21AID11	COMPUTATIONAL INTELLIGENCE	L	T	P	C
		3	0	0	3

Course Objectives:

- To provide a strong foundation on fundamental concepts in Computational Intelligence.
- To enable Problem-solving through various searching techniques.
- To apply these techniques in applications which involve perception, reasoning and learning.
- To apply Computational Intelligence techniques for information retrieval
- To apply Computational Intelligence techniques primarily for machine learning

UNIT I	INTRODUCTION	9 Hours

Introduction to Artificial Intelligence-Search-Heuristic Search-A* algorithm-Game Playing-Alpha-Beta Pruning-Expert systems-Inference-Rules-Forward Chaining and Backward Chaining-Genetic Algorithms.

UNIT II	KNOWLEDGE REPRESENTATION AND REASONING	9 Hours

Proposition Logic – First Order Predicate Logic – Unification – Forward Chaining -Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering – Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories – Reasoning with Default Information – Prolog Programming.

UNIT III	UNCERTAINTY	9 Hours

Non monotonic reasoning-Fuzzy Logic-Fuzzy rules-fuzzy inference-Temporal Logic-Temporal Reasoning-Neural Networks-Neuro-fuzzy Inference.

UNIT IV	LEARNING	9 Hours

Probability basics – Bayes Rule and its Applications – Bayesian Networks – Exact and Approximate Inference in Bayesian Networks – Hidden Markov Models – Forms of Learning – Supervised Learning – Learning Decision Trees – Regression and Classification with Linear Models – Artificial Neural Networks – Nonparametric Models – Support Vector Machines – Statistical Learning – Learning with Complete Data – Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning

UNIT V	INTELLIGENCE AND APPLICATIONS	9 Hours

Natural language processing-Morphological Analysis-Syntax analysis-Semantic Analysis-All applications – Language Models – Information Retrieval – Information Extraction – Machine Translation – Machine Learning – Symbol-Based – Machine Learning: Connectionist – Machine Learning.

UNIT VI	CASE STUDY	

Case Study on real time applications on Intelligence

TOTAL PERIODS: 45

Course Outcomes:

- Provide a basic exposition to the goals and methods of Computational Intelligence.
- Study of the design of intelligent computational techniques.
- Apply the Intelligent techniques for problem solving
- Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.

Text books:

1. Stuart Russell, Peter Norvig, ―Artificial Intelligence: A Modern Approach, Third Edition, Pearson Education / Prentice Hall of India, 2010.
2. Elaine Rich and Kevin Knight, ―Artificial Intelligence, Third Edition, Tata McGraw-Hill, 2010.

Reference Books:

1. Patrick H. Winston. "Artificial Intelligence", Third edition, Pearson Edition, 2006.
2. Dan W.Patterson, ―Introduction to Artificial Intelligence and Expert Systems, PHI, 2006.
3. Nils J. Nilsson, ―Artificial Intelligence: A new Synthesis, Harcourt Asia Pvt. Ltd., 2000