Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**3rd / 6th**
Course Name	**Artificial Intelligence**	**Course Code:**	**CS307**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**50 Marks**		**End Term Exam:**	**50 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	1. Understand the concepts of AI and searching techniques. 2. To develop the logical skills of knowledge and its representational structure. 3. Understand the concepts of natural language processing. 4. Study the concepts related to machine learning.				

Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
CO2	Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving.
CO3	Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information.
CO4	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
Pedagogy	Interactive, discussion-bases, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 20 Marks Activity: 10 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Introduction to AI:** Application of AI, Problem, Problem Space and Searches: Problem Characteristics, Simple Problem Solving, Examples, Searching for Solution. **Uninformed Search Strategies:** Breadth- First Search, Depth-First Search, Depth Limited Search, and Iterative Deepening Search. **Informed Search Strategies:** BFS, A* Algorithms, RBFS, Hill-Climbing, Constraint Satisfaction Problem (CSP), Mean-End-Analysis. **Activity:** • Comparative analysis of DFS, BFS, DLS & IDS.	17	CO1

Unit 2	**Knowledge Representation Concept:** Representation and Mapping, Approaches to Knowledge Representation. **First Order Predicate Logic:** Representing Simple Facts in Logic, Computable Functions and Predicates, Rules of Interface, Resolution, Unification and Lifting, Forward and Backward Chaining. **Activity:** • Analysis of interface resolution rules.	13	CO2
Unit 3	**Natural Language Processing:** Introduction, Overview of Linguistics, Grammar and Languages, Parsing Techniques, Semantic Analysis and Representation Structure, Natural Language Generation, Natural Language Systems, Introduction to Learning and Expert System. **Activity:** • Comparative analysis of parsing techniques.	15	CO3
Unit 4	**Machine Learning:** Supervised and Unsupervised Learning, Decision Trees, Statistical Learning models, Learning with Complete Data: Naive Bayes Models, Learning with Hidden Data: EM algorithm, Reinforcement Learning. **Activity:** • Case study of machine learning algorithms.	15	CO4

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	2	2	1	1	1	3	1	2	2	1	1
CO2	1	2	1			1	2	2	2	2	3	1	2	2
CO3	2	1	1	2	1	2	1	1	2	2	2	2	2	2
CO4	1	2	2	1	1	1	1	1	1	2	1	1	1	1

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books

1. Artificial Intelligence, Elaine Rich and Kevin Knight, McGraw-Hill, 2nd Edition, 1991.
2. Artificial Intelligence- A Modern Approach, Stuart Russell, Peter Norvig, Pearson Education, 3rd Edition, 2009.

Reference Books

1. Artificial Intelligence: The Basics, Kevin Warwick, Rout-ledge,1st Edition,2006
2. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India.
3. NilsJ.Nilsson, "Principles of Artificial Intelligence", Narosa Publishing house.

Para Text

Unit 1:
- https://www.digimat.in/nptel/courses/video/106106126/L01.html

Unit 2:
- http://www.nitttrc.edu.in/nptel/courses/video/106106126/L02.html

Unit 3:
- https://archive.nptel.ac.in/courses/106/102/106102220/

Unit 4:
- https://archive.nptel.ac.in/courses/112/103/112103280/

Recapitulation & Examination Pattern		
Internal Continuous Assessment:		
Component	**Marks**	**Pattern**
Mid Semester	20	**Section A:** Contains **10** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **0.5 Marks.** **Section B:** Contains **07** descriptive questions out of which **05** questions are to be attempted. Each question carries **03 Marks**.
Activity/ Practical	10	Will be decieded by subject teacher
Class Test	05	Contains **05 descriptive questions.** Each question carries **01** Mark.
Online Test/ Objective Test	05	Contains **10 multiple choice questions.** Each question carries **0.5** Marks.
Assignment/ Presentation	05	Assignment to be made on topics and instruction given by subject teacher
Attendance	05	As per policy
Total Marks	**50**	

Course created by: Dr. Mohd Haleem

Signature:

Approved by: Prof. Mansaf Alam

Signature: