COURSE STRUCTURE & SYLLABUS

M.TECH PROGRAMME in
COMPUTER SCIENCE ENGINEERING
DEPARTMENT OF CSE

CENTURION UNIVERSITY OF TECHNOLOGY
MANAGEMENT, ODISHA
# COURSE STRUCTURE OF M.TECH (Computer Science) (2 Years)

<table>
<thead>
<tr>
<th>First semester</th>
<th>Second Semester</th>
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<tr>
<td><strong>Code</strong></td>
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<tr>
<td>MTCO 1101</td>
<td>Analysis and Design of Algorithm</td>
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<tr>
<td>MTCO 1102</td>
<td>Discrete Mathematical Structures</td>
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<tr>
<td>MTCO 1103</td>
<td>Advanced Computer Architecture</td>
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<tr>
<td>Elective---1</td>
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<td>Elective---2</td>
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<td><strong>( Any TWO of the following subjects)</strong></td>
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<tr>
<td>COPE 1101</td>
<td>Embedded Systems</td>
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<tr>
<td>COPE 1102</td>
<td>Software Testing</td>
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<tr>
<td>COPE 1103</td>
<td>Basic Digital Image Processing</td>
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<td>COPE 1104</td>
<td>Real-Time Systems</td>
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<tr>
<td>COPE 1105</td>
<td>Service Oriented Architecture</td>
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<td>COPE 1106</td>
<td>Software Quality Assurance</td>
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<td>COPR 1107</td>
<td>Analysis and Design of Algorithm Lab</td>
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<td>COPT 1108</td>
<td>Seminar ( Pre-thesis work)- 1</td>
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<td><strong>Semester credits</strong></td>
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<tr>
<td>CODE</td>
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<td>MTCO 2101</td>
<td>Web Technologies</td>
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<td>Elective --- 5</td>
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<td>( Any ONE of the following subjects)</td>
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<tr>
<td>COPE 2101</td>
<td>Enterprise Planning Resource</td>
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<td>COPE 2102</td>
<td>Cryptography</td>
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<tr>
<td>COPE 2103</td>
<td>VLSI Design</td>
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<td>COPE 2104</td>
<td>Multimedia Systems</td>
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<tr>
<td>COPT 2107</td>
<td>Thesis / project (Part-1)</td>
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<tr>
<td>COPR 2108</td>
<td>Web Technologies Lab</td>
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<td>COCV 2109</td>
<td>Comprehensive viva</td>
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<td>Semester credits</td>
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TOTAL CUMULATIVE CREDITS (4 SEMESTERS) ----------- 90
FIRST SEMESTER SYLLABUS FOR M-TECH (CSE)

MTCO 1101 Analysis and Design of Algorithm (3-1-0)

UNIT-1 (12 Hrs)
Algorithm paradigms, Asymptotic notations, Recurrences, Divide and conquer (Merge sort, Heap sort, Quick sort and its correctness proofs) Lower bounds of sorting, Counting sort.

UNIT-II (12 hrs)
Randomization (Randomization quick sort, Primality testing), Dynamic Programming (Floyd-Warshall Algorithm, Longest Common Subsequence, Matrix chain multiplication), Greedy Method (Single source shortest path, M, Knapsack problem, Minimum cost spanning trees, Task scheduling),

UNIT- III (16 hrs)
Polynomial time, Polynomial-time verification, NP completeness and reducibility, NP completeness proofs,, Cook's theorem, NP complete problem
Geometric algorithms (range searching, convex hulls, segment intersections, closest pairs),
Numerical algorithms (integer, matrix and polynomial multiplication, FFT, extended Euclid's algorithm),
Internet algorithm (text pattern matching, tries, Ukonnen's algorithm).

Books:
Module-I (12 hrs)
The Foundations: Logic and Proof and Functions
Logic, Propositional Equivalences, Predicates & Quantifiers, Nested Quantifiers, Methods of proof,
Functions, Proof Strategy, Mathematical Induction, Recursive Definition & Structural induction.

Module-II(12 hrs)
Counting
The Basic of Counting, The pigeonhole Principle, Permutation & Combinations, Binomial Coefficients.
Advanced Counting Techniques
Recurrence Relations, Solving Recurrence Relations, Divide & Conquer Algorithms,
Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion.

