

| Code | Subject | T | P |
|-----------|--|---|---|
| MCA09.5.1 | Software Design Methodologies | 4 | - |
| MCA09.5.2 | Multimedia Application Development | 4 | - |
| MCA09.5.3 | Object Oriented Analysis and Design (using UML) | 4 | - |
| MCA09.5.4 | Elective-III MCA09.5.4.1 Software Project Management MCA09.5.4.2 Information Retrieval Systems MCA09.5.4.3 E-Commerce | 4 | - |
| MCA09.5.5 | Elective-IV MCA09.5.5.1 Middle Ware Technologies MCA09.5.5.2 Advanced Data Bases MCA09.5.5.3 Information Security | 4 | - |
| MCA09.5.6 | UML Lab | - | 4 |
| MCA09.5.7 | Multimedia Application Development Lab | - | 4 |

MCA III year II Sem (VI semester)

| Code | Subject |
|-----------|--|
| MCA09.6.1 | Project Seminar |
| MCA09.6.2 | Dissertation /Thesis Excellent/Good/Satisfactory/Not-Satisfactory |

UNIT I:

Basic concepts of Design: Introduction, Characteristics of design activities

Essential elements of designs

Design Quality: Software quality models: Hierarchical models, Relational models

The effect of design on software quality: efficiency, Correctness and reliability, Portability, Maintainability, Reusability, Interoperability

UNIT II:

Quality attributes of software design: Witt, Baker and Merritt's design objectives , Parnas and Weiss's requirements of good designs, Quality of development process

Design Principles: Basic rules of software design: Causes of difficulties, Vehicles to overcome difficulties, Basic rules of software design

Design processes: The context of design in software development process, Generic design process: descriptive models, structure of software design methods

UNIT III:

Software Architecture:

The notion of architecture: Architecture in the discipline of buildings, Architecture in the discipline of computer hardware, the general notion of architecture: The notion of software architecture: Prescriptive models, Descriptive models, Multiple view models, the roles of architecture in software design, software architectural style: Introductory examples, the notion of software architectural style

UNIT IV:

Description of Software Architectures: The visual notation: Active and passive elements, Data and control Relationships, Decomposition/Composition of architectural elements

UNIT V:

Typical Architectural Styles: Data flow: The general data flow styles, the pipe-and filter sub-style, the batch sequential processing sub-style

Independent components: the general independent components style, the event-based implicit invocation systems sub-style

Call and return: The general call and return style, the layered systems sub-style, data abstraction: the abstract data type and object-oriented sub-styles, Data-centred style, Virtual machine Architecture

UNIT VI:

Using Styles In Design:

Choices of styles, Combinations of styles, Hierarchical heterogeneous styles, simultaneously heterogeneous styles, Locationally heterogeneous styles, Case Study:

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

MCA III year I Sem (V semester)

Keyword frequency vector: specification of the problem, designs in various styles, Analysis and comparison

Architectural Design space: Theory of design spaces: Structure of design spaces, solving design synthesis and analysis problems, Design space of architectural elements: Behavior features, static features, Static features

Design space of architectural styles:

Characteristic features of architectural styles, Classification of styles

UNIT VII:

Analysis and Evaluation: The concept of scenario, scenarios for evaluating modifiability: Scenarios for evaluating reusability, specification of operational profiles, evaluation and analysis of performance, Scenarios for evaluating reusability:

Analysis and Evaluation of Modifiability: the SAAM Method:

The input and output, the process (Activities in SAAM Analysis)

UNIT VIII:

Quality Trade- Off Analysis: The ATAM Method: ATAM analysis process, ATAM analysis activities

Model-Based Analysis: The HASARD Method: Representation of quality models, construction of quality models, Hazard identification, Cause- consequence analysis, assembling graphic model, Identification of quality concerns

Derivation of quality features: contribution factors of a quality concern, sensitive quality attributes of a component, Quality risks, trade-off points.

TEXT BOOK:

1. Software Design Methodology: From Principles to Architectural Styles , Hong zhu, Elsevier,2009

REFERENCE BOOKS:

1. Software Architecture: Perspectives on an Emerging discipline, Shaw, M.,Garlan, PEA, 2008.
2. Software Architecture in Practice, Bass, L., Clements P,Kazman, PEA,2003
3. Evaluating Software Architectures: Methods and Case Studies, Clements, Kazman, Klien, PEA, 2002
4. Tutorial on Software Design Techniques, Freeman, Wasserman, A.I.(Es), IEEE, 1980
5. Design and Use of Software Architectures- Adopting and Evolving a product – Line Approach, Bosch, J., ACM Press , Addison Wesley, 2000
6. Software Architecture and Design, Bernard Witt, Baker, Merritt, Von Nostrand Reinhold,NY, 1994.

UNIT I :

Fundamental concepts in Text and Image:

Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT II:

Fundamental Concepts in Video and Digital Audio:

Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT III:

Action Script I:

Action Script Features, Object-Oriented Action Script, Datatypes and Type Checking, Classes, Authoring an Action Script Class.

UNIT IV:

Action Script II :

Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

UNIT IV:

Application Development:

An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.

UNIT VI:

Multimedia Data Compression:

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT VII:

Basic Video Compression Techniques:

Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT VIII:

Multimedia Networks:

Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

TEXT BOOKS:

1. Fundamentals of Multimedia , Ze-Nian Li , Mark S. Drew, PHI/PEA.
2. Multimedia Systems, Parag Havaldar, Gerard Medioni, cengage, 2009.

REFERENCE BOOKS:

1. Essentials Action Script 3.0, Colin Mooock, SPD O, Reilly,2007.
2. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
3. Digital Multimedia, Nigel Chapman, Jenny Chapman, Wiley-Dreamtech.
4. Multimedia & Communications Technology, Steve Heath, Elsevier .
5. Multimedia Technology & Applications, David Hilman , Galgotia.
6. Multimedia Technologies, Banerji, Mohan Ghosh, MGH.

MCA09.5.3 OBJECT ORIENTED ANALYSIS AND DESIGN (USING UML)

UNIT I:

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 model of the UML, Architecture.

UNIT II:

Basic structural Modeling:

Classes, relationships, common mechanisms, diagrams, Advanced structural modeling: advanced relationships, interfaces, types & roles, packages, instances.

UNIT III:

Class & object diagrams:

Terms, concepts, examples, modeling techniques, class & Object diagrams.

UNIT IV:

Collaboration diagrams:

Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

UNIT V:

Sequence diagrams:

Terms, concepts, differences between collaboration and sequence diagrams, depicting synchronous messages with/without priority call back mechanism broadcast message.

UNIT VI:

Behavioral Modeling:

Interactions, use cases, use case diagrams, activity diagrams.

UNIT VII:

Advanced Behavioral Modeling:

Events and signals, state machines, processes & threads, time and space, state chart diagrams.

UNIT VIII:

Architectural Modeling:

Terms, concepts, examples, modeling techniques for component diagrams and deployment diagrams.

TEXT BOOKS:

1. The Unified Modeling Language User Guide, Grady Booch, Rumbaugh, Ivar Jacobson, PEA
2. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Addison Wesley

REFERENCE BOOKS:

1. Head First Object Oriented Analysis & Design, Mclaughlin,SPD OReilly,2006
2. Object oriented Analysis& Design Using UML, Mahesh ,PHI
3. The Unified Modeling Language Reference Manual, 2/e, Rumbaugh, Grady Booch,etc., PEA
4. Object Oriented Analysis & Design, Satzinger, Jackson, Thomson
5. Object Oriented Analysis Design & implementation, Dathan.,Ramnath, University Press
6. Object Oriented Analysis & Design, John Deacon, PEA
7. Fundamentals of Object Oriented Analysis and Design in UML, M Pages-Jones, PEA
8. Object-Oriented Design with UML, Barclay,Savage,Elsevier,2008

(Elective-III)

UNIT I:

Conventional Software Management :

The waterfall model, conventional software Management performance.

Evolution of Software Economics : Software Economics, pragmatic software cost estimation.

UNIT II:

Improving Software Economics :

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new : The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT III:

Life cycle phases :

Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process : The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT IV:

Model based software architectures :

A Management perspective and technical perspective.

Work Flows of the process : Software process workflows, Iteration workflows.

UNIT V :

Checkpoints of the process :

Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning : Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT VI:

Project Organizations and Responsibilities :

Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building blocks, The Project Environment.

UNIT VII:

Project Control and Process instrumentation :

The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Tailoring the Process : Process discriminates.

