Syllabus

NR23 B.Tech CSE (AI&ML) Syllabus NRCM

KNOWLEDGE REPRESENTATION AND REASONING

B Tech III Year II Sem

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
23AM601	Professional Course	3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes:60		

Pre-requisites:

1. A course on "Computer Programming and Data Structures".
2. A course on "Advanced Data Structures".

Course Objectives: To learn

1. To investigate the key concepts of Knowledge Representation (KR) techniques and different notations.
2. To integrate the KR view as a knowledge engineering approach to model organizational knowledge.
3. To introduce the study of ontologies as a KR paradigm and applications of ontologies.
4. To understand various KR techniques and process, knowledge acquisition and sharing of ontology.

Course outcomes: The student will be able to

1. Analyze and design knowledge-based systems intended for computer implementation.
2. Acquire theoretical knowledge about principles for logic-based representation and reasoning.
3. Ability to understand knowledge-engineering process
4. Ability to implement production systems, frames, inheritance systems and approaches to handle uncertain or incomplete knowledge.

UNIT-I

The Key Concepts: Knowledge, Representation, Reasoning, Why knowledge representation and reasoning, Role of logic
Logic: Historical background, Representing knowledge in logic, Varieties of logic, Name, Type, Measures, Unity Amidst diversity.

UNIT -II

Ontology: Ontological categories, Philosophical background, Top-level categories, Describing physical entities, Defining abstractions, Sets, Collections, Types and Categories, Space and Time.

UNIT - Ill

Knowledge Representations: Knowledge Engineering, Representing structure in frames, Rules and data, Object-oriented systems, Natural language Semantics, Levels of representation.

UNIT- IV

Processes: Times, Events and Situations, Classification of processes, Procedures, Processes and Histories, Concurrent processes, Computation, Constraint satisfaction, Change Contexts: Syntax of contexts, Semantics of contexts, First-order reasoning in contexts, Modal reasoning in contexts, Encapsulating objects in contexts.

UNIT-V

Knowledge Soup: Vagueness, Uncertainty, Randomness and Ignorance, Limitations of logic, Fuzzy logic, Nonmonotonic Logic, Theories, Models and the world, Semiotics Knowledge Acquisition and Sharing: Sharing Ontologies, Conceptual schema, Accommodating multiple paradigms, Relating different knowledge representations, Language patterns, Tools for knowledge acquisition.

TEXT BOOKS:

1. Knowledge Representation logical, Philosophical, and Computational Foundations by John F.Sowa, Thomson Learning.
2. Knowledge Representation and Reasoning by Ronald J. Brachman, Hector J. Levesque, Elsevier.