	2	2	2	2	1	3
CO5	3	3	3	2	3	2	3	2	1	2	2	3	3	3	3
Target	2.2	2.8	2	2.6	2.6	2	2.2	1.8	1.6	1.6	1.8	1.6	1.8	1.8	3

PSO2
3
3
3
2
1
2.4