MSc Computer Science Syllabus First Year (2018-2023)
Elective : Artificial Intelligence

Semester I	Subject Code: MSE1805	Lectures: 60

Objectives:

The syllabus aims in equipping students with,
- Know various AI search algorithms,
- knowledge of reasoning in the presence of incomplete and/or uncertain information,
- Understand different AI applications.

Unit 1: Introduction	**10**
Ch 1. Introduction to Artificial Intelligence	**3**

    ➢ What is AI?
    ➢ Early work in AI.
    ➢ AI problems and Techniques.

Ch 2 .Problems, Problem Spaces and Search

    ➢ Defining AI problems as a State Space Search: example   **7**
    ➢ Introduction to AI Agents.
    ➢ Production Systems.
    ➢ Search and Control Strategies.
    ➢ Problem Characteristics.
    ➢ Issues in Design of Search Programs.
    ➢ Additional Problems.

BOS Members:

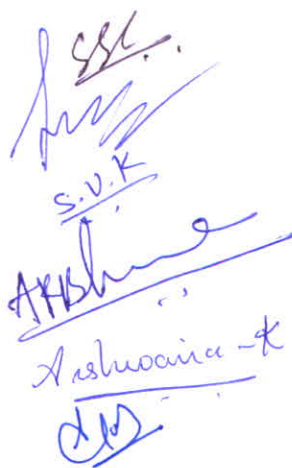Prof. Seema Chowhan (Subject Expert)

Prof. Lonare (Subject Expert)

Prof. Shilpa Khadilkar (Subject Expert)

Ms. Anuradha Bhamre (Industry Expert)

Ms. Aishwarya Kaliyiluvla(Alumni)

Prof. Ashwini Kulkarni
(Chairman and Internal Faculty)

Prof. Alka Kalhapure (Internal Faculty)

Unit 2: Heuristic Search Techniques and Knowledge Representation	20

Ch3. Heuristic Search Techniques
    ➤ Generate-and-test
    ➤ Hill Climbing
    ➤ Best First Search
    ➤ A* , AO* algorithms
    ➤ Problem Reduction
    ➤ Constraint Satisfaction
    ➤ Mean-Ends Analysis
	10

Ch 4. Knowledge Representation
    ➤ Representations and Mappings
    ➤ Approaches to Knowledge Representation
    ➤ Knowledge representation method
    ➤ Propositional Logic
    ➤ Predicate logic
    ➤ Representing Simple facts in Logic
    ➤ Representing Instances and Isa relationships
    ➤ Computable Functions and Predicates
    ➤ Resolution
    ➤ Forward and backward chaining
	10

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2

Unit 3: Slot – and – Filler Structures	8

Ch5. Slot – and – Filler Structures	4

Weak Structures
Semantic Networks
Frames
Strong Structures
Conceptual Dependencies
Scripts

Ch6. Game Playing

	4
➢ Minimax Search Procedures	
➢ Adding alpha-beta cutoffs	

- Baye's Uncertianty Reasoning: Basic Probabilty Axioms,
  Rule, Baysian Classification, Certainty Factor
➢ Theory, Dempster Shafar Theory.

Unit 4: Introduction to Learning	10

Ch 7. What is learning?

	4
➢ Rote Learning	
➢ Learning by taking advice	
➢ Learning in problem solving	
➢ Learning from examples	
➢ Supervised and unsupervised learning	
➢ Explanation based learning	

Ch.8   Applications of AI.
➢ Introduction to Expert Systems, Natural language processing,
  Neural networks .

	6

Activity : To implement the AI concepts using programming language PROLOG

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Reference Books:

1. Eberhart, Elsevier, *Computational Intelligence*. ISBN 9788131217832
2. Nilsson, Elsevier, *Artificial Intelligence: A New Synthesis* ISBN 9788181471901
3. Artificial Intelligence, Tata McGraw Hill, 2nd Edition, by
4. Elaine Rich and Kevin Knight , *Introduction to Artificial Intelligence and Expert System*, Prentice Hall of India Pvt. Ltd., New Delhi, 1997, 2nd Printing, by Dan Patterson.
5. Stuart Rusell and Peter Norvig, *Artificial Intelligence :A Modern Approach*

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