INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

X SEMESTER

JANUARY – MAY 2013

Subject Code	Subject Name	Credits
IC-1001	Simulation and Modeling	4
IC-1002	Artificial Intelligence	4
IC-1003	Compiler Design	4
IC-1004	Parallel Processing	4
IC-1005	Enterprise computing Techniques	6
IC-1106	Comprehensive Viva	4

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

MCA (6 Years) X SEMESTER

IC-1001: Simulation & Modeling

Aim of Course:- The aim of the course is to provide basic concepts of organizational behavior and management decisions..

Objectives:

The course is designed to make students:

- Understand the complexities of real-life situations and to use different Simulated Models to forecast and suggest probable line of action to management to take proper decisions.
- Understand and prepare programs for complex Real Life Problems using available Simulation Software.
- Learn to prepare programs for different Managerial problems related to waiting-line situations and Inventory Analysis.

Course Contents:

UNIT I

Organisational behaviour and management. Product-Mix organizations. Role of Manager. Models Meaning and classifications. Principles of O.R. Models

UNIT II

Simulation: -Meaning scope and Limitations Advantages of Simulation. Models over classical techniques of O.R.

Random Number Generation. Computer based generation of Random Nos. C-program for Mid-Square and Mixed congruence Arithmetic method.

Monte-Carlow method of manual calculations using R. Nos. to handle. Problems related to Waiting Line, Inventory Control and Demand

UNIT III

System Analysis: -Meaning of a system, State of system, Entity, Attributes, Activities.

Examples. Types of Systems: -Discrete and continuous. Discrete -Event -Simulation. Time-Advance mechanism.

Next-Event Time Advance mechanism for single server Q-system, Numerical examples and manual calculations of Q (t) and B (t). Components and organization of discrete event simulation model using Next event time advance mechanism. Flow of control.

C-program :-Organization of Next-Event time advance simulation models. Framework for sound simulation study.

UNIT IV

Simulation Software: -comparison with general-purpose languages. Necessity of Simulation Software. Detailed study of GPSS languages with special reference to GPSS-V. Coding and Programming for simulation of Manufacturing systems, Super-Markets and Inventory Systems

UNIT V

Building Valid, Credible and appropriately detailed Simulation Models. Principles for valid Simulation Models. Techniques used for verification of Simulated Computer Program. Experimental Designs and sensitivity Analysis.

Reference Books:

1. Dr. S.D. Sharma, Text Book of Operations Research.
2. Law And Kelton , Simulation Modeling And Analysis.
3. Geoffrey Gordon , System Simulation.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) X SEMESTER
IC-1002: Artificial Intelligence

Aim of Course: To familiarize students with techniques of representing knowledge required to build intelligent machines capable of taking decision like human beings.

Objectives:

The course is designed to make students:

- To familiarize students with techniques of solving problems that need human intelligence.
- To enable students to formulate Artificial Intelligence problems
- To enable students to use heuristic techniques to solve the AI problem.

Course Contents:

UNIT I

Introduction to AI & Problem Solving in AI: What is AI, AI Techniques, Defining the problem in AI, Problem Spaces, Problem Characteristics, Production System and its Characteristics?

UNIT II

Heuristic Search Techniques: Heuristic Search, Criteria for Search, Various Search Techniques-Generate and Test, Depth-first Search, Breadth-first Search, Hill Climbing, Best-First Search, A* and AO* algorithm, Constraint Satisfaction, Means-Ends Analysis etc.

UNIT III

Knowledge Representation and Issues: Types of Knowledge, Representation and Mappings, Approaches and Issues in Knowledge Representation, Predicate Logic – Representation of simple facts, computable functions; Resolution, Logic Programming, Matching, Control Knowledge etc.

UNIT IV

Prolog Programming: Introduction and Applications, Facts, Objects and Predicates. Linguistic variables, Rules, Input-Output operations, Controlling Execution: Recursion, Fail, Cut; Arithmetic operation, compound objects, List and various operations on Lists; Dynamic Databases; Expert-System design etc.

UNIT V

KR Techniques & Advance Artificial Intelligence: Slot and Filler Structure – Introduction, Weak and Strong Structures, Semantic Nets, Frames, Conceptual Dependency and Frames; Fuzzy logic Expert Systems – Concepts and Design.

Reference Books:

1. Rich & Knight, Artificial Intelligence, Second Edition, Tata Mcgraw Hill
2. Russel and Norvig, Artificial Intelligence A Modern Approach, Prentice Hall
3. Dan Patterson, AI & Expert System, Prentice Hall of India
4. Ivan Bratko, Prolog Programming for Artificial Intelligence, Pearson Education, III Edition
5. Carl Townsend, Introduction to Turbo Prolog, BPB Publication
6. Patrick Winston, Artificial Intelligence, Pearson Education India

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) X SEMESTER
IC-1003: Compiler Design

Aim of Course: The course aims at understanding the working of compiler in detail so as to have knowledge of whole spectrum of language processing technology.

Objectives:

The course is designed to make students:

- Understand various phases of compilers theoretically as well as practically so as to have the actually feeling of its working.
- Understand some aspects of computation should be covered in course as parsing is of the most important issue in compiler.
- Learn the concepts of symbol table management, syntax-Directed definition and translations along with the code optimization and generation and error handling have to cover to complete the aim.

Course Contents:

UNIT I

Translators, interpreters, assemblers, Compilers, Types of Compilers, Model of a compiler. Analysis of source program, The phases of a compiler, Cousins of the compilers.