Module-III(16 hrs)
Graphs
Introduction to Graphs, Graph Terminology, Representing Graph & Graph Isomorphism,
Connectivity, Euler & Hamiltonian Paths, Shortest-Path Problems.
Trees Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees
Boolean Algebra
Boolean Functions, Representing Boolean Functions, Lattice as Partially Ordered Sets, Boolean Algebra, Finite State Machines.

BOOKS:-

1. Discrete Mathematics & Its Applications by Kenneth H. Rosen. TMH
MTCO 1103  ADVANCED COMPUTER ARCHITECTURE  (3-1-0)

Module-I(12 hrs)
Introduction: Review of basic computer architecture, quantitative techniques in computer design, measuring and reporting performance;
CISC and RISC processors. Pipelining: Basic concepts, instructions and arithmetic pipeline, data hazards, control hazards and structural hazards, techniques for handling hazards, Exception handling, pipeline optimization techniques;
Module-II(12 hrs)
Hierarchical memory technology: Inclusion, Coherence and locality properties, cache memory organizations, techniques for reducing cache misses, virtual memory organization, mapping and management techniques, memory replacement policies;
Module-III(16 hrs)
Instruction-level parallelism: basic concepts, techniques for increasing ILP, super-scalar, super-pipelined and VLIW processor architectures, array and vector processors;
Multiprocessor architecture: Taxonomy of parallel architectures;
Centralized shared-memory architecture: Synchronization, memory consistency, interconnections networks, Distributed shared-memory architecture, cluster computers.
Books:
COPE 1101  EMBEDDED SYSTEMS (3-1-0)

Module – I (12 Hours)
Introduction: Features of Embedded systems, Design matrices, Embedded system design flow, SOC and VLSI circuit.

ARM: An advanced Micro Controller, Brief history, ARM pipeline, Instruction Set Architecture ISA: Registers, Data Processing Instructions, Data Transfer Instructions, Multiplications instructions, Software interrupt, Conditional execution, branch instruction, Swap instruction, THUMB instructions. FPGA

Module – II (12 Hours)
Devices and device drivers, I/O devices, Serial peripheral interfaces, IIC, RS232C, RS422, RS485, Universal serial bus, USB Interface, USB Connector IrDA, CAN, Bluetooth, ISA, PCI, PCI – X and advance busses, Device drivers.
Real time operating system: Hard real time, firm real time, soft real time, Task periodicity: periodic task, sporadic task, aperiodic task, task scheduling, scheduling algorithms: clock driven scheduling, event driven scheduling.

Module – III (16 Hours)
Low power embedded system design: Dynamic power dissipation, Static power dissipation, Power reduction techniques, system level power management.

Text Books:
1. “Embedded System Design ” by Santanu Chattopadhay, PHI
2. “Embedded system architecture, programming and design” By Raj Kamal, TMH

Reference Books:
1. “Hardware software co-design of Embedded systems” By Ralf Niemann, Kulwer Academic.
2. “Embedded real time system programming” By Sriram V Iyer, Pankaj Gupta, TMH.
Module 1. (12 Hrs)
Basics of Software Testing
The Testing process, Testing and Debugging; Test Metrics; Software and Hardware Testing; Testing and Verification; Defect Management; Execution History; Test case generation Strategies, Static and dynamic analysis., Model-Based Testing; Control-flow Graph, state-model, and data-flow-based testing.

Module 2. (16 hrs)
Test Generation and Regression Testing
Basics of Regression Testing (RTS), Selecting Regression Tests; Test Selection Using Execution Trace; Test Selection Using program slicing; Test Minimization; Test Prioritization; Tools for Regression Testing.

Module 3. (12 hrs)
Test Adequacy
Test Adequacy; Basics; Adequacy Criteria Based on Control Flow. Data-Flow Concepts; Adequacy Criteria Based on Data-Flow; Control Flow versus Data- Flow; The Subsumes Relation; Structural and Functional Testing; Scalability of Coverage Measurement.

