

P.E.S COLLEGE OF ENGINEERING,MANDYA - 571401
 (An Autonomous Institution Under VTU Belgaum)
Department of Master of Computer Applications

SCHEME OF TEACHING AND EXAMINATION (2010)
V SEMESTER MCA (Master of Computer Applications)

Sl. No	Course Code	Course Title	Credit L : T : P	Total	Examination			
					Marks			
					CIE	SEE	Total	
1	P08MCA501	System Simulation & Modeling	4:1:0	5	50	50	100	
2	P08MCA502	Object Oriented Modeling & Design Patterns	3:1:1	5	50	50	100	
3	P08MCA503	Software Testing	2:1:0	3	25	25	50	
4	P08MCA53X	Elective Group III	4:1:0	5	50	50	100	
5	P08MCA54X	Elective Group IV	4:1:0	5	50	50	100	
6	P08MCA504	Seminar and Mini Project (Numerical Algorithms, Operation Research Algorithms , and Graph theory Algorithms)	0:0:2	2	25	25	50	
Total					25	250	250	500

*** L: Lecture T: Tutorial P: Practical**

Course Code for Electives in Group III

Sl. No.	Course code	Elective Group - III
1.	P08MCA531	Topics in Enterprise Architecture-II (4:1:0=5)
2.	P08MCA532	Advanced Software Engineering (4:1:0=5)
3	P08MCA533	Grid Computing (4:1:0=5)
4.	P08MCA534	Data Compression (4:1:0=5)

Course Code for Electives in Group IV

Sl. No.	Course code	Elective Group - IV
1.	P08MCA541	Mobile Computing (4:1:0=5)
2.	P08MCA542	Service Oriented Architecture (4:1:0=5)
3	P08MCA543	Data Mining (4:1:0=5)
4.	P08MCA544	Decision Support System (4:1:0=5)

V Semester

System Simulation and Modeling

Course Code : P08MCA501

Total Hours : 52

Credit : 4:1:0=5

CIE:50 SEE:50

Introduction

8 Hrs

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. Simulation examples: Simulation of queuing systems; Simulation of inventory systems; Other examples of simulation.

General Principles, Simulation Software

6 Hrs

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.

Statistical Models in Simulation

6 Hrs

Review of terminology and concepts; Useful statistical models; Discrete distributions; Continuous distributions; Poisson process; Empirical distributions.

Queuing Models

6 Hrs

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.

Random-Number Generation, Random -Variety Generation

8 Hrs

Properties of random numbers; Generation of pseudo-random numbers; Techniques for generating random numbers; Tests for Random Numbers. Random-Variety Generation: Inverse transform technique; Acceptance-Rejection technique; Special properties.

Input Modeling

6 Hrs

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.

Output Analysis for a Single Model

6 Hrs

Types of simulations with respect to output analysis; Stochastic nature of output data; Measures of performance and their estimation; Output analysis for terminating simulations; Output analysis for steady-state simulations.

Verification and Validation of Simulation Models, Optimization

6 Hrs

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, 4th Edition, Pearson Education, 2007.
(Chapters 1, 2, 3, 4.4, 4.5, 5, 6.1 to 6.3, 6.4.1, 6.6, 7, 8, 9, 10, 11, 12.4)

Reference Books:

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

Object Oriented Modeling and Design Patterns

Course Code : P08MCA502
Total Hours : 52

Credit : 3:1:1=5
CIE:50 SEE:50

Introduction, Modeling Concepts, Class Modeling

7 Hrs

What is Object Orientation? What is OO development? OO themes; Evidence for usefulness of OO development; OO modeling history. Modeling as Design Technique: Modeling; abstraction; The three models. Class Modeling: Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models; Practical tips.

Advanced Class Modeling, State Modeling

6 Hrs

Advanced object and class concepts; Association ends; N-ary associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived data; Packages; Practical tips. State Modeling: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips.

Advanced State Modeling, Interaction Modeling

6 Hrs

Advanced State Modeling: Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Practical tips. Interaction Modeling: Use case models; Sequence models; Activity models. Use case relationships; Procedural sequence models; Special constructs for activity models.

Process Overview, System Conception, Domain Analysis

7 Hrs

Process Overview: Development stages; Development life cycle. System Conception: Devising a system concept; Elaborating a concept; Preparing a problem statement. Domain Analysis: Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis.

Application Analysis, System Design

7 Hrs

Application Analysis: Application interaction model; Application class model; Application state model; Adding operations. Overview of system design; Estimating performance; Making a reuse plan; Breaking a system in to sub-systems; Identifying concurrency; Allocation of sub-systems; Management of data storage; Handling global resources; Choosing a software control strategy; Handling boundary conditions; Setting the trade-off priorities; Common architectural styles; Architecture of the ATM system as the example.

