SOFTWARE ARCHITECTURES

Subject Code: 10IS81	**I.A. Marks : 25**
Hours/Week : 04	**Exam Hours: 03**
Total Hours : 52	**Exam Marks: 100**

PART – A

UNIT – 1   **6 Hours**
Introduction: The Architecture Business Cycle: Where do architectures come from? Software processes and the architecture business cycle; What makes a "good" architecture? What software architecture is and what it is not; Other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture; Architectural structures and views.

UNIT – 2   **7 Hours**
Architectural Styles and Case Studies: Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures. Case Studies: Keyword in Context; Instrumentation software; Mobile robotics; Cruise control; Three vignettes in mixed style.

UNIT – 3   **6 Hours**
Quality: Functionality and architecture; Architecture and quality attributes; System quality attributes; Quality attribute scenarios in practice; Other system quality attributes; Business qualities; Architecture qualities. Achieving Quality: Introducing tactics; Availability tactics; Modifiability tactics; Performance tactics; Security tactics; Testability tactics; Usability tactics; Relationship of tactics to architectural patterns; Architectural patterns and styles.

UNIT – 4   **7 Hours**
Architectural Patterns – 1: Introduction; From mud to structure: Layers, Pipes and Filters, Blackboard.

PART – B

UNIT – 5   **7 Hours**
Architectural Patterns – 2: Distributed Systems: Broker; Interactive Systems: MVC, Presentation-Abstraction-Control.

UNIT – 6   **6 Hours**
Architectural Patterns – 3: Adaptable Systems: Microkernel; Reflection.

UNIT – 7   **6 Hours**
Some Design Patterns: Structural decomposition: Whole – Part;
Organization of work: Master – Slave; Access Control: Proxy.

UNIT – 8   **7 Hours**
Designing and Documenting Software Architecture: Architecture in the life cycle; Designing the architecture; Forming the team structure; Creating a skeletal system. Uses of architectural documentation; Views; Choosing the relevant views; Documenting a view; Documentation across views.

Text Books:
1. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, 2nd Edition, Pearson Education, 2003.
   (Chapters 1, 2, 4, 5, 7, 9)
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2007.
   (Chapters 2, 3.1 to 3.4)
3. Mary Shaw and David Garlan: Software Architecture- Perspectives on an Emerging Discipline, Prentice-Hall of India, 2007.
   (Chapters 1.1, 2, 3)

Reference Books:
1. E. Gamma, R. Helm, R. Johnson, J. Vlissides: Design Patterns- Elements of Reusable Object-Oriented Software, Pearson Education, 1995.

Web Reference: http://www.hillside.net/patterns/

SYSTEM MODELING AND SIMULATION

Sub Code: 10CS82   **IA Marks**   **: 25**
Hrs/Week: 04   **Exam Hours**   **: 03**
Total Hrs   **: 52**   **Exam**
Marks   : 100

PART – A
UNIT – 1   **8 Hours**
Introduction: When simulation is the appropriate tool and when it is not appropriate; Advantages and disadvantages of Simulation; Areas of

application; Systems and system environment; Components of a system; Discrete and continuous systems; Model of a system; Types of Models; Discrete-Event System Simulation; Steps in a Simulation Study. The basics of Spreadsheet simulation, Simulation example: Simulation of queuing systems in a spreadsheet.

UNIT – 2   **6 Hours**
General Principles, Simulation Software: Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using Event Scheduling; List processing. Simulation in Java; Simulation in GPSS

UNIT – 3   **6 Hours**
Statistical Models in Simulation: Review of terminology and concepts; Useful statistical models; Discrete distributions; Continuous distributions; Poisson process; Empirical distributions.

UNIT – 4   **6 Hours**
Queuing Models: Characteristics of queuing systems; Queuing notation; Long-run measures of performance of queuing systems; Steady-state behavior of M/G/1 queue; Networks of queues; Rough-cut modeling: An illustration..

PART – B

UNIT – 5   **8 Hours**
Random-Number Generation, Random-Variate Generation: Properties of random numbers; Generation of pseudo-random numbers; Techniques for generating random numbers; Tests for Random Numbers Random-Variate Generation: Inverse transform technique; Acceptance-Rejection technique; Special properties.

UNIT – 6   **6 Hours**
Input Modeling : Data Collection; Identifying the distribution with data; Parameter estimation; Goodness of Fit Tests; Fitting a non-stationary Poisson process; Selecting input models without data; Multivariate and Time-Series input models.

UNIT – 7   **6 Hours**
Estimation of Absolute Performance: Types of simulations with respect to output analysis; Stochastic nature of output data; Absolute measures of performance and their estimation; Output analysis for terminating simulations; Output analysis for steady-state simulations.

UNIT – 8   6 Hours
Verification, Calibration, and Validation; Optimization: Model building, verification and validation; Verification of simulation models; Calibration and validation of models, Optimization via Simulation

Text Books:
1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol: Discrete-Event System Simulation, 5th Edition, Pearson Education, 2010.
   (Listed topics only from Chapters1 to 12)

Reference Books:
1. Lawrence M. Leemis, Stephen K. Park: Discrete – Event Simulation: A First Course, Pearson Education, 2006.
2. Averill M. Law: Simulation Modeling and Analysis, 4th Edition, Tata McGraw-Hill, 2007.

WIRELESS NETWORKS AND MOBILE COMPUTING

Sub Code: 10IS831	**IA Marks**	**: 25**
Hrs/Week: 04	**Exam Hours**	**: 03**
Total Hrs: 52	**Exam Marks**	**: 100**

PART-A
UNIT – 1   6 Hours
Mobile Computing Architecture: Types of Networks, Architecture for Mobile Computing, 3-tier Architecture, Design Considerations for Mobile Computing

UNIT – 2   7 Hours
Wireless Networks – 1: GSM and SMS: Global Systems for Mobile Communication (GSM and Short Service Messages (SMS): GSM Architecture, Entities, Call routing in GSM, PLMN Interface, GSM Addresses and Identities, Network Aspects in GSM, Mobility Management, GSM Frequency allocation. Introduction to SMS, SMS Architecture, SM MT, SM MO, SMS as Information bearer, applications

UNIT – 3   6 Hours
Wireless Networks – 2: GPRS : GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Billing and Charging in GPRS

UNIT – 4   **7 Hours**
Wireless Networks – 3: CDMA, 3G and WiMAX: Spread Spectrum technology, IS-95, CDMA versus GSM, Wireless Data, Third Generation Networks, Applications on 3G, Introduction to WiMAX.