Text Books:

Reference Books:
COPE 1103 BASIC DIGITAL IMAGE PROCESSING (3-1-0)

Module-I(15 hrs)
DIGITAL IMAGE FUNDAMENTALS

IMAGE ENHANCEMENT & RESTORATION

Module-II(10 hrs)
IMAGE COMPRESSION & SEGMENTATION

Module-III(15 hrs)
REPRESENTATION AND DESCRIPTION
Representation schemes - Boundary descriptors - Regional descriptors - Relational Descriptors

OBJECT RECOGNITION AND INTERPRETATION
Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

REFERENCE BOOKS:
COPE 1104 Real Time Systems (3-1-0)

UNIT-1 [14Hrs]
Introduction: What is real time, Applications of Real-Time systems, A basic model of Real-time system, Characteristics of Real-time system, Safety and Reliability, Types of Real-time tasks, timing constraints, Modelling timing constraints
Real-Time Task Scheduling: Some important concepts, Types of Real-time tasks and their characteristics, Task scheduling, Clock-Driven scheduling, Hybrid schedulers, Event-Driven scheduling, Earliest Deadline First (EDF) scheduling, Rate monotonic algorithm (RMA). Some issues Associated with RMA. Issues in using RMA practical situations.

UNIT-2 [14Hrs]
Scheduling Real-time tasks in multiprocessor and distributed systems: Multiprocessor task allocation, Dynamic allocation of tasks. Fault tolerant scheduling of tasks. Clock in distributed Real-time systems, Centralized clock synchronization

UNIT-3 [12Hrs]
Commercial Real-time operating systems: Time services, Features of a Real-time operating system, Unix as a Real-time operating system, Unix-based Real-time operating system, POSIX, A survey of contemporary Real-time operating systems. Benchmarking real-time systems.
Real-time Communication: Examples of applications requiring real-time communication, Basic concepts, Real-time communication in a LAN. Soft Real-time communication in a LAN. Hard real-time communication over packet switched networks. Qos framework, Routing, Resource reservation, Rate control, Qos models.

Books:
COPE 1105  SERVICE ORIENTED ARCHITECTURE (3-1-0)

Module-I(14 hrs)
INTRODUCTION TO SOA WITH WEB SERVICES

SOA AND WEB SERVICES
The web services platform – Service contracts – Service-level data model – Service discovery-registration and lookup – Service-level security – Service level interaction patterns – Atomic services and composite services – Generating proxies and skeletons and service contracts – Service-level communication and alternative transports – A Retrospective on Service-oriented architectures- Overview of integration – Integration and Interoperability using XML and web services

Module-II(14 hrs)
SOA AND MULTI-CHANNEL ACCESS

SOA AND BUSINESS PROCESS MANAGEMENT
Basic Business process management concepts – examples – combining BPM,SOA, and web services – Orchestration and Choreography specification - examples - web services.

META DATA MANAGEMENT

Module-III(12 hrs)
WEB SERVICES SECURITY

TRANSACTION PROCESSING
Overview – the transaction paradigm – impact of web services on transactions - protocols and coordination – transaction and specification

REFERENCES
COPE 1106 SOFTWARE QUALITY ASSURANCE (3-1-0)

Module-I (12 Hrs)

CONCEPTS

Module-II (14 hrs)

SOFTWARE ENGINEERING CONCEPTS

QUALITY ASSURANCE MODELS

Module-III (14 Hrs)

SOFTWARE QUALITY ASSURANCE RELATED TOPICS
Software Process - Definition and implementation; internal Auditing and Assessments; Software testing - Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

FUTURE TRENDS
PSP and TSP, CMMI, OO Methodology, Clean-room software engineering, Defect injection and prevention.

REFERENCE BOOKS:
COPR 1107  Analysis and Design of Algorithm Laboratory  (0-0-3)

All the problems have to be implemented either writing C programs or writing C++ programs

Elementary Problems : (8 is compulsory and any four among the rest)
1. Using a stack of characters, convert an infix string to a postfix string.
2. implement polynomial addition using a single linked list
3. Implement insertion, deletion, searching of a BST, Also write a routine to draw the BST horizontally.
4. implement insertion routine in an AVL tree using rotation.
5. Implement binary search and linear search in a program
6. Implement heap sort using a max heap.
7. Implement DFS/ BFS routine in a connected graph
8. Implement Dijkstra’s shortest path algorithm using BFS

Greedy Algorithm (Any Two)
1. Given a set of weights, form a Huffman tree from the weight and also find out the code corresponding to each weight.
2. Take a weighted graph as an input, find out one MST using Kruskal/ prim’s algorithm
3. Given a set of weight and an upper bound M – Find out a solution to the Knapsack problem

Divide and Conquer Algorithm (any Two)
1. Write a quick sort routine, run it for a different input sizes and calculate the time of running. Plot in graph paper input size verses time.
2. Implement two way merge sort and calculate the time of sorting
3. Implement Strasseem’s matrix multiplication algorithm for matrices whose order is a power of two.

Dynamic programming (Any one)
1. Find out a solution for 0/1 knapsack problem
2. given two sequences of character, find out their longest common subsequence using dynamic programming
COPT 1108  SEMINAR( PRETHESIS WORK-1) (0-0-3)
MTCO 1201  Formal Language and Automata Theory (3-1-0)

Module-I(14 hrs)
FINITE AUTOMATA AND REGULAR LANGUAGES
Finite Automata and Regular languages - Regular expressions and Regular languages –non determinism and Kleenes theorem, Equivalence of DFA and NFA, Finite Automation with e-moves, equivalence of regular expression and NFA with e-moves – pumping lemma for regular sets.

CONTEXT FREE LANGUAGES
Context free languages, Derivation and languages, Relationship between derivation and derivation trees, Simplification of context free grammars – Normal forms for context free grammars, CNF, and GNF.

Module-II(15 hrs)
PUSH DOWN AUTOMATA (PDA)
Acceptance by PDA, Pushdown automata and Context free languages, Pumping lemma for CFL, deterministic Context free languages and Deterministic pushdown automata.

TURING MACHINE
Context sensitive languages and LBA, Turing machine (Definition and examples), Computable languages and functions, Church Turing hypothesis, Universal Turing machine, P and NP problems, NP-complete.

Module-III(11 hrs)
UNSOLVABLE PROBLEMS
Unsolvable problems - Rice Theorem - Post's correspondence Problem, Recursive and recursively enumerable languages.

REFERENCE BOOKS:


Module 2 15Hrs

Module 3 10Hrs

Text Book:

References:
1) Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI., 2010
2) S Kaushik, Artificial Intelligence, Cengage Learning, 1st ed. 2011
MTCO 1203  OBJECT ORIENTED SYSTEM (3-1-0)

UNIT-1 (10 hrs)
Real world domains, object oriented approach and technology, objects instances and concepts, Objects and classes of objects, generalized object oriented software, Development cycle, Object oriented programming language, object-oriented analysis of a real world domain object model. The notion of encapsulation and information hiding, object identity: entity and attributes, data and knowledge: The notion of inheritance, Relationship between objects: Association, Generalization/ Specialization, Aggregation, Object and States, Dynamic behavior of objects.

UNIT-II (8 hrs)
Object-Oriented analysis: introduction, Techniques for information gathering for RA, use case driven object oriented analysis, concepts and principles, identifying the elements of an object model, Management of Object-Oriented Software projects, Object oriented analysis, domain analysis and generic components of object-oriented analysis model, object behavior model.
The intent of object-oriented metrics, the distinguishing characteristics and metrics for the object-oriented design model, class oriented metrics, operation oriented metrics, metrics for object oriented testing, metrics for object-oriented projects.

UNIT-III (10 hrs)
Introduction to UML : The meaning of object-orientation, object identity, encapsulation, information hiding, polymorphism, genericity, importance of modeling, principles of modeling, object oriented modeling, conceptual modeling of the UML, Architecture.
Basic structural modeling : classes, relationships, common mechanisms, diagrams, advanced structural modeling : advanced relationship interfaces, roles, packages, instances.

UNIT-IV (12 hrs)
Behavioral modeling: interactions, use cases, use case diagrams, activity diagrams. Advanced Behavioral modeling: Events and signals, state machines, process and threads, time and space, state chart diagram. Architectural Modeling: Terms, concepts, examples, modeling techniques for component diagrams and deployment diagram

Suggested Reading:
COPE 1201  DATA WAREHOUSING AND DATA MINING  (3-1-0)
Module-I(12 hrs)
INTRODUCTION:
Definition of Data Mining - Data Mining Vs Query Tools – Machine Learning –Taxonomy of Data Mining
Tasks – Steps in Data Mining Process – Overview of Data Mining techniques.
DATA WAREHOUSING:
Warehouse Schema – Data Warehouse Architecture – Data Mart – Meta Data – Types of Meta Data –
Data Warehouse Backend Process – Development Life Cycle
Module-II(20 Hrs)
DATA PRE-PROCESSING AND CHARACTERIZATION:
Data Cleaning – Data Integration and Transformation – Data Reduction – Discretization and Concept
Hierarchy Generation – Primitives – Data Mining Query Language – Generalization – Summarization –
Analytical Characterization and Comparison - Association Rule Mining - Multi Dimensional data from
Transactional Database
CLASSIFICATION AND ASSOCIATION:
Classification – Decision Tree Induction – Bayesian Classification – Prediction – Back Propagation –
Cluster Analysis – Hierarchical Method – Density Based Method – Grid Based Method – Outlier Analysis -
Basic Association Algorithms – Parallel and Distributed Algorithms – Advanced Association rule
algorithms
Module-III(8 hrs)
5. ADVANCED TOPICS:
Web Mining – Web Content Mining – Structure and Usage Mining – Spatial Mining – Spatial Data
Overview – Generalization and Specialization – Spatial Rules and Classification Algorithms – Spatial
Clustering Algorithms – Temporal Mining
REFERENCES:
Amsterdam, 2001.
Delhi, 2005.