Class Design, Implementation Modeling, Legacy Systems

7 Hrs

Class Design: Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms; Recursing downwards, Refactoring; Design optimization; Reification of behavior; Adjustment of inheritance; Organizing a class design; ATM example. Implementation Modeling: Overview of implementation; Fine-tuning classes; Fine-tuning generalizations; Realizing associations; Testing. Legacy Systems: Reverse engineering; Building the class models; Building the interaction model; Building the state model; Reverse engineering tips; Wrapping; Maintenance.

Design Patterns, Idioms

12 Hrs

What is a pattern and what makes a pattern? Pattern categories; Relationships between patterns; Pattern description; Communication Patterns: Forwarder-Receiver; Client-Dispatcher-Server; Publisher-Subscriber; Management Patterns: Command processor; View Handler; Idioms: Introduction; What can idioms provide? Idioms and style; Where to find idioms; Counted Pointer example.

Text Books:

1. Michael Blaha, James Rumbaugh: Object-Oriented Modeling and Design with UML, 2nd

- Edition, Pearson Education, 2005. (Chapters 1 to 17, 23)
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, 2006.
(Chapters 1, 3.5, 3.6, 4)

Reference Books:

1. Grady Booch et al: Object-Oriented Analysis and Design with Applications, 3rd Edition, Pearson, 2007.
 2. Mark Priestley: Practical Object-Oriented Design with UML, 2nd Edition, Tata McGraw-Hill, 2003.
 3. K. Barclay, J. Savage: Object-Oriented Design with UML and JAVA, Elsevier, 2008.
 4. Booch, G., Rumbaugh, J., and Jacobson, I.: The Unified Modeling Language User Guide, 2nd Edition, Pearson, 2005.
1. E. Gamma, R. Helm, R. Johnson, J. Vlissides: Design Patterns- Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995.
 2. Simon Bennett, Steve McRobb and Ray Farmer: Object-Oriented Systems Analysis and Design using UML, 2nd Edition, Tata McGraw-Hill, 2002.

Software Testing

Course Code : P08MCA503
Total Hours : 26

Credit : 2:1:0=3
CIE:50 SEE:50

Basics of Software Testing

10 Hrs

Human Errors and Testing; Software Quality; Requirements, Behavior and Correctness; Correctness versus Reliability; Testing and Debugging; Test Metrics; Software and Hardware Testing; Defect Management; Execution History; Test-generation Strategies, Static Testing, Model-Based Testing and Model Checking; Control-Flow Graph; Types of Testing; The Saturation Effect.

Test Generation from Requirements

8 Hrs

Introduction; The test-Selection Problem; Equivalence Partitioning; Boundary Value Analysis; Category-Partition Method. Cause-Effect Graphing.

Structural Testing

4 Hrs

Overview, Statement testing, Branch testing, condition testing, path testing, procedure call testing, comparing structural testing criteria, The infeasibility problem

Test case selection and Adequacy, Test execution

4 Hrs

Overview, Test specification and cases; Adequacy criteria; Test oracles.

Text Books:

1. Aditya P Mathur: Foundations of Software Testing, Pearson Education, 2008. (Excluding 1.8, 1.12.4,1.15,1.16,1.17, 2.6.4,2.6.5)
2. Mauro Pezze, Michal young; software testing and analysis-process, principles and Techniques, John Wiley and Sons, 2008.

Reference Books:

1. Srinivasan Desikan, Gopaldaswamy Ramesh: Software testing Principles and Practices, 2nd Edition, Pearson, 2007.
2. Ron Patton: Software Testing, 2nd edition, Pearson, 2004.
3. Brian Marrick: the Craft of Software Testing, Pearson, 1995.

Elective Group III

Topics in Enterprise Architecture - II

Course Code : P08MCA531

Total Hours : 52

Credit : 4:1:0=5

CIE:50 SEE:50

The philosophy of .NET

6 Hrs

Understanding the Previous State of Affairs, The .NET Solution, The Building Block of the .NET Platform (CLR,CTS, and CLS), The Role of the .NET Base Class Libraries, What C# Brings to the Table, An Overview of .NET Binaries (aka Assemblies), the Role of the Common Intermediate Language , The Role of .NET Type Metadata, The Role of the Assembly Manifest, Compiling CIL to Platform –Specific Instructions, Understanding the Common Type System, Intrinsic CTS Data Types, Understanding the Common Languages Specification, Understanding the Common Language Runtime A tour of the .NET Namespaces, Increasing Your Namespace Nomenclature, Deploying the .NET Runtime

Building C# Applications

6 Hrs

The Role of the Command Line Compiler (csc.exe), Building C # Application using csc.exe Working with csc.exe Response Files, Generating Bug Reports , Remaining C# Compiler Options, The Command Line Debugger (cordbg.exe) Using the, Visual Studio .NET IDE, Other Key Aspects of the VS.NET IDE, C# “Preprocessor:” Directives, An Interesting Aside: The System. Environment Class.

C# Language Fundamentals.

