

With effect from the academic year 2023-2024

Department of Mathematics
Osmania University, Hyderabad
M.Sc. Computer Science
 Course under Choice Based Credit System

SEMESTER – III

Paper	Code	Paper Title	Hp W	Marks	Credits
I	CS301T	Artificial Intelligence	4	30+70=100	4
II	CS302T	Compiler Design	4	30+70=100	4
III	Elective CS303T(A)	Network Security	4	30+70=100	4
	CS303T(B)	Block chain and Crypto Currency Technologies			
	CS303T(C)	Big Data Analytics			
IV	Elective CS304T(A)	Natural Language Processing	4	30+70=100	4
	CS304T(B)	Web Mining			
	CS304T(C)	DEVOPS			
V	CS305P	Artificial Intelligence Lab	4	50	2
VI	CS306P	Compiler Design Lab	4	50	2
Total			24	500	20

SEMESTER – IV

Paper	Code	Paper Title	HpW	Marks	Credits
I	CS401T	Cloud Computing	4	30+70=100	4
II	CS402T	Data Science with R	4	30+70=100	4
III	Elective CS403T(A)	Computer Organization	4	30+70=100	4
	CS403T(B)	Distributed Systems			
	CS403T(C)	Machine Learning			
IV	CS404P	Data Science with R Lab	4	50	2
IV	CS405P	Project Work	12	75 + 75= 150	6
Total			28	500	20

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M.Sc. Computer Science
Semester – III
Paper – I : Artificial Intelligence

CS 301T

Unit – I

Introduction to Artificial Intelligence: introduction, AI techniques, problem solving with AI, AI models, data acquisition and learning aspects in AI.

Problem Solving: problem-solving process, formulating problem, problem types and characteristics, problem analysis and representation, problem space and search, toy problems, real-world problems, problem reduction methods.

Uniformed Search: general search algorithm, uniformed search methods – BFS, uniform cost search, DFS, DLS, IS, bi-directional search, comparison of the uniformed techniques.

Unit – II

Informed Search: generate and test, best first search, greedy search, A* search, memory bounded heuristic search, heuristic function, AO* search, local search algorithms and optimization problems, adversarial search methods (game theory), online search algorithms.

What is an intelligent agent? Types of agent, what is constraint satisfaction problem (CSP), CSP as search problem, local search for CSP, formulating problem structure.

Knowledge and Reasoning: knowledge representation, knowledge-based agents, the wumpus world, logic, propositional logic, predicate logic, unification and lifting: inference in FOL, representing knowledge using rules, semantic networks, frame systems, inference, types of reasoning.

Unit – III

Uncertain Knowledge and Reasoning: uncertainty and methods, Bayesian probability and belief network, probabilistic reasoning, probabilistic reasoning over time, forward and backward reasoning, perception, making simple decisions, making complex decisions, other techniques in uncertainty and reasoning process.

Planning problem, simple planning agent, planning languages, blocks world, goal stack planning, means-ends analysis, planning as a state-space search.

Learning: what is machine learning? Learning paradigms, learning concepts, methods and models, statistical learning methods, artificial neural networks-based learning, support vector machines, reinforcement learning.

Unit – IV

Expert Systems: architecture of expert system, confidence factors, existing expert systems, knowledge acquisition, shell and explanations, self-explaining system, rule-based expert systems, forward and backward chaining, frame-based expert systems, uncertainty management in expert systems, expert system and DSS, pros and cons of expert systems, case study.

Pattern Recognition: machine perception and pattern recognition, feature extraction, classification, object recognition, speech recognition, pattern mining. Game Playing: important concepts of game theory, game playing and knowledge structure, game as search problem, alpha-beta pruning, game theory problems, robotics.

Concepts and terminology of ANN, feed-forward NN, feedback networks, pattern associative networks, Competitive learning, fuzzy sets, fuzzy inference process, neuro-fuzzy systems, range of AI applications, AI applications and examples, case study: agricultural domain – farmer's intelligent assistant.

Text Book: Parag kulkarni, Prachi Joshi, Artificial Intelligence: Building Intelligent Systems

References:

1. Nils J Nilsson, Artificial Intelligence: A New Synthesis
2. Kevin Knight, Elaine Rich, B Nair, Artificial Intelligence
3. Stuart Russell, Peter Norvig, Artificial Intelligence: A Modern Approach
4. Eugene Charniak, Drew McDermott, Introduction to Artificial Intelligence
5. Vinod Chandra SS, Anand Hareendran S. Artificial Intelligence and Machine Learning

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Paper – II : Compiler Design

CS 302T

Unit – I

Introduction: language processors, phases of a compiler, a model for a compiler front end, syntax-directed translation, parsing, a translator for simple expressions, Lexical Analysis: role of lexical analyzer, input buffering, specification of tokens, Lex lexical analyzer generator, data structures in compilation.

Top-Down Parsing: Introduction, Context free grammars, writing a grammar, recursive-descent parsing, LL(1) grammars, predictive parsing, preprocessing steps required for predictive parsing.

Unit – II

Bottom-Up Parsing: shift reduce parsing, SLR parsing, CLR parsing and LALR parsing, error recovery in parsing, handling ambiguous grammar, parser generator – YACC.

Semantic Analysis: syntax-directed definitions, evaluation order for SDD's, application of SDT.

Unit – III

-Code Generation: syntax trees, three-address code, types and declarations, translation of expressions, type checking. Runtime Environment: storage organization, stack allocation of space, heap management, storage allocation for arrays, strings and records, introduction to garbage collection and trace based collection,

Unit – IV

Code Generation: issues in the design of code generator, target language, addresses in the target code, blocks and flow graphs, optimization of blocks, peephole optimization, register allocation and assignment.

Code Optimization: principal sources of optimization, data flow analysis, constant propagation, partial redundancy elimination, loops in flow graphs.

Text Book : A. V. Aho, Monica S. Lam, Ravi Sethi, J. D. Ullman, Compilers Principles, Techniques, & Tools, (2e)

References

1. Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Modern Compiler Design
2. Kenneth C. Loudon, Compiler Construction Principles and Practice
3. Thomas w. Parsons, Introduction to Compiler Construction
4. Andrew N. Appel, Modern Compiler Implementation in C
5. John R. Levin, Tony Mason, Doug Brown, LEX & YACC
6. Cooper, Linda, Engineering a Compiler

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25/01/2024