AMITY UNIVERSITY
UTTAR PRADESH

COURSE CURRICULUM

Course Name: ADVANCED ARTIFICIAL INTELLIGENCE
Course Level : Ph.D.
Course Type : PCC
Course Code: CSIT902
Credit Unit: 04

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
2	-	-	2	4

Course Objective:

The Objective of the course is to:

- To explain the basic principles, techniques, and applications of Artificial Intelligence.
- To apply the basic areas of artificial intelligence search, knowledge representation, learning and their applications in design.
- They should be able to design and implement key components of intelligent agents of moderate complexity in Java and/or Lisp or Prolog and evaluate their performance.

Pre-requisites:

Basic Knowledge of Computer Fundamental.

Student Learning Outcomes:

After the completion of course, the student will be able to:

- Explain the basic of artificial intelligence.
- Describe about knowledge representation, and learning.
- Analyze implementation of intelligent agents for a variety of tasks in analysis, design, and problem-solving.

- **Course Contents/Syllabus:**

	Weightage (%)
Module-I Introduction	**15**
AI and its importance, AI Problem, Application area. State space representation, problem-reduction representation, production system, production system characteristics, and types of production system.	
Module-II Heuristic Search Techniques	**25**
AI and search process, brute force search, depth-first search, breadth-first search, time and space complexities, heuristics search, hill climbing, best first search, A* algorithm and beam search. AI and game playing, plausible move generator, static evaluation move generator, game playing strategies, problems in game playing.	
Module III: Structured Knowledge and Logic	**20**
Associative networks, frame structures, conceptual dependencies and scripts. Prepositional logic: syntax and semantics, First Order Predicate Logic (FOPL): Syntax and semantics, conversion to clausal form, inference rules, unification, and the resolution principles.	
Module IV: Object Oriented Representation	**20**
Overview of object oriented systems, object classes, messages and methods. Rule-based knowledge representation- procedural and declarative knowledge, forward and backward reasoning, matching, control knowledge.	
Module V: Expert System	**20**
Type of learning, Knowledge Acquisition, Early work in machine learning, learning by induction. Introduction to expert system, Phases of expert system, characteristics of expert system and a case study. Introduction to Neural Network, Fuzzy Logic, Robotics, LISP and Prolog.	

- **Pedagogy for Course Delivery:**
  The class will be held with the help of lectures. In addition to assigning the case studies, the course instructor will spend considerable time in understanding the concepts.

- **Assessment/ Examination Scheme:**

Theory L/T (%)	Lab/Practical/Studio (%)	Total
50	50	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	Mid-Term Exam	Assignments	Self-Work	Attendance	
Weightage (%)	10	5	10	5	70

Self -Work Assessment (S/W)

Continuous Assessment/Internal Assessment			External Assessment	
Components (Drop down)	REVIEW OF LITERATURE & GAP ANALYSIS	SYNOPSIS	PRESENTATION	VIVA VOCE
Weightage (%)	15	15	35	35

Text Books/Reference Books:

Text:

- Artificial Intelligence – II Edition, Elaine Rich, Kevin Knight, TMH, 1991.

References:

- Foundations of Artificial Intelligence and Expert Systems, V S Janakiraman, K Sarukesi, P Gopalakrishan, Macmillan India Ltd, 2005.
- Introduction to AI and Expert System, Dan W. Patterson, PHI, 2003.

Journals:

- Artificial Intelligence Review, Springer
- Artificial Intelligence, Elsevier