COPE 1202  COMPILER DESIGN  (3-1-0)
Module-I(14 Hrs)
INTRODUCTION
Basic concepts - Grammar - Language - Parts of a compiler – Grouping of phases - Compiler construction
tools.
LEXICAL ANALYZER
Role of a lexical analyzer – Input buffering - Specification and recognition of tokens - Finite automata -
Regular expression to finite automation – Optimization of DFA-based pattern matchers-Use of a tool for
generating lexical analyzer.
Module-II(16 Hrs)
SYNTAX ANALYZER
Role of a parser - Context-free grammars - Top-down parsing - Bottom-up parsing - Use of a tool to
generate parsers.
INTERMEDIATE CODE GENERATION
Intermediate languages - Declaration - Assignment statements - Boolean expressions - Flow control
statements –Back patching.
Module-III (10 Hrs)
CODE GENERATION
Introduction to optimization techniques - Issues in the design of a code generator - Run-time storage management - Design of a simple code generator.

REFERENCE BOOKS:

COPE 1203 Pattern Recognition (3-1-0)
Module-I (12 Hrs)
Introduction to pattern recognition and applications to OCR, speech recognition, fingerprints, signatures etc. Commercial importance of applications. Introduction to Statistical, Neural and Structural Approaches.
Statistical Pattern Recognition: Patterns and classification, discriminant functions, Bayes decision rule, nearest neighbour rule, probability of error. Linear discriminant functions: Perceptrons and training, LMSE approaches.
Module-II (14 hrs)
Module-III (14 hrs)
Syntactic pattern recognition: Formal languages and grammars Pattern grammars and higher dimensional grammars, Parsing, automata realizations, stochastic grammars, Grammatical Inference, computational learning theory, Valiant’s framework.
References:

Cope 1204 DISTRIBUTED DATABASE SYSTEM (3-1-0)
Module-I (12 hrs)
Features of distributed databases, features of centralized databases, level of distributed transparency – Reference Architecture, types of Data Fragmentation, distribution Transparency, Access primitives, Integrity constraints. Distributed Database design – A frame work, the design of database fragmentation, the allocation of fragments. Translation of global queries into fragment queries, query optimization.
Module-II (14 hrs)
Distributed Transaction Management – A framework, transaction atomicity, 2-phase commit, concurrency control: fundations, distributed deadlocks, timestamps. Reliability: Basic concepts, commit protocols, consistent view of Network, Detection and Resolution of Inconsistencies, check points and cold restart.
Module-III (14 hrs)
Commercial Systems: Tranclem’s ENCOMPASS
Distributed database systems, IBM’s Inter system communication, feature of distributed ingres and Oracle.
Heterogeneous databases: General problems – brief study of multibase.
COPE 1205  Computational Intelligence  (3-1-0)

Module-I (12 Hrs)


Fuzzy Inference System: Mamdani fuzzy models, Sugeno Fuzzy Models, Tsukamoto fuzzy models, other considerations.

Least Square Method for system Identification: System Identification, Basic of matrix manipulations and calculus, Least-square estimator, Geometric interpretation of LSE, Recursive least-square estimator, Recursive LSE for time varying systems, Statistical Properties and maximum likelihood estimator, LSE for nonlinear models.

Module-II (14 hrs)

Derivative-based optimization: Descent methods, the method of steepest descent, Newton’s methods, Step size determination, conjugate gradient methods, Analysis of quadratic case, nonlinear least-squares problems, Incorporation of stochastic mechanism.

Derivative-free optimization: Genetic algorithm simulated annealing, random search, Downhill simplex search, Swarm Intelligence, genetic programming.

Adaptive Networks: Architecture, Back propagation for feed forward networks, Extended back propagation for recurrent networks, Hybrid learning rule: combing steepest descent and LSE.


Learning from reinforcement: Failure is the surest path to success, temporal difference learning, the art of dynamic programming, Adaptive heuristic critic, Q-learning, A cost path problem, World modeling, other network configurations, Reinforcement learning by evolutionary computations.

Module-III (14 hrs)


Adaptive Neuro-fuzzy inference systems: ANFIS architecture, Hybrid learning algorithms, Learning methods that cross-fertilize ANFIS and RBNF, ANFIS as universal approximator, Simulation examples, Extensions and advance topics.


Books:
COPE 1206  AGENT BASED INTELLIGENT SYSTEMS (3-1-0)
Module-I(15 Hrs)
INTRODUCTION
KNOWLEDGE REPRESENTATION AND REASONING
Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies- Knowledge Representation-Objects-Actions-Events
Module-II(16 Hrs)
PLANNING AGENTS
AGENTS AND UNCERTAINTY
Module-III(9 Hrs)
5. HIGHER LEVEL AGENTS
Knowledge in Learning-Relevance Information-Statistical Learning Methods-Reinforcement Learning- Communication-Formal Grammar-Augmented Grammars- Future of AI.

REFERENCE BOOKS:

COPR 1207  **Software Technologies Laboratory  (0-0-3)**

**Experiment 1:** Develop requirements specification for a given problem (The requirements specification should include both functional and non-functional requirements.

For a set of about 20 sample problems, see the questions section of Chap 6 of Software Engineering book of Rajib Mall)

**Experiment 2:** Develop DFD Model (Level 0, Level 1 DFD and data dictionary) of the sample problem (Use of a CASE tool required)

**Experiment 3:** Develop Structured design for the DFD model developed

**Experiment 4:** Develop UML Use case model for a problem
(Use of a CASE tool any of Rational rose, Argo UML, or Visual Paradigm etc. is required) **Experiment 5:** Develop Sequence Diagrams

**Experiment 6:** Develop Class diagrams

**Experiment 7:** Develop code for the developed class model using Java

**Experiment 8:** Use testing tool such as Junit

**Experiment 9:** Use a configuration management tool

**Experiment 10:** Use any one project management tool such as Microsoft Project or Gantt Project, etc.
COPT 1208  SEMINAR (PRE THESIS WORK -2)  (0-0-3)
MTCO 2101 WEB TECHNOLOGY (3-1-0)

Module-I
INTRODUCTION

COMMON GATEWAY INTERFACE

Module-II
JAVA PROGRAMMING
Java fundamentals: Classes – Inheritance – Packages – Interfaces – Exceptions Handling – Multi threading – Applets

SERVER SIDE PROGRAMMING

Module-III
APPLICATIONS
Simple applications – Internet Commerce – Database connectivity – Online databases – EDI Applications in Business – Plug-ins – Firewalls

REFERENCE BOOKS:
1. Deitel, Deitel and Neito, “INTERNET and WORLD WIDE WEB – How to program”, Pearson education asia, 2002
Enterprise Resource Planning (3-1-0)

Module-I (9 Hrs)

INTRODUCTION:
Business Processes - Concepts of ERP - brief history of ERP - major components and their functions in ERP system. Basic differences between manufacturing and services - Data Integration Issues

Module-II (15 Hrs)
IMPLEMENTATION ISSUES

ERP ARCHITECTURE:
Basic architectural Concepts - The system control interfaces – Services -Presentation interface – Database Interface. ERP and Internet – ERP and E-Commerce.

Module-III (16 Hrs)
ERP INTERFACES:
Description – Multi- client server solution - Open technology - User Interface - Application Integration - Data base requirement – methodology - interfaces with other systems and systems design and implementation aspects.

ERP MODULES:

REFERENCES:
COPE 2101 CRYPTOGRAPHY (3-1-0)

Module-I (10 hrs)
Introduction to Cryptography: Basics of Symmetric Key Cryptography, Basics of Asymmetric Key Cryptography, Hardness of Functions.

Goldreich-Levin Theorem: Relation between Hardcore Predicates and Trap-door permutations

Module-II (15 hrs)
Formal Notions of Attacks: Attacks under Message Indistinguishability: Chosen Plaintext Attack (IND-CPA), Chosen Ciphertext Attacks (IND-CCA1 and INDCCA2), Attacks under Message Non-malleability: NM-CPA and NM-CCA2, Interrelations among the attack model
Random Oracles: Provable Security and asymmetric cryptography, hash functions
One-way functions: Weak and Strong one way functions
Pseudo-random Generators (PRG): Blum-Micali-Yao Construction, Construction of more powerful PRG, Relation between One-way functions and PRG, Pseudorandom Functions (PRF)
Building a Pseudorandom Permutation: The Luby Rackoff Construction: Formal
Definition, Application of the Luby Rackoff Construction to the construction of Block Ciphers, The DES in the light of Luby Rackoff Construction
Left or Right Security (LOR)

Module-III (15 hrs)
Message Authentication Codes (MACs): Formal Definition of Weak and Strong MACs, Using a PRF as a MAC, Variable length MAC
Public Key Signature Schemes: Formal Definitions, Signing and Verification, Formal Proofs of Security of Full Domain Hashing
Assumptions for Public Key Signature Schemes: One way functions Imply Secure One-time Signatures Shamir's Secret Sharing Scheme
Formally Analyzing Cryptographic Protocols
Zero Knowledge Proofs and Protocols

References:
2. Wenbo Mao, Modern Cryptography, Theory & Practice, Pearson Edu. (Low Priced Ed.)

REFERENCE BOOKS:
Cope 2103 VLSI Design (3-1-0)

Module-I (14 hrs)
Introduction to VLSI Design Methodologies, Full Custom Design, Semi Custom Design and Programmable design, VLSI Design Flow, Design Entry, Synthesis, Floorplanning, Place & Route, Timing analysis, Front – end design and Backend design.
Front End Design: Introduction to high level design, Hardware Description Language.

Module-II (12 hrs)
Backend Design: Introduction to low level Design.
Fabrication Process (NMOS & CMOS)

Module-III (14 hrs)
Wafer Preparation, Oxidation, Photo & Ion Lithography, Etching, Diffusion, Ion implantation, Metalization.
Design of Telecom Chips
Introduction to VLSI Design modulators, Demodulators, Transiver ICS, coder & Decoders.
Companies Involved in Communication chip design.

Suggested text books and references
1) Application specific Integrated Circuits by Smith (For Unit –I)
2) VHDL by Douglas Perry, TMH Publication (for Unit-II)
3) VLSI Design & Techniques, Pucknell & Eshraghian, PHI (For Unit-III & Unit-V)
4) VLSI Technology, S. M. Size, Mc Graw Hill (For Unit-IV)
5) Resources from Internet: www.ti.com
COPE 2104  MULTIMEDIA SYSTEMS (3-1-0)

Module-I (15 hrs)
1. INTRODUCTION AND QOS
Introduction-QOS Requirements and Constraints-Concepts-Resources- Establishment Phase-Run-Time Phase-
Management Architectures.

OPERATING SYSTEMS
Real-Time Processing-Scheduling-Interprocess Communication-Memory and Management-Server
Architecture-Disk Management.

Module-II (9 hrs)
FILE SYSTEMS AND NETWORKS
Traditional and Multimedia File Systems-Caching Policy-Batching-Piggy backing-Ethernet-Gigabit
Ethernet-Token Ring-100VG AnyLAN-Fiber Distributed Data Interface (FDDI)- ATM Networks-MAN-WAN.

Module-III (16 hrs)
COMMUNICATION
Transport Subsystem-Protocol Support for QOS-Transport of Multimedia-Computer Supported
Cooperative Work-Architecture-Session Management-MBone Applications.

SYNCHRONIZATION
Synchronization in Multimedia Systems-Presentation-Synchronization Types-Multimedia Synchronization
Methods-Case Studies-MHEG-MODE-ACME.

REFERENCE BOOKS:

1. Web Page Creation using HTML and DHTML and Client side Scripting Languages
2. Write a application/GUI program in java for getting time and data information from the server using TCP/UDP
3. Develop web application with CGI validation.
4. Develop Multi-threaded programs with Java.
5. Write a program in java to implement Database Connectivity
6. Write a JSP program for order processing
7. Write a Servlet, bean program to access information from databases
8. Write a ASP program using the components
10. Designing of a simple plug-in.
FOURTH SEMESTER SYLLABUS FOR M-TECH (CSE)

COPT 2201 THESIS/PROJECT (PART-2)