PART - B
UNIT – 5   **6 Hours**
Mobile Client: Moving beyond desktop, Mobile handset overview, Mobile phones and their features, PDA, Design Constraints in applications for handheld devices.Mobile IP: Introduction, discovery, Registration, Tunneling, Cellular IP, Mobile IP with IPv6

UNIT – 6   **7 Hours**
Mobile OS and Computing Environment: Smart Client Architecture, The Client: User Interface, Data Storage, Performance, Data Synchronization, Messaging. The Server: Data Synchronization, Enterprise Data Source, Messaging. Mobile Operating Systems: WinCE, Palm OS, Symbian OS, Linux, Proprietary OS Client Development : The development process, Need analysis phase, Design phase, Implementation and Testing phase, Deployment phase, Development Tools, Device Emulators.

UNIT – 7   **6 Hours**
Building, Mobile Internet Applications: Thin client: Architecture, the client, Middleware, messaging Servers, Processing a Wireless request, Wireless Applications Protocol (WAP) Overview, Wireless Languages: Markup Languages, HDML, WML, HTML, cHTML, XHTML, VoiceXML.

UNIT – 8   **7 Hours**
J2ME: Introduction, CDC, CLDC, MIDP; Programming for CLDC, MIDlet model, Provisioning, MIDlet life-cycle, Creating new application, MIDlet event handling, GUI in MIDP, Low level GUI Components, Multimedia APIs; Communication in MIDP, Security Considerations in MIDP.

Text Books:

1. Dr. Ashok Talukder, Ms Roopa Yavagal, Mr. Hasan Ahmed: Mobile Computing, Technology, Applications and Service Creation, 2d Edition, Tata McGraw Hill, 2010
2. Martyn Mallik: Mobile and Wireless Design Essentials, Wiley, 2003

Reference Books:
1. Raj kamal: Mobile Computing, Oxford University Press, 2007.
2. Iti Saha Misra: Wireless Communications and Networks, 3G and Beyond, Tata McGraw Hill, 2009.

WEB 2.0 AND RICH INTERNET APPLICATIONS

Sub Code: 10IS832	**IA Marks**	**: 25**	
Hrs/ Week: 04	**Exam Hours**	**: 03**	
Total Hours: 52	**Exam Marks**	**: 100**	

PART - A

UNIT – 1   **6 Hours**

Introduction, Ajax – 1: Web 2.0 and Rich Internet Applications, Overview of Ajax, Examples of usage of Ajax: Updating web page text, Chatting in real time, Dragging and dropping, Downloading images. Creating Ajax Applications: An example, Analysis of example ajax.html, Creating the JavaScript, Creating and opening the XMLHttpRequest object, Data download, Displaying the fetched data, Connecting to the server, Adding Server-side programming, Sending data to the server using GET and POST, Using Ajax together with XML.

UNIT – 2   **7 Hours**

Ajax – 2: Handling multiple XMLHttpRequest objects in the same page, Using two XMLHttpRequest objects, Using an array of XMLHttpRequest objects, Using inner functions, Downloading JavaScript, connecting to Google Suggest, Creating google.php, Downloading from other domains with Ajax, HTML header request and Ajax, Defeating caching, Examples.Building XML and working with XML in JavaScript, Getting the document element, Accessing any XML element, Handling whitespace in Firefox, Handling cross-browser whitespace, Accessing XML data directly, Validating XML, Further examples of Rich Internet Applications with Ajax.

UNIT – 3   **6 Hours**

Ajax – 3: Drawing user's attention to downloaded text, Styling text, colors and background using CSS, Setting element location in the web pages, Setting the stacking order of web page elements, Further examples of using Ajax. Displaying all the data in an HTML form, Working with PHP server variables, Getting the data in to array format, Wrapping applications in to a single PHP page, Validating input from the user, Validating integers and text, DOM, Appending new elements to a web page using the DOM and Ajax, Replacing elements using the DOM, Handling timeouts in Ajax, Downloading images with Ajax, Example programs.

UNIT – 4   **7 Hours**

Flex – 1 : Introduction: Understanding Flex Application Technologies, Using Flex Elements, Working with Data Services (Loading Data at Runtime), The Differences between Traditional and Flex Web Applications, Understanding

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How Flex Applications Work, Understanding Flex and Flash Authoring. Building Applications with the Flex Framework: Using Flex Tool Sets, Creating Projects, Building Applications, Deploying Applications Framework Fundamentals: Understanding How Flex Applications Are Structured, Loading and Initializing Flex Applications, Understanding the Component Life Cycles, Loading One Flex Application into Another Flex Application, Differentiating Between Flash Player and the Flex Framework, Caching the Framework, Understanding Application Domains, Localization, Managing Layout: Flex Layout Overview, Making Fluid Interfaces, Putting It All Together.

PART B

UNIT – 5   **7 Hours**
Flex – 2: MXML: Understanding MXML Syntax and Structure, Making MXML Interactive Working with UI Components: Understanding UI Components, Buttons, Value Selectors, Text Components, List-Based Controls, Pop-Up Controls, Navigators, Control Bars Customizing Application Appearance: Using Styles, Skinning components, Customizing the preloader, Themes, Runtime CSS

UNIT – 6   **6 Hours**
Flex – 3: ActionScript: Using ActionScript, MXML and ActionScript Correlations, Understanding ActionScript Syntax, Variables and Properties, Inheritance, Interfaces, Handling Events, Error Handling, Using XML

UNIT – 7   **7 Hours**
Flex – 4: Managing State: Creating States, Applying States, Defining States, Adding and Removing Components, Setting Properties, Setting Styles, Setting Event Handlers, Using Action Scripts to Define States, Managing Object Creation Policies, Handling State Events, Understanding State Life Cycles, When To Use States.Using Effects and Transitions: Using Effects, Creating Custom Effects, Using Transitions, Creating Custom Transitions.