UNIT II

Finite automata, non-deterministic and deterministic finite automata, Acceptance of strings by NDFA and DFA, Transforming NDFA to DFA, minimization/optimization of a DFA, related algorithm. Regular sets and regular expression. Obtaining regular expression from finite automata.

Lexical analyzer design, The role of Lexical Analyzer, Input Buffering, Specification of tokens, and Recognition of tokens.

UNIT III

Syntax analysis, CFG, derivation of a parse tree, elimination of left recursion Regular grammar, Right linear and left linear grammar. Parsing, Top-Down and Bottom Up parsing, general parsing strategies.

Top-down Parsing techniques: Brute-force approach, recursive descent parser and algorithms, Simple LL (1) grammar, LL (1) with null and without null rules grammars, predictive parsing.

Bottom-up parsing- Handle of a right sentential form, Shift-reduce parsers, operator precedence parsing, LR parsing.

UNIT IV

Symbol table contents Organization for block structured languages-stack symbols tables. Stack implemented hash structured symbol tables. Symbol table organization for Object Oriented Programming Languages.

Intermediates code generation, translation schemes for programming language constructs.

Code Optimization: - Definition, Local code optimization techniques, Elimination of local and global common sub Expressions, loop optimization.

UNIT V

Code Generation: - Definition, machine model, simple code generation method. Peephole optimization.

Error Handling: - Error recovery, recovery from various phase and parsing.

Reference Books:

1. Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman, Compilers: Principles, Techniques, and Tools, Addison Wesley Longman.
2. Jean Paul Tremblay, Paul G. Sorenson , The Theory & Practice of Compiler Writing.
3. Barrett, Bates, Gustafson, Couch , Compiler Construction Theory & Practice.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) X SEMESTER
IC-1004: Parallel Processing

Aim of Course: To make students acquainted with parallel processing machines and programming techniques for effective use of them.

Objectives:

The course is designed to make students:

- Learning fundamental parallel processing concepts
- Learning parallel machine structure.
- Learning parallel algorithm design.
- Learning of interconnecting networks for parallel machine
- Programming using threads.
- Data flow and Wave front system

Course Contents:

UNIT I

Introduction to Parallel Processing: Parallelism in uni-processor System, Parallel Computer Structures, Architectural Classification Schemes, Parallel Processing Applications (Assignment). Program and Network Properties: Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms , System Interconnection Architecture

UNIT II

Pipeline Computers and Vectorization Methods: Vector Super Computers , Early Vector Processors, Recent Vector Processors, Vector Processing Requirements.

UNIT III

Structures and Algorithms for Array Processors: SIMD Array Processors , SIMD Interconnection networks, Parallel Algorithms for Array Processors , Associative Array Processors, Massively Parallel Processors, Performance Enhancement Methods

UNIT IV

Multiprocessor Architecture and Programming: Interconnection Networks, Functional Structures, Parallel memory Organization, Multiprocessor Operating System, Exploiting Concurrency for Multiprocessing.

UNIT V

Multiprocessing Control and Algorithms: Interprocesses Communication Mechanisms, System Deadlocks and Protection, Multiprocessor Scheduling Strategies, Parallel Algorithms for Multiprocessors

Reference Books:

1. Kai Hwang & A. Briggs, Computer Architecture and Parallel Processing, McGraw Hill [TB1]
2. Kai Hwang, Advanced computer Architecture-Parallelism, Scalability, Programmability, McGraw Hill [TB2]
3. Michel J. Quinn, Parallel Computing-Theory and Practice, McGraw Hill
4. J.M. Crichlow , An Introduction to Distributed and Parallel computing, Prentice Hall
5. A.S. Tanenbaum, Modern Operating System, Prentice Hall.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) X SEMESTER
IC-1005: Enterprise Component Technology

Aim of the course: To enable the students understand the concepts of EJB and build web-based and/or enterprise-based applications that incorporate EJB technology.

Objectives:

The course is designed to make students:

- Implement business-tier functionality using EJB technology
- Learn the concepts and implementation of RMI and JNDI
- Get an overview of EJB fundamentals.
- Learn the concepts and implementation of Entity and Session beans..

Course Contents:

UNIT I

RMI: Object Serialization, Developing Applications with RMI, and the RMI security manager, Parameters passing in RMI.

UNIT II

JNDI: Naming services, Directory services, Benefits of JNDI, JNDI Architecture, JNDI concepts

UNIT III

Overview & EJB Fundamentals: Motivation for EJB, Component architecture, Various roles in J2EE architecture, Type of Beans, Distributed object & Middleware, Constituents of enterprise beans: Enterprise beans class, EJB Object, Home object, Local interfaces, Deployment description, Vendor specific files.

UNIT IV

Session Beans: Stateless session beans, statefull session beans, characteristics of statefull session beans, lifecycle diagram for session beans. JMS, Integrating JMS with EJB, Developing message driver beans.

UNIT V

Entity Beans: Persistence concepts, Features of entity beans, Bean managed Persistent entity beans, and Container managed persistent entity beans, Life cycle Diagrams, BMP and CMP relationships.

Reference Books:

1. Ed Roman “Mastering Enterprise Java Beans”, Wiley Publishing, 2005, 3rd Edition
2. Kal Ahmed “Professional JAVA server programming”, SPD, 2005
3. J2EE Tutorial from www.java.sun.com