AMITY UNIVERSITY
UTTAR PRADESH

**Course Title:** **Artificial Intelligence**
**Credit Units:** **05**
**Course Level:** **UG**
**Course Code:** **CSE401**

| L | T | P/S | SW/FW | TOTAL CREDIT UNITS |
|---|---|---|---|---|
| 3 | 1 | 2 | - | 5 |

**Course Objectives:**

To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content. Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi-disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

**Pre-requisites:** Basic Knowledge of Programming Language , Problem solving Technique

**Course Contents/Syllabus:**

| | **Weightage (%)** |
|---|---|
| **Module I : Problem solving and Scope of AI & Problem Solving** | **15** |
| Introduction to Artificial Intelligence. • Applications- Games, Theorem proving, Natural language processing, Vision and speech processing, Robotics, Expert systems. • AI techniques- search knowledge, Abstraction • State space search, Production systems • Search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis | |

| | |
|---|---|
| **Module II: Knowledge Representation** | **20** |
| • Knowledge Representation issues • first order predicate calculus • Horn Clauses • Resolution, Semantic • Nets, Frames • Partitioned Nets • Procedural Vs Declarative knowledge • Forward Vs Backward Reasoning. | |
| **Module III : Understanding Natural Languages** | **10** |
| • Introduction to NLP • Basics of Syntactic Processing, • Basics of Semantic Analysis • Basics of Parsing techniques • context free and transformational grammars • transition nets • augmented transition nets • Conceptual Dependency • Scripts • Basics of grammar free analyzers • Basics of sentence generation • Basics of translation. | |
| **Module IV : Expert System and Learning** | **30** |
| • Expert System: Need • Justification for expert systems • knowledge acquisition • Case studies: MYCIN, RI. • Learning: Concept of learning • learning automation • Genetic algorithm • Learning by inductions, neural nets. • Programming Language: Introduction to programming Language, LISP and PROLOG • Handling Uncertainties: Non-monotonic reasoning • Probabilistic reasoning • Use of certainty factors • Fuzzy logic | |
| **Module V: Introduction to Robotics** | **25** |
| • Robotics – Introduction , Architecture • Robot Kinematics: Position Analysis • Dynamic Analysis and Forces • Trajectory Planning • Sensors and vision system • Application of Robotics • Features of Robotics | |

**Student Learning Outcomes:**

1. Graduates will have an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
2. Graduates will have an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

3. Graduates will have an ability to analyze the local and global impact of computing on• individuals, organizations, and society Graduate will have an ability to use current techniques, skills, and tools necessary for• computing practice
4. Graduates will have an ability to apply design and development principles in the construction of software systems of varying complexity.

**Pedagogy for Course Delivery:**
The class will be taught using theory and case based method. In addition to assigning the case studies, the course instructor will spend considerable time in Understanding the concept of innovation through the eyes of the student. The instructor will cover the ways think innovatively liberally using thinking techniques

**Lab Manual:**
1 Programming Language: Introduction to programming Language, LISP and PROLOG Click To Delete
2 Arithmetic operations(add, sub, multiplication ,Division) implementation Click To Delete
3 Knowledge representation Click To Delete
4 Basic problem & puzzle solving Click To Delete
5 Heuristic Search and Linear search Click To Delete
6 Disease problem Click To Delete
7 Logic problems Click To Delete
8 Case studies – MYCIN , DENDRAL

**Assessment/ Examination Scheme:**

| Theory L/T (%) | Lab/Practical/Studio (%) | Total |
|---|---|---|
| 80 | 20 | 100% |

**Theory Assessment (L&T):**

| Continuous Assessment/Internal Assessment | | | | | End Term Examination |
|---|---|---|---|---|---|
| **Components (Drop down)** | **Attendance** | **Class Test** | **Assignment** | **Viva Voce** | |
| **Weightage (%)** | 5 | 10 | 8 | 7 | 70 |

## Lab Assessment

| Continuous Assessment/Internal Assessment | | | | | End Term Examination |
|---|---|---|---|---|---|
| **Components (Drop down)** | **Attendance** | **Lab Record** | **Performance** | **Viva** | |
| **Weightage (%)** | **5** | **10** | **10** | **5** | **70** |

## Text & References:

***Text:***


1 E. Rich and K. Knight, “Artificial intelligence”,
2 N.J. Nilsson, “Principles of AI”, Narosa Publ. House
3 John J. Craig, “Introduction to Robotics”, Addison Wesley publication
4 D.W. Patterson, “Introduction to AI and Expert Systems"