UNIT VIII:

Future Software Project Management :

Modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

TEXT BOOKs:

1. Software Project Management, Walker Royce, PEA, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH
2. Software Project Management, Joel Henry, PEA
3. Software Project Management in practice, Pankaj Jalote, PEA, 2005,
4. Effective Software Project Management, Robert K.Wysocki, Wiley,2006
5. Project Management in IT, Kathy Schwalbe, Cengage
6. Quality Software Project Management, Futrell,Donald F. Shafer, Donald I. Shafer, PEA

MCA09.5.4.2 INFORMATION RETRIEVAL SYSTEMS

(Elective III)

UNIT I :

Introduction to Information storage and retrieval systems:

Domain Analysis of IR systems, IR and other types of Information Systems, IR System Evaluation

Introduction to Data structures and algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms.

UNIT II:

Inverted Files:

Introduction, Structures used in Inverted Files, Building an Inverted file using a sorted array, Modifications to the Basic Techniques.

UNIT III:

Signature Files :

Introduction, Concepts of Signature files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT IV:

New Indices for Text:

PAT Trees and PAT Arrays: Introduction, PAT Tree structure, Algorithms on the PAT Trees, Building PAT Trees as PATRICA Trees, PAT representation as Arrays.

UNIT V:

Lexical Analysis and Stoplists:

Introduction, Lexical Analysis, Stoplists.

UNIT VI:

Stemming Algorithms:

Introduction, Types of Stemming algorithms, Experimental Evaluations of Stemming, Stemming to Compress Inverted Files.

UNIT VII:

Thesaurus Construction:

Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri.

UNIT VIII:

String Searching Algorithms:

Introduction, Preliminaries, The Naive Algorithm, The Knutt-Morris-Pratt Algorithm, The Boyer-Moore Algorithm, The Shift-Or Algorithm, The Karp-Rabin Algorithm.

TEXT BOOKS:

1. Modern Information Retrieval, Ricardo Baeza-Yates, Neto, PEA,2007.
2. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark Academic Press, 2000.
3. Information Retrieval: Algorithms and Heuristics , 2/e, Grossman, Ophir Frieder, , Springer, 2004.

REFERENCE BOOKS:

1. Information Retrieval Data Structures and Algorithms , Frakes, Ricardo Baeza-Yates, PEA
2. Information Storage and Retieval, Robert Korfhage, Wiley & Sons.
3. Introduction to Information Retrieval, Manning, Raghavan, Cambridge .

UNIT I:

Electronic Commerce, Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT II:

Consumer Oriented Electronic commerce, Mercantile Process models.

UNIT III:

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT IV:

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT V:

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT VI:

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT VII:

Consumer Search and Resource Discovery, Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT VIII:

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

TEXT BOOK :

1. Frontiers of Electronic Commerce , Kalakata, Whinston, PEA,2006.

REFERENCE BOOKS:

1. E-Commerce Fundamentals and Applications Hendry Chan, Raymond Lee,Dillon,Chang, John Wiley.
2. E-Commerce,A Managerial Perspective, Turban E, Lee J , King ,Chung H.M.,PEA,2001.
3. E-Commerce An Indian Perspective , 3/e, P.T. Joseph, PHI,2009.
3. E-Commerce, S.Jaiswal , Galgotia.
5. Electronic Commerce , Gary P.Schneider, Thomson.

MCA09.5.5.1 MIDDLEWARE AND ENTERPRISE INTEGRATION TECHNOLOGIES**(Elective IV)****UNIT I :****Introduction to Object Oriented Systems :**

Preview of Object-orientation, Concept of distributed object systems, Reasons to distribute for centralized objects. Client-server system architecture, Multi tier system architectures. File Server, Database Server, Group Server, Object Server, Web Server.

UNIT II :**Introduction to Middleware Technologies:**

General Middleware, Service Specific Middleware, Client/Server Building blocks, RPC - messaging, Peer-to-Peer, Java RMI.

UNIT III :**Introduction to Distributed Objects :**

Computing standards, OMG, Overview of CORBA, Overview of COM/DCOM, and Overview of EJB.

UNIT IV :**EJB Architecture :**

Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

UNIT V :**CORBA :**

Introduction and concepts, distributed objects in CORBA, CORBA components, architectural features, method invocations, static and dynamic: IDL (Interface Definition Language) models and interfaces. Structure of CORBA IDL, CORBA's self-describing data; CORBA interface repository. Building an application using CORBA.

UNIT VI :**CORBA Services and CORBA Component Model :**

Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

UNIT VII :**COM and NET:**

Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces, COM Threading Models, Marshalling, Custom and standard marshalling, Comparison COM and CORBA, Introduction to .NET, Overview of .NET architecture, Remoting.