8 Hrs

The Anatomy of a Basic C# Class, Creating objects: Constructor Basics, The Composition of a C# Application, Default Assignment and Variable Scope, The C# Member Initialization Syntax, Basic Input and Output with the Console Class, Understanding Value Types and Reference Types, The Master Node: System, Object, The System Data Types (and C# Aliases), Converting Between Value Types and Reference Types: Boxing and Unboxing, Defining Program Constants, C# Iteration Constructs, C# Controls Flow Constructs, The Complete Set of C# Operators, Defining Custom Class Methods, Understating Static Methods, Methods Parameter Modifies, Array Manipulation in C #, String Manipulation in C#, C# Enumerations, Defining Structures in C#, Defining Custom Namespaces.

Object- Oriented Programming with C#

6 Hrs

Forms Defining of the C# Class, Definition the “Default Public Interface” of a Type, Recapping the Pillars of OOP, The First Pillars: C#'s Encapsulation Services, Pseudo-Encapsulation: Creating Read-Only Fields, The Second Pillar: C#'s Inheritance Supports, keeping Family Secrets: The “ Protected” Keyword, Nested Type Definitions, The Third Pillar: C #'s Polymorphic Support, Casting Between .

Exceptions and Object Lifetime.

6 Hrs

Ode to Errors, Bugs, and Exceptions, The Role of .NET Exception Handling, the System. Exception Base Class, Throwing a Generic Exception, Catching Exception, CLR System – Level Exception (System. System Exception), Custom Application- Level Exception (System. System Exception), Handling Multiple Exception, The Family Block, the Last Chance Exception Dynamically Identifying Application –and System Level Exception Debugging System Exception Using VS. NET, Understanding Object Lifetime, the CIT of “new”, The Basics of Garbage Collection,, Finalization a Type, The Finalization Process, Building an Ad Hoc Destruction Method, Garbage Collection Optimizations, The System. GC Type.

Interfaces and Collections

6 Hrs

Defining Interfaces Using C# Invoking Interface Members at the object Level, Exercising the Shapes Hierarchy, Understanding Explicit Interface Implementation, Interfaces As Polymorphic Agents, Building Interface Hierarchies, Implementing, Implementation, Interfaces Using VS .NET, understanding the IConvertible Interface, Building a Custom Enumerator (IEnumerable and Enumerator), Building Cloneable objects (ICloneable), Building Comparable Objects (I Comparable), Exploring the system. Collections Namespace, Building a Custom Container (Retrofitting the Cars Type).

Callback Interfaces, Delegates, and Events, Advanced Techniques

8 Hrs

Understanding Callback Interfaces, Understanding the .NET Delegate Type, Members of System. Multicast Delegate, The Simplest Possible Delegate Example, Building More a Elaborate Delegate Example, Understanding Asynchronous Delegates, Understanding (and Using)Events.

The Advances Keywords of C#, A Catalog of C# Keywords Building a Custom Indexer, A Variation of the Cars Indexer Internal Representation of Type Indexer . Using C# Indexer from VB .NET. Overloading operators, The Internal Representation of Overloading Operators, interacting with Overload Operator from Overloaded- Operator-Challenged Languages, Creating Custom Conversion Routines, Defining Implicit Conversion Routines, The Internal Representations of Customs Conversion Routines

Understanding .NET Assemblies.

6 Hrs

Problems with Classic COM Binaries, An Overview of .NET Assembly, Building a Simple File Test Assembly, A C#. Client Application, A Visual Basic .NET Client Application, Cross Language Inheritance, Exploring the CarLibrary's, Manifest, Exploring the CarLibrary's Types, Building the Multifile Assembly ,Using Assembly, Understanding Private Assemblies, Probing for Private Assemblies (The Basics), Private A Assemblies XML Configurations Files, Probing for Private Assemblies (The Details), Understanding Shared Assembly, Understanding Shared Names, Building a Shared Assembly, understanding Delay Signing, Installing/Removing Shared Assembly, Using a Shared Assembly.

Text Books:

1. Andrew Troelsen: Pro C# with .NET 3.0, Special Edition, Dream tech Press, India, 2007.
Chapters: 1 to 11 (up to pp.369)
2. E. Balagurusamy: Programming in C#, , 5th Reprint, Tata McGraw Hill, 2004.
(Programming Examples 3.7, 3.10, 5.5, 6.1, 7.2, 7.4, 7.5, 7.6, 8.1, 8.2, 8.3, 8.5, 8.8, 9.1, 9.2, 9.3, 9.4, 10.2, 10.4, 11.2, 11.4, 12.1, 12.4, 12.5, 12.6, 13.1,13.2, 13.3, 13.6, 14.1, 14.2, 4.4,15.2,15.3, 16.1, 16.2, 16.3, 18.3, 18.5.18.6.)

Reference Books:

1. Tom Archer: Inside C#, WP Publishers, 2001.
2. Herbert Schildt: The Complete Reference C#, , Tata McGraw Hill, 2004.

Advanced Software Engineering

Course Code : P08MCA532

Total Hours : 52

Credit : 4:1:0=5

CIE:50 SEE:50

Quality Management

7 Hrs

Quality Concepts: Quality, Software quality; The software quality dilemma; Achieving software quