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<td>MCA09.4.4.1 Embedded Real Time Systems</td>
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MCA09.4.1 SOFTWARE ENGINEERING

UNIT I : Introduction to Software Engineering :
The evolving role of software, Changing Nature of Software, Software myths.

UNIT II : Process models :
The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT III : Requirements engineering process :
Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models : Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT IV : Design Engineering :
Design process and Design quality, Design concepts, the design model.
Creating an architectural design : Software architecture, Data design, Architectural styles and patterns, Architectural Design.

UNIT V : Object-Oriented Design :
Objects and object classes, An Object-Oriented design process, Design evolution.
Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT VI : Testing Strategies : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.
Product metrics : Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT VII : Metrics for Process and Products :
Software Measurement, Metrics for software quality.

UNIT VIII : Quality Management :
TEXT BOOKS:

1. Software Engineering, 7/e, Roger S. Pressman, TMH
2. Software Engineering, 8/e, Sommerville, Pearson.

REFERENCE BOOKS

3. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
5. Software Engineering principles and practice, W S Jawadekar, TMH
6. Software Engineering, James, PHI
7. Software Engineering concepts, R Fairley, TMH
MCA09.4.2 ADVANCED JAVA FOR WEB TECHNOLOGIES

UNIT I: Review of HTML4;
Common tags, HTML Tables and formatting internal linking, Complex HTML forms.

UNIT II: Introduction to Scripting Languages:
Java Scripts, Control structures, functions, arrays & objects, DHTML, CSS, event model, filters & transitions.

UNIT III: Review of Applets, Class, Event Handling, AWT Programming:
Introduction to Swing: Japlet, Handling Swing Controls like Icons, Buttons, Text Boxes, Combo Boxes, Tabbed Pains, Scroll Pains, Trees, Tables, Differences between AWT Controls & Swing Controls, Developing a Home page using Applets & Swing.

UNIT IV: Java Beans:
Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizers, Java Beans API.

UNIT V: Introduction to Servelets:

UNIT VI: Introduction to JSP:
The Problem with Servelets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.
Setting Up the JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

UNIT VII: JSP Application Development:
Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values, Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Passing Control and Data Between Pages – Sharing Session and Application Data Memory Usage Considerations.

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UNIT VIII: Database Access:

TEXT BOOKS:
1. Internet and World Wide Web: How to program, 6/e, Dietel, Dietel, Pearson.
2. The Complete Reference Java, 3/e, Patrick Naughton, Herbert Schildt, TMH.

REFERENCE BOOKS:
5. Programming world wide web, Sebesta, PEA
6. Web Tehnologies, 2/e, Godbole, kahate, TMH
7. An Introduction to web Design , Programming ,Wang,Thomson

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MCA09.4.3 DATA WAREHOUSING AND DATA MINING

UNIT I: Introduction:
Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II: Data Warehouse and OLAP:
Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

UNIT III: Data Mining Primitives, Languages, and System Architectures:
Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems.

UNIT IV: Concepts Description, Characterization and Comparison:
Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

UNIT V: Mining Association Rules in Large Databases:
Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT VI: Classification and Prediction:
Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT VII: Cluster Analysis Introduction:

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Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT VIII : Mining Complex Types of Data:
Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

TEXT BOOKS:
1. Data Mining, Concepts and Techniques, Jiawei Han, Micheline Kamber, Harcourt India.

REFERENCE BOOKS:
3. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson.
5. Data Warehousing Fundamentals, Paulraj Ponnaiah, Wiley.
6. The Data Warehouse Life cycle Tool kit, Ralph Kimball, Wiley.
MCA09.4.4.1 EMBEDDED SYSTEMS AND REAL TIME SYSTEMS
(Elective I)

Unit I: Introduction to Embedded systems:
What is an embedded system Vs. General computing system, history, classification, major application areas, purpose of embedded systems.
Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT II: 8—bit microcontrollers architecture:
Characteristics, quality attributes, application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT III:
Interrupt, timers and serial ports of 8051
8051 interrupts, interfacing ADC 0801, Timers, serial port, Reset circuit, power saving modes.

UNIT IV: Programming the 8051 Micro controller:
Addressing modes, Instruction set, sata transfer instructions, Arithmetic Instructions, Logical Instructions, Arithmetic Instructions, logical instructions, Boolean, Program control transfer instructions.

UNIT V:
RTOS and Scheduling
Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT VI:
Task communication of RTOS
Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher’s problem.

UNIT VII:
The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects,
events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT VIII:

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I: Introduction:
Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

UNIT II: The graphical user interface:
Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – interface popularity, characteristics- Principles of user interface.

UNIT III: Design process
Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT IV: Screen Designing :
Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

UNIT V: Windows:
Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT VI: Components :
Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

UNIT VII: Software tools :

UNIT VIII: Interaction Devices:
Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

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TEXT BOOKS:
2. The Essential guide to user interface design, 2/e, Wilbert O Galitz, Wiley DreamaTech.

REFERENCE BOOKS:
3. Designing the user interface. 4/e, Ben Shneidermann, PEA.
4. User Interface Design, Soren Lauesen, PEA.
5. Interaction Design PRECE, ROGERS, SHARPS, Wiley.
MCA09.4.4.3 ERP & SUPPLY CHAIN MANAGEMENT
(Elective I)

UNIT I: Introduction to ERP:

UNIT II: ERP Implementation:

UNIT III: Business Modules:

UNIT IV: Fundamentals of Supply Chain Management:
Supply chain networks, Integrated supply chain planning, Decision phases in a supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT V: SCM Strategies, Performance:
Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT VI: Planning and Managing Inventories:
Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multi-echelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT VII: Distribution Management:

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Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

UNIT VIII: Strategic Cost Management in Supply Chain:
The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

TEXT BOOKS:
1. ERP Demystified, 2/e, Alexis Leon, TMH, 2007.

REFERENCE BOOKS:
4. Enterprise Resource Planning Concepts and Practice, 7/e, Vinod Kumar, PHI.
5. Enterprise Resource Planning, Mary Sumner, PEA.
7. Supply Chain Management on Demand, An Fromm, Springer.
MCA09.4.5.1 DISTRIBUTED OPERATING SYSTEMS
(Elective II)

UNIT I: Processes:

UNIT II: Naming Systems:

UNIT III: Synchronization:
Clock synchronization, logical clocks, global state, election algorithms, mutual exclusion, distributed transactions.

UNIT IV: Consistency and Replication:
Introduction, Data-Centric Consistency Models, Client-Centric Consistency Models, Distribution Protocols, Consistency Protocols, Examples: Orca and Causally-Consistent Lazy Replication.

UNIT V: Fault Tolerance:
Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

UNIT VI: Distributed Object-Based Systems:
CORBA, Distributed Com, Globe and Comparison of CORBA, DCOM, and Globe.

UNIT VII: Distributed File Systems:

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UNIT VIII: Distributed Document-Based Systems and Coordination-Based Systems:
Distributed Coordination-Based Systems: Introduction to Coordination Models, TIB/Rendezvous, JINI, Comparison of TIB/Rendezvous and JINI.

TEXT BOOKS:
1. Distributed Systems , Principles and Paradigms, 2/e, Tanenbaum, Maarten Van Steen, PHI.

REFERENCE BOOKS:
3. Distributed Operating Systems and Algorithm Analysis, Chow, Johnson, PEA
4. Distributed Systems Concepts and Design, 4/e, George Coulouris, Dollimore, Kindberg, PEA.
UNIT I: Introduction to Mobile Communications and Computing:

UNIT II: (Wireless) Medium Access Control:
Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT III: Mobile Network Layer:
Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT IV: Mobile Transport Layer:
Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT V: Database Issues:
Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT VI: Data Dissemination:
Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT VII: Mobile Ad hoc Networks (MANETs):
Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT VIII: Protocols and Tools:
Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT BOOKS:
3. Adhoc Wireless Networks, 2/e, Sivaram murthy, Manoj, PEA, 2009

REFERENCE BOOKS:
MCA09.4.5.3 COMPILER DESIGN  
(Elective II)

UNIT I : Overview of Compilation:
Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common
programming language features, pass and Phases of translation, interpretation, bootstrapping, data
structures in compilation – LEX lexical analyzer generator.

UNIT II : Parsing:
Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive
parsing, Preprocessing steps required for predictive parsing.
Bottom up parsing: - Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling
ambiguous grammar, YACC – automatic parser generator.

UNIT III : Semantic analysis:
Intermediate forms of source Programs – abstract syntax tree, Attributed grammars, Syntax directed
translation, Conversion of popular Programming languages language Constructs into Intermediate code
forms, Type checker.

UNIT IV : Symbol Tables:
Symbol table format, organization for block structured languages, hashing, tree structures representation
of scope information. Block structures and non block structure storage allocation: static, Runtime stack
and heap storage allocation, storage allocation for arrays, strings and records.

UNIT V : Code Generation :
Processing the intermediate Code- Interpretation, Code generation, Simple code generation, code
generation for basic blocks, BURS Code generation and dynamic programming, Register allocation by
graph coloring, Evaluation of code generation techniques Preprocessing the intermediate code, post
processing the target code, machine code generation.

UNIT VI : Code optimization:
Consideration for Optimization, Machine dependent and machine independent code optimization, Scope
of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.
UNIT VII : Data flow analysis:
Dataflow Analysis, Intermediate representation for flow analysis , Various dataflow analyses ,
Transformations using dataflow analysis Speeding up dataflow analysis , Alias analysis.

UNIT VIII : Loop Optimizations:
D dominators, Loop-invariant computations, Induction variables, Array bounds checks, Loop unrolling

TEXT BOOKS:

REFERENCE BOOKS :
4. LEX & YACC , John R. Levine, Tony Mason, Doug Brown, O'reilly