UNIT VIII :

Service Oriented architecture (SAO) Fundamentals:

Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, Basic SOA , Enterprise Service Bus (ESB), SOA enterprise Software Models.

TEXT BOOKS:

1. Distributed Component Architecture, G. Sudha Sadasivam , Wiley
2. Service Oriented Architecture: Concepts , Technology & Design, Thomas Erl, PHI
3. Java programming with CORBA, 3/e, G. Brose, A Vogel, K. Duddy, Wiley-dreamtech
4. Distributed Systems, 2/e, Tanenbaum, Van Steen, PEA

REFERENCE BOOKS :

1. Client/server Programming with Java & Corba W/cd, Robert Orfali, Dan Harkey, Wiley
2. Component Software: Beyond Object-Oriented Programming, Clemens Szyperski, PEA.
3. Inside CORBA, Mowbray, PEA
2. COM and CORBA side by side, Jason Pritchard, PEA
3. Enterprise JavaBeans 3.0, 5/e, Bill Burke, O'Reilly .
4. Component Based technology, Sudha Sadasivam, Wiley

MCA09.5.5.2 ADVANCED DATABASES

(Elective IV)

UNIT I:

Introduction:

Distributed Data Processing, Distributed Databases System, promises of DDBS, Problem areas.

Overview of Relational DBMS: Relational Databases Concepts, Normalization, Integrity rules, Relational data languages.

UNIT II:

Distributed DBMS Architecture:

Architectural Models for Distributed DBMS, DDMBS Architecture.

Distributed Database Design:

Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT III:

Query Processing and Decomposition:

Query processing Objectives, Characterization of query processors, layers of query of query processing, query decomposition, Localization of distributed data.

UNIT IV:

Distributed query Optimization:

Query optimization, centralized query optimization, Distributed query optimization algorithms.

UNIT V:

Transaction Management:

Definition, properties of transaction, types of transactions. Distributed concurrency control. Serialization, concurrency control Mechanism & Algorithms. Time stamped and Optimistic concurrency control Algorithms, Dead lock Management.

UNIT VI:

Distributed DBMS Reliability:

Reliability concepts and Measures, fault-tolerance in Distributed systems, failures in Distributed DBMS, local & Distributed Reliability Protocols, site failures and Network partitioning.

Parallel Database Systems: Database Series, Parallel Architecture, Parallel DBMS Techniques, Parallel exception problems, Parallel Execution for Hierarchical architecture.

UNIT VII:

Distributed object Database Management Systems:

Fundamental object concepts and Models, Object Distributed Design, Architectural Issues, Object Management, Distributed Object storage, Object query Processing.

UNIT VIII:

Object Oriented Data Model:

Inheritance, object identity, persistent programming languages, persistence of objects, comparing OODBMS and ORDBMS.

TEXT BOOKS:

1. Principles of Distributed Database Systems, 2/e, OZSU, Valduriez, Sridhar, PEA, 2001
2. Distributed Databases, Stefan Seri, Pelagatti Willipse, TMH

REFERENCE BOOKS:

3. Database System Concepts, 5/e, Korth, Silberschatz, Sudershan, TMH
4. Database Management Systems, 3/e, Raghuramakrishnan, Johhanes Gehrke, TMH
5. Data Base Principles, Programming, and Performance, 2/e, P O' Neil, E O'Neil, Elsevier

MCA09.5.5.3 INFORMATION SECURITY

(Elective IV)

UNIT I :

Introduction:

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT II :

Conventional Encryption:

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

UNIT III :

Public key:

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT IV :

Email Privacy:

Pretty Good Privacy (PGP) and S/MIME.

UNIT V :

IP Security:

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT VI :

Web Security:

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

UNIT VII :

SNMP:

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats

UNIT VIII :

Fire walls:

Firewall Design principles, Trusted Systems, Intrusion Detection Systems

TEXT BOOKS:

1. Network Security Essentials: Applications and Standards, William Stallings, PEA.
2. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech

REFERENCE BOOKS:

1. Network Security & Cryptography, Bernard Menezes, Cengage,2010
2. Fundamentals of Network Security, Eric Maiwald, Dream Tech
3. Network Security: Private Communication in a Public World, Kaufman, Perlman, PEA/PHI.
4. Principles of Information Security, Whitman, Thomson.
5. Cryptography and Network Security, 3/e, Stallings, PHI/PEA
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Introduction to Cryptography, Buchmann, Springer