B.TECH. IV Semester-7	L	T	P	C
CS 701: Artificial Intelligence	3	0	2	4

Unit - 1	6 Hours
Introduction to AI: Foundation of AI, AI Applications, Agent & environment, Rationality, Types of Agents, AI Techniques, AI-Problem formulation Basics of problem- solving: Problem representation paradigms, Defining the Problems as a State Space Search, state space, satisfiability vs optimality, pattern classification problems, example domains.	
Unit - 2	**14 Hours**
Problem solving through search: Problem size, complexity, approximation and search, Measure of Performance and Analysis of Search Algorithms. Search techniques: uninformed search – DFS, BFS, Iterative deepening depth-first search; informed search – Heuristic Search Techniques, Best-first search(greedy), A*, IDA*, Local search, Hill Climbing & its variants, Simulated Annealing, Problem Reduction search: AND-OR graphs - AO* and game trees – Game playing, Adversarial Search, Minimax, Alpha-Beta pruning, Constraint Satisfaction problems, Means-Ends Analysis, knowledge based problem solving. Introduction to Neural Network.	
Unit - 3	**14 Hours**
Knowledge Representation & Acquisition: Knowledge representation as logic, Propositional logic, Predicate (First order) logic; Inference, rule based, frame and semantic network approaches, Knowledge Acquisition: Learn ability theory, approaches to learning. *Uncertainty*: Uncertainty Treatment: formal and empirical approaches including Bayesian theory, belief functions, certainty factors, and fuzzy sets. Detailed Discussion from Example Domains: Industry, Language, Medicine, Verification, Vision, Knowledge Based Systems.	
Unit - 4	**8 Hours**
Planning & Expert Systems: The Blocks World, Components of A Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Languages and Machines: AI languages and systems, special purpose architectures, expert systems: Architecture of Expert Systems, Roles of Expert Systems – Knowledge Acquisition – Meta Knowledge, Heuristics, Case studies (MYCIN, DART).	
Total Contact Time: 42 Hours	

Recommended Books

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall, Pearson Education
2. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, Morgan-Kaufmann.
3. Artificial Intelligence: Elaine Rich and Kevin Knight, Tata Mcgraw-Hill
4. E. Charniack and D. McDermott, Artificial Intelligence, Addison Wesley
5. Winston P.H., Artificial Intelligence, 3rd edition, Addison Wesley

Useful Links

1. AI on the Web
2. http://www.aaai.org

B.TECH. IV Semester-7	L	T	P	C
CS 703: Natural Language Processing	3	0	2	4

Unit - 1	14 Hours
Introduction: Human languages, Formal language and Natural Language, Finite state transducer, Introduction to corpus, elements in balanced corpus, Tree Bank, WordNet. *Morphology and N-Grams*: Inflectional morphology, Derivational morphology, Finite state morphological parsing, Morphology and Indian languages, Simple N-grams, Smoothing, Back off, Entropy.	
Unit - 2	**14 Hours**
Speech Tagging and Syntax: Stochastic POS tagging, HMM, Transformation based tagging (TBL), Handling of unknown words, named entities, Multi word expressions, Speech Processing: Speech and phonetics, Vocal organ, Phonological rules, Probabilistic models-Spelling error, Bayesian method to spelling, Minimum edit distance, Bayesian method of pronunciation variation, Viterbi algorithm, HMM and Speech recognition.	
Unit - 3	**8 Hours**
Semantic Parsing: Parsing- Unification, Statistical Parsing, Probabilistic parsing, Semantic Interpretation, word Sense System, Tree Bank.	
Unit - 4	**6 Hours**
Application and Case Studies: Application: Sentiment analysis, spelling correction, Word sense disambiguation, Machine translation, Text Classification, Question answering system.	
Total Contact Time: 42 Hours	

Recommended Books

1. Dan Jurafsky and James Martin, Speech and Language Processing, 2nd Edition, Prentice-Hall (2008)
2. Allen, James, Natural Language Understanding, Second Edition, Benjamin/Cummin
3. Charniack, Eugene, Statistical Language Learning, MIT Press,
4. Manning, Christopher and Heinrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press
5. C. D. and H. Schütze: Foundations of Statistical Natural Language Processing, The MIT Press
6. Radford, Andrew et. al., Linguistics, An Introduction, Cambridge University Press