UNIT – 8   **6 Hours**
Flex – 5: Working with Data: Using Data Models, Data Binding, Enabling Data Binding for Custom Classes, Data Binding Examples, Building data binding proxies.Validating and Formatting Data: Validating user input, Formatting Data.

Text Books:
1. Steven Holzner: Ajax: A Beginner's Guide, Tata McGraw Hill, 2009.
   (Listed topics from Chapters 3, 4, 6, 7, 11, 12)

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2. Chafic Kazon and Joey Lott: Programming Flex 3, O'Reilly, June 2009.
   (Listed topics from Chapters 1 to 8, 12 to 15)

Reference Books:
1. Jack Herrington and Emily Kim: Getting Started with Flex 3, O'Reilly, 1st Edition, 2008.
2. Michele E. Davis and John A. Phillips: Flex 3 - A Beginner's Guide, Tata McGraw-Hill, 2008.
3. Colin Moock: Essential Actionscript 3.0, O'Reilly Publications, 2007.
4. Nicholas C Zakas et al : Professional Ajax, 2nd Edition, Wrox / Wiley India, 2007.

USER INTERFACE DESIGN

Sub Code: 10IS833	IA Marks : 25
Hrs/Week: 04	Exam Hours : 03
Total Hrs: 52	Exam Marks : 100

PART - A

UNIT 1   **8 Hours**
Usability of Interactive Systems: Introduction, Usability Requirements, Usability measures, Usability
Motivations, Universal Usability, Goals for our profession
Guideline, principles, and Theories: Introduction, Guidelines, principles, Theories, Object-Action Interface Model

UNIT 2   **5 Hours**
Managing Design Processes: Introduction, Organizational Design to support Usability, The Three pillars of design, Development Methodologies, Ethnographic Observation, Participatory Design, Scenario Development, Social Impact statement for Early Design Review, Legal Issues.

UNIT 3   **7 Hours**
Evaluating Interface Designs: Introduction, Expert Reviews, Usability Testing and Laboratories, Survey Instruments, Acceptance Tests, Evaluation During Active Use, Controlled Psychologically Oriented Experiments.
Software Tools: Introduction, Specification Methods, Interface-Building Tools, Evaluation and Critiquing Tools.

UNIT 4   **8 Hours**

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Direct Manipulation and Virtual Environments: Introduction, Examples of Direct Manipulation, 3D Interfaces, Teleoperation, Virtual and Augmented Reality.

Menu Selection, Form Fillin, and Dialog Boxes: Introduction, Task-Related Menu Organization, Single Menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data Entry with Menus: Form Fillin, Dialog Boxes, and Alternatives, Audio Menus and Menus for small Displays.

PART - B

UNIT 5   **8 Hours**
Command and Natural Languages: Introduction, Functionality to Support User's Tasks, Command-Organization Strategies, The Benefits of Structure, Naming and Abbreviations, Natural Language in Computing.

Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory interfaces, Displays-Small and Large, Printers.

UNIT 6   **6 Hours**
Quality of Service: Introduction, Models of Response-Time Impacts, Expectations and Attitudes, User Productivity, Variability in Response Time, Frustrating Experiences.

Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Window Design, Color.

UNIT 7   **5 Hours**
User Manuals, Online Help, and Tutorials: Introduction, Paper versus Online Manuals, Reading from Paper Verses from Displays, Shaping the Content of the Manuals, Online Manuals and Help, Online Tutorials, Demonstrations, and Guides, Online Communities for User Assistance, the Development Process.

UNIT 8
5 Hours
Information Search and Visualization: Introduction, Search in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Search Interfaces, Information Visualization

Text Books:
1. Ben Shneiderman: Designing the User Interface, 4rd Edition, Pearson Education, 2009.
   (Chapters 1 to 9 and 11 to 14)

Reference Books:
1. Alan J Dix et. al.: Human-Computer Interaction, II Edition, Prentice-Hall India, 1998.

2. Eberts: User Interface Design, Prentice-Hall, 1994.
3. Wilber O Galitz: The Essential Guide to User Interface Design - An Introduction to GUI Design, Principles and Techniques, Wiley-Dreamtech India Pvt. Ltd, 1998.

NETWORK MANAGEMENT SYSTEMS

Sub Code: 10IS834	IA Marks	: 25
Hrs/Week: 04	Exam Hours	: 03
Total Hrs: 52	Exam Marks	: 100

PART – A

UNIT 1   **7 Hours**
Introduction: Analogy of Telephone Network Management, Data   and Telecommunication Network Distributed computing Environments, TCP/IP-Based Networks: The Internet and Intranets, Communications Protocols and Standards- Communication Architectures, Protocol Layers and Services; Case Histories of Networking and Management – The Importance of topology , Filtering Does Not Reduce Load on Node, Some Common Network Problems; Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions- Goal of Network Management, Network Provisioning, Network Operations and the NOC, Network Installation and Maintenance; Network and System Management, Network Management System platform, Current Status and Future of Network Management.

UNIT 2   **6 Hours**
Basic Foundations: Standards, Models, and Language: Network Management Standards, Network Management Model, Organization Model, Information Model – Management Information Trees, Managed Object Perspectives, Communication Model; ASN.1- Terminology, Symbols, and Conventions, Objects and Data Types, Object Names, An Example of ASN.1 from ISO 8824; Encoding Structure; Macros, Functional Model.

UNIT 3   **6 Hours**
SNMPv1 Network Management - 1: Managed Network: The History of SNMP Management, Internet Organizations and standards, Internet Documents, The SNMP Model, The Organization Model, System Overview.

UNIT 4   **7 Hours**
SNMPv1 Network Management – 2: The Information Model – Introduction, The Structure of Management Information, Managed Objects, Management Information Base.The SNMP Communication Model – The SNMP Architecture, Administrative Model, SNMP Specifications, SNMP

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Operations, SNMP MIB Group, Functional Model

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PART - B

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UNIT 5   **6 Hours**
SNMP Management – RMON: Remote Monitoring, RMON SMI and MIB, RMONI1- RMON1 Textual Conventions, RMON1 Groups and Functions, Relationship Between Control and Data Tables, RMON1 Common and Ethernet Groups, RMON Token Ring Extension Groups, RMON2 – The RMON2 Management Information Base, RMON2 Conformance Specifications; ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON.

UNIT 6   **6 Hours**
Broadband Network Management: ATM Networks: Broadband Networks and Services, ATM Technology – Virtual Path-Virtual Circuit, TM Packet Size, Integrated Service, SONET, ATM LAN Emulation, Virtual LAN; ATM Network Management – The ATM Network Reference Model, The Integrated Local Management Interface, The ATM Management Information Base, The Role of SNMP and ILMI in ATM Management, M1 Interface: Management of ATM Network Element, M2 Interface: Management of Private Networks, M3 Interface: Customer Network Management of Public Networks, M4 Interface: Public Network Management, Management of LAN Emulation, ATM Digital Exchange Interface Management.

UNIT 7   **6 Hours**
Broadband Network Management: Broadband Access Networks and Technologies – Broadband Access Networks, roadband Access Technology; HFCT Technology – The Broadband LAN, The Cable Modem, The Cable Modem Termination System, The HFC Plant, The RF Spectrum for Cable Modem; Data Over Cable Reference Architecture; HFC Management – Cable Modem and CMTS Management, HFC Link Management, RF Spectrum Management, DSL Technology; Asymmetric Digital Subscriber Line Technology – Role of the ADSL Access Network in an Overall Network, ADSL Architecture, ADSL Channeling Schemes, ADSL Encoding Schemes; ADSL Management – ADSL Network Management Elements, ADSL Configuration Management, ADSL Fault Management, ADSL Performance Management, SNMP-Based ADSL Line MIB, MIB Integration with Interfaces Groups in MIB-2, ADSL Configuration Profiles.

UNIT 8   **8 Hours**
Network Management Applications: Configuration Management- Network Provisioning, Inventory Management, Network Topology, Fault Management- Fault Detection, Fault Location and Isolation Techniques,

Performance Management – Performance Metrics, Data Monitoring, Problem Isolation, Performance Statistics; Event Correlation Techniques – Rule-Based Reasoning, Model-Based Reasoning, Case-Based Reasoning, Codebook correlation Model, State Transition Graph Model, Finite State Machine Model, Security Management – Policies and Procedures, Security Breaches and the Resources Needed to Prevent Them, Firewalls, Cryptography, Authentication and Authorization, Client/Server Authentication Systems, Messages Transfer Security, Protection of Networks from Virus Attacks, Accounting Management, Report Management, Policy-Based Management, Service Level Management.

Text Books:
1. Mani Subramanian: Network Management- Principles and Practice, 2nd Edition, Pearson Education, 2010.

Reference Books:
1. J. Richard Burke: Network management Concepts and Practices: a Hands-On Approach, PHI, 2008.

INFORMATION AND NETWORK SECURITY

Subject Code: 10IS835	**I.A. Marks : 25**
Hours/Week : 04	**Exam Hours: 03**
Total Hours : 52	**Exam Marks: 100**

PART – A

UNIT 1   **6 Hours**
Planning for Security: Introduction; Information Security Policy, Standards, and Practices; The Information Security Blue Print; Contingency plan and a model for contingency plan

UNIT 2   **6 Hours**
Security Technology-1: Introduction; Physical design; Firewalls; Protecting Remote Connections

UNIT 3   **6 Hours**
Security Technology – 2: Introduction; Intrusion Detection Systems (IDS); Honey Pots, Honey Nets, and Padded cell systems; Scanning and Analysis Tools

UNIT 4   **8 Hours**
Cryptography: Introduction; A short History of Cryptography; Principles of Cryptography; Cryptography Tools; Attacks on Cryptosystems.

UNIT 5   **8 Hours**
Introduction to Network Security, Authentication Applications: Attacks, services, and Mechanisms; Security Attacks; Security Services; A model for Internetwork Security; Internet Standards and RFCs Kerberos, X.509 Directory Authentication Service.

UNIT 6   **6 Hours**
Electronic Mail Security: Pretty Good Privacy (PGP); S/MIME

UNIT 7   **6 Hours**
IP Security: IP Security Overview; IP Security Architecture; Authentication Header; Encapsulating Security Payload; Combining Security Associations; Key Management.

UNIT 8   **6 Hours**
Web Security: Web security requirements; Secure Socket layer (SSL) and Transport layer Security (TLS); Secure Electronic Transaction (SET)

Text Books:
1. Michael E. Whitman and Herbert J. Mattord: Principles of Information Security, 2nd Edition, Cengage Learning, 2005. (Chapters 5, 6, 7, 8; Exclude the topics not mentioned in the syllabus)
2. William Stallings: Network Security Essentials: Applications and Standards, 3rd Edition, Pearson Education, 2007. (Chapters: 1, 4, 5, 6, 7, 8)

Reference Book:
1. Behrouz A. Forouzan: Cryptography and Network Security, Special Indian Edition, Tata McGraw-Hill, 2007.

MICROCONTROLLER-BASED SYSTEMS

Subject Code: 10IS836	**I.A. Marks : 25**
Hours/Week : 04	**Exam Hours: 03**
Total Hours : 52	**Exam Marks: 100**

PART – A

UNIT 1   **7 Hours**
Introduction, 8051 Assembly Language Programming – 1: Microcontrollers and embedded processors; Overview of the 8051 family 8051 Assembly Language Programming (ALP) -1: Inside the 8051;

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Introduction to 8051 ALP; Assembling and running an 8051 program; The PC and ROM space in 8051; Data types, directives, flag bits, PSW register, register banks, and the stack.

UNIT 2   **6 Hours**
ALP – 2: Jump and loop instructions; Call instructions; Time delay for various 8051 family members; I/O programming; I/O bit manipulation programming. Immediate and register addressing modes; Accessing memory using various addressing modes.

UNIT 3   **7 Hours**
ALP – 3 - Programming in C: Bit addresses for I/O and RAM; Extra 128 bytes of on-chip RAM in 8052.Arithmetic instructions; Signed numbers and arithmetic operations; Logic and compare instructions; rotate instruction and serialization; BCD, ASCII, and other application programs. Programming in C: Data types and time delays; I/O programming; Logic operations; Data conversion programs; Accessing code ROM space; Data serialization.

UNIT 4   **6 Hours**
Pin Description, Timer Programming: Pin description of 8051; Intel Hex file; Programming the 8051 timers; Counter programming; Programming Timers 0 and 1 in C.

PART – B
UNIT 5   **6 Hours**
Serial Port Programming, Interrupt Programming: Basics of serial communications; 8051 connections to RS232; Serial port programming in assembly and in C 8051 interrupts; Programming timer interrupts; Programming external hardware interrupts; Programming the serial communications interrupt; Interrupt priority in 8051 / 8052; Interrupt programming in C.

UNIT 6   **7 Hours**
Interfacing LCD, Keyboard, ADC, DAC and Sensors : LCE interfacing; Keyboard interfacing; Parallel and serial ADC; DAC interfacing; Sensor interfacing and signal conditioning

UNIT 7   **7 Hours**
Interfacing to External Memory, Interfacing with 8255: Memory address decoding; Interfacing 8031 / 8051 with external ROM; 8051 data memory space; Accessing external data memory in C. Interfacing with 8255; Programming 8255 in C.

UNIT 8   **6 Hours**
DS12887 RTC interfacing and Programming, Applications: DS12887
RTC interfacing; DS12887 RTC programming in C; Alarm, SQW, and IRQ
features of DS12886 Relays and opto-isolators; Stepper motor interfacing;
DC motor interfacing and PWM

Text Books:
1. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D.
   McKinlay: The 8051 Microcontroller and Embedded Systems using
   Assembly and C, 2nd Edition, Pearson Education, 2008.

Reference Books:
1. Raj Kamal: Microcontrollers Architecture, Programming,
   Interfacing and System Design, Pearson Education, 2007.
2. Dr. Ramani Kalpathi, Ganesh Raja: Microcontrollers and
   Applications, 1st Revised Edition, Sanguine - Pearson, 2010.

ADHOC NETWORKS

Sub Code: 10IS841	**IA Marks**	**: 25**
Hrs/Week: 04	**Exam Hours**	**: 03**
Total Hrs: 52	**Exam Marks**	**: 100**

PART – A

UNIT 1   **6 Hours**
Introduction: Ad hoc Networks: Introduction, Issues in Ad hoc wireless
networks, Ad hoc wireless internet.
UNIT 2   **7 Hours**
MAC – 1: MAC Protocols for Ad hoc wireless Networks: Introduction,
Issues in designing a MAC protocol for Ad hoc wireless Networks, Design
goals of a MAC protocol for Ad hoc wireless Networks, Classification of
MAC protocols, Contention based protocols with reservation mechanisms.

UNIT 3   **6 Hours**
MAC – 2: Contention-based MAC protocols with scheduling mechanism,
MAC protocols that use directional antennas, Other MAC protocols.

UNIT 4   **7 Hours**
Routing – 1: Routing protocols for Ad hoc wireless Networks: Introduction,
Issues in designing a routing protocol for Ad hoc wireless Networks,
Classification of routing protocols, Table drive routing protocol, On-demand
routing protocol.

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PART- B

UNIT 5   **6 Hours**

Routing – 2: Hybrid routing protocol, Routing protocols with effective flooding mechanisms, Hierarchical routing protocols, Power aware routing protocols

UNIT 6   **7 Hours**

Transport Layer: Transport layer protocols for Ad hoc wireless Networks: Introduction, Issues in designing a transport layer protocol for Ad hoc wireless Networks, Design goals of a transport layer protocol for Ad hoc wireless Networks, Classification of transport layer solutions, TCP over Ad hoc wireless Networks, Other transport layer protocols for Ad hoc wireless Networks.

UNIT 7   **6 Hours**

Security: Security: Security in wireless Ad hoc wireless Networks, Network security requirements, Issues & challenges in security provisioning, Network security attacks, Key management, Secure routing in Ad hoc wireless Networks.

UNIT 8   **7 Hours**

QoS: Quality of service in Ad hoc wireless Networks: Introduction, Issues and challenges in providing QoS in Ad hoc wireless Networks, Classification of QoS solutions, MAC layer solutions, network layer solutions.

Text Books:
1. C. Siva Ram Murthy & B. S. Manoj: Ad hoc Wireless Networks, 2nd Edition, Pearson Education, 2005.

Reference Books:
1. Ozan K. Tonguz and Gianguigi Ferrari: Ad hoc Wireless Networks, John Wiley, 2008.
2. Xiuzhen Cheng, Xiao Hung, Ding-Zhu Du: Ad hoc Wireless Networking, Kluwer Academic Publishers, 2004.
3. C.K. Toh: Adhoc Mobile Wireless Networks- Protocols and Systems, Pearson Education, 2002.

INFORMATION RETRIEVAL

Subject Code: 10IS842   **I.A. Marks: 25**
Hours/Week: 4   **Exam Marks: 100**
Total Hours: 52   **Exam Hours: 3**

PART – A

UNIT – 1   **7 Hours**
Introduction, Retrieval Strategies – 1: Introduction; Retrieval Strategies:
Vector Space Model; Probabilistic Retrieval strategies

UNIT – 2   **6 Hours**
Retrieval Strategies – 2: Some More Retrieval Strategies: Language
Models; Inference Networks; Extended Boolean Retrieval; Latent Semantic
Indexing; Neural Networks; Genetic Algorithms; Fuzzy Set Retrieval.

UNIT – 3   **7 Hours**
Retrieval Utilities: Relevance feedback; Clustering; Passage-Based
Retrieval; N-Grams; Regression Analysis; Thesauri; Semantic Networks;
Parsing.

UNIT – 4   **6 Hours**
Indexing and Searching: Introduction; Inverted Files; Other indices for text;
Boolean queries; Sequential searching; Pattern matching; Structural queries;
Compression.

PART – B

UNIT – 5   **6 Hours**
Cross-Language Information Retrieval and Efficiency: Introduction;
Crossing the language barrier; Cross-Language retrieval strategies; Cross
language utilities. Duplicate Document Detection.

UNIT – 6   **6 Hours**
Integrating Structured Data and Text: Review of the relational model; A
historical progression; Information retrieval as a relational application; Semi-
structured search using a relational schema; Multi-dimensional data model.

UNIT – 7   **7 Hours**
Parallel Information Retrieval, Distributed Information Retrieval:
Parallel text scanning; Parallel indexing; Clustering and classification; Large

parallel systems; A theoretic model of distributed information retrieval; Web search; Result fusion; Peer-to-Peer information systems; Other architectures.

UNIT – 8   **7 Hours**
Multimedia IR: Introduction; data modeling; Query languages; Spatial access methods; A general multimedia indexing approach; One-dimensional time series; Two-dimensional color images; Automatic picture extraction.

Text Books:
1. David A. Grossman, Ophir Frieder: Information Retrieval Algorithms and Heuristics, 2nd Edition, Springer, 2004.
   (Chapters 1, 2, 3, 4, 5, 6, 7, 8)
2. Ricardo Baeza-Yates, Berthier Ribeiro-Neto: Modern Information Retrieval, Pearson Education, 1999
   (Chapters 8, 11, 12)

Reference Books:
1. William B. Frakes, Ricardo Baeza-Yates (Editors): Information Retrieval Data Structures & Algorithms, Pearson Education, 1992.

SUPPLY CHAIN MANAGEMENT

Subject Code: 10IS843   I.A. Marks: 25
Hours/Week: 4   Exam Marks: 100
Total Hours: 52   Exam Hours: 3

PART – A

UNIT – 1   **6 Hours**
Introduction to Supply Chain, Performance of Supply Chain: What is a Supply Chain; Decision phases in a supply Chain; Process view of a Supply Chain; The importance of Supply Chain Flows; Examples of Supply Chains.
Competitive and Supply Chain strategies; Achieving strategic fit; Expanding strategic scope.

UNIT – 2   **6 Hours**
Supply Cain drivers and Obstacles, Designing Distribution Network: Drivers of Supply Chain Performance; A framework for structuring drivers; Facilities, Inventory, Transportation, and Information; Obstacles to achieve strategic fit
The role of distribution in the Supply Chain; factors influencing distribution network design; Design options for a distribution network; the value of distributors in the Supply Chain; Distribution Networks in practice.

UNIT – 3   **7 Hours**

Network Design: The role of network design in the Supply Chain; Factors influencing Network design Decisions; A framework for Network Design Decisions; Models for facility Location and Capacity Allocation; making Network Design decisions in practice.

The impact of uncertainty on Network design; Discounted cash flow analysis; Representations of uncertainty; Evaluating Network Design decisions using Decision Trees; Making Supply Chain decisions under uncertainty in practice.

UNIT – 4   **7 Hours**

Demand Forecasting, Aggregate Planning: The role of forecasting in a Supply Chain; Characteristics of forecast; Components of a forecast and forecasting methods; Basic approach of Demand forecasting; Time series forecasting methods; Measures of forecast errors; The role of aggregate planning in a supply Chain; The aggregate planning problem; Aggregate planning strategies.

PART – B

UNIT – 5   **6 Hours**

Inventory Management: The role of cycle inventory in a supply Chain; Economies of scale to exploit fixed costs, quantity discounts; Short-term discounting; Managing multi-echelon cycle inventory; Estimating cycle inventory related costs in practice.

UNIT – 6   **7 Hours**

Transportation: The role of transportation in the Supply Chain; Factors affecting transportation decisions; Modes of transportation and their performance characteristics; Design options for a transportation network; Trade-offs in transportation design; Tailored transportation; Routing and scheduling in transportation; Making transportation decisions in practice.

UNIT – 7   **7 Hours**

Pricing and Revenue Management, Coordination : The role of revenue management in Supply Chain; revenue management for multiple customer segments, perishable assets, seasonal demand, and bulk and spot contracts; Using revenue management in practice

Lack of Supply Chain coordination and Bullwhip effect; Effect of lack of coordination on performance; Obstacles to coordination in the Supply Chain; managerial levers to achieve coordination; Building strategic partnerships and trust within a supply Chain; Achieving coordination in practice.

UNIT – 8 6 Hours

IT, Internet and Supply Chain: The role of IT in the Supply Chain; The Supply Chain IT framework; CRM; Internal SCM; Supplier Relationship Management; The transaction management foundation; The future if IT in SCM; Supply Chain It in practice.

The role of E-Business in Supply Chain; The E-Business framework; The B2B addition to the E-Business framework; E-Business in practice

Text Books:
1. Sunil Chopra, Pter Meindl: Supply Chain Management Strategy, Planning, and Operation, 3rd Edition, Pearson Education, 2007. (Chapters 1, 2, 4, 4, 5, 6, 7, 8.1 to 8.3, 10, 14, 15, 16, 17, 18)

Reference Books:
1. David Simchi-Levi, Philp Kaminky, Edith Simchi-Levi: Designing and Managing The Supply Chain Concepts, Strategies & Case Studies, 3rd Edition, Tata McGraw Hill, 2003.
2. R.P. Mohanty, S.G. Deshmukh: Supply Chain Management Theories & Practices, Bizmantra, 2005.
3. Rahul V. Altekar: Supply Chain Management Concepts and Cases, PHI, 2005.
4. M Martin Christopher: Logistics and Supply Chain Management, 2nd Edition, Pearson Education, 1998.

SERVICES ORIENTED ARCHITECTURE

Subject Code: 10IS844   **I.A. Marks: 25**
Hours/Week: 4   **Exam Marks: 100**
Total Hours: 52   **Exam Hours: 3**

PART – A

UNIT 1 7 Hours

Introduction o SOA, Evolution of SOA: Fundamental SOA; Common Characteristics of contemporary SOA; Common tangible benefits of SOA;An SOA timeline (from XML to Web services to SOA); The continuing evolution of SOA (Standards organizations and Contributing vendors); The roots of SOA (comparing SOA to Past architectures).

UNIT 2 6 Hours

Web Services and Primitive SOA : The Web services framework; Services (as Web services); Service descriptions (with WSDL); Messaging (with SOAP).

UNIT 3   **6 Hours**
Web Services and Contemporary SOA – 1: Message exchange patterns;
Service activity; Coordination; Atomic Transactions; Business activities;
Orchestration; Choreography

UNIT 4   **7 Hours**
Web Services and Contemporary SOA – 2:   Addressing;   Reliable
messaging; Correlation; Polices; Metadata exchange; Security; Notification
and eventing

PART – B
UNIT 5   **7 Hours**
Principles of Service – Orientation: Services-orientation and the enterprise;
Anatomy of a service-oriented architecture; Common Principles of Service-
orientation; How service orientation principles inter-relate; Service-
orientation and object-orientation; Native Web service support for service-
orientation principles.

UNIT 6   **6 Hours**
Service Layers: Service-orientation and contemporary SOA; Service layer
abstraction; Application service layer, Business service layer, Orchestration
service layer; Agnostic services; Service layer configuration scenarios

UNIT 7   **7 Hours**
Business Process Design: WS-BPEL language basics; WS-Coordination
overview; Service-oriented business process design; WS-addressing
language basics; WS-Reliable Messaging language basics

UNIT 8   **6 Hours**
SOA Platforms: SOA platform basics; SOA support in J2EE; SOA support in
.NET; Integration considerations

Text Books:
1. Thomas Erl: Service-Oriented Architecture – Concepts, Technology,
    and Design, Pearson Education, 2005.

Reference Books:
1. Eric Newcomer, Greg Lomow: Understanding SOA with Web
    Services, Pearson Education, 2005.

Clouds, Grids, and Clusters

Subject Code: 10IS845   **I.A. Marks: 25**
Hours/Week: 4   **Exam Marks: 100**
Total Hours: 52   **Exam Hours: 3**

PART – A

UNIT - 1   **6 Hours**
Introduction: Overview of Cloud Computing, Applications, Intranets and the Cloud, When can cloud Computing be used? Benefits and limitations, Security concerns, Regulatory issues

UNIT - 2   **6 Hours**
Business Case for Cloud, Examples of Cloud Services: Cloud computing services, Help to the business, Deleting the data center. Examples: Google, Microsoft, IBM, Salesforce.com and its uses, Cloud at Thomson Reuters.

UNIT - 3   **7 Hours**
Technology, Cloud Storage, Standards: Cloud Computing Technology: Clients, Security, Network, Services.
Overview of Cloud storage, Some providers of Cloud storage. Standards: Applications, Clients, Infrastructure, Service.

UNIT - 4   **7 Hours**
Other issues: Overview of SaaS (Software as a Service), Driving forces, Company offerings: Google, Microsoft, IBM. Software plus Service: Overview, Mobile device integration Local Clouds, Thin Clients, Migrating to the Cloud: Virtualization, Server solutions, Thin clients, Cloud services for individuals, mid-markets, and enterprises, Migration.

PART - B

UNIT - 5   **7 Hours**
GRID Computing – 1: Introduction: Data Center, The Grid and the Distributed/ High Performance Computing, Cluster Computing and Grid Computing, Metacomputing – the Precursor of Grid Computing, Scientific, Business and e-Governance Grids, Web services and Grid Computing, Business Computing and the Grid – a Potential Win win Situation, e-Governance and the Grid. Technologies and Architectures for Grid Computing: Clustering and Grid Computing, Issues in Data Grids, Key Functional Requirements in Grid Computing, Standards for Grid Computing , Recent Technological Trends in Large Data Grids.OGSA and WSRF: OGSA for Resource Distribution, Stateful Web Services in OGSA, WSRF (Web Services Resource Framework), Resource Approach to Stateful Services, WSRF Specification.

The Grid and the Database: Issues in Database Integration with the Grid, The Requirements of a Grid enabled database, Storage Request Broker (SRB), How to integrate the Database with the Grid? The Architecture of OGSA-DAI for Offering Grid Database Services

UNIT - 6   **6 Hours**
GRID Computing – 2: World Wide Grid Computing Activities, Organizations and Projects: Standards Organizations, Organizations Developing Grid Computing Tool Kits, Framework and Middleware, Grid Projects and Organizations Building and Using Grid Based Solutions. Web Services and the Service Oriented Architecture (SOA): History and Background, Service Oriented Architecture, How a Web Service Works, SOAP and WSDL, Description, Creating Web Services, Server Side. Globus Toolkit: History of Globus Toolkit, Versions of Globus Toolkit, Applications of GT4 – cases, GT4 – Approaches and Benefits, Infrastructure Management, Monitoring and Discovery, Security, Data, Choreography and Coordination, Main Features of GT4 Functionality – a Summary, GT4 Architecture, GT4 Command Line Programs, GT4 Containers.

UNIT - 7   **7 Hours**
Cluster Computing – 1: Introduction: What is Cluster Computing, Approaches to Parallel Computing, How to Achieve Low Cost Parallel Computing through Clusters, Definition and Architecture of a Cluster, What is the Functionality a Cluster can offer? Categories of Clusters Cluster Middleware: Levels and Layers of Single System Image (SSI), Cluster Middleware Design Objectives, Resource Management and Scheduling, Cluster Programming Environment and Tools. Early Cluster Architectures and High Throughput Computing Clusters: Early Cluster Architectures, High Throughput Computing Clusters, Condor. Setting up and Administering a Cluster: How to set up a Simple Cluster? Design considerations for the Front End of a Cluster, Setting up nodes, Clusters of Clusters or Metaclusters, System Monitoring, Directory Services inside the Clusters & DCE, Global Clocks Sync, Administering heterogeneous Clusters.

UNIT - 8   **6 Hours**
Cluster Computing – 2: Cluster Technology for High Availability: Highly Available Clusters, High Availability Parallel Computing, Mission Critical (or Business Critical or Business Continuity) Applications, Types of Failures and Errors, Cluster Architectures and Configurations for High Availability, Faults and Error Detection, Failure Recovery, Failover / Recovery Clusters. Performance Model and Simulation: Performance Measures and Metrics, Profit Effectiveness of Parallel Computing through Clusters. Process Scheduling, Load Sharing and Load Balancing: Job Management System (JMS) Resource Management System (RMS), Queues, Hosts, Resources, Jobs and Policies, Policies for Resource Utilization, Scheduling Policies

Load Sharing and Load Balancing, Strategies for Load Balancing, Modeling Parameters Case Studies of Cluster Systems: Beowulf, PARAM.

Text Books:
1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter: Cloud Computing, A Practical Approach, McGraw Fill, 2010.
2. Prabhu: Grid and Cluster Computing, PHI, 2007.

Reference Books:
1. Joshy Joseph, Craig Fellenstein: Grid Computing, Pearson Education, 2007.
2. Internet Resources

DECISION SUPPORT SYSTEMS

Subject Code: 10IS846   **I.A. Marks   : 25**
Hours/Week : 04   **Exam Hours: 03**
Total Hours : 52   **Exam Marks: 100**

PART - A

UNIT – 1   **6 Hours**
Decision Making and Computerized Support – 1: Managers and Decision Making, Managerial-Decision Making and Information Systems, Managers and Computer Support, Computerized Decision Support and the Supporting technologies, A frame work for decision support, The concept of Decision Support systems, Group Decision Support Systems, Enterprise Information Systems, Knowledge Management systems, Expert Systems, Artificial Neural Networks, Hybrid Support Systems.
Decision-Making Systems, Modeling, and Support: Introduction and Definitions, Systems, Models.

UNIT – 2   **6 Hours**
Decision Making and Computerized Support – 2: Phases of Decision-Making Process, Decision-Making: The Intelligence Phase, Decision Making: The Design Phase, Decision Making: The Choice Phase, Decision Making: Implementation Phase, How decisions are supported, Personality types, gender, human cognition, and decision styles; The Decision –Makers.

UNIT – 3   **6 Hours**
Decision Support Systems: An Overview: DSS Configuration, What is DSS? Characteristics and Capabilities of DSS, Components of DSS, The Data Management Subsystem, The   Model Management Subsystem, The

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User Interface Subsystem, The Knowledge-Based Management Subsystem, The User, DSS Hardware, DSS Classification.

UNIT – 4   **6 Hours**
Decision Support Systems Development: Introduction to DSS development, The Traditional System Development Life cycle, Alternate Development Methodologies, Prototyping: The DSS Development Methodology, DSS Technology Levels and Tools, DSS Development Platforms, DSS Development Tool Selection, Team-Developed DSS, End User-Developed DSS, Putting the System Together.

PART - B

UNIT – 5   **6 Hours**
Group Support Systems: Group Decision Making, Communication and Collaboration, Communication Support, Collaboration Support: Computer-Supported Cooperative work, Group Support Systems, Group Support Systems Technologies, Group Systems Meeting Room and Online, The GSS Meeting Process, Distance Learning, Creativity and Idea Generation.

UNIT – 6   **7 Hours**
Enterprise Information Systems: Concepts and definitions, Evolution of Executive and Enterprise Information Systems, Executive's roles and information needs, Characteristics and capabilities of Executive Support Systems, Comparing and integrating EIS and DSS, Supply and Value Chains and Decision Support, Supply Chain problems and solutions, MRP, ERP / ERM, SCM, CRM, PLM, BPM, and BAM.

UNIT – 7   **6 Hours**
Knowledge Management: Introduction, Organizational learning and Transformation, Knowledge management initiatives, Approaches to Knowledge management, IT in Knowledge management, Knowledge management systems implications, Role of people in Knowledge management, Ensuring success of Knowledge management.

UNIT – 8   **6 Hours**
Integration, Impacts, and the Future of Management-Support Systems: System Integration: An Overview, Models of MSS integration, Intelligent DSS, Intelligent modeling and model management, Integration with the Web, Enterprise systems, and Knowledge Management, The impact of MSS: An Overview, MSS impacts on organizations, Impact on individuals, Decision-Making and the Manager's job, Issues of legality, privacy, and ethics, Intelligent Systems and employment levels, Internet communities, Other societal impacts and the Digital Divide, The future of Management-Support Systems.

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Text Books:

1. Efraim Turban. Jay E. Aronson, Ting-Peng Liang: Decision Support Systems and Intelligent Systems, 8th Edition, Pearson Education, 2008.
   (Chapters 1, 2, 3, 6, 7, 8 excluding 8.7 to 8.9, 9, 15)

Reference Books:

1. Sprague R.H. Jr and H.J. Watson: Decision Support Systems, 4th Edition, Prentice Hall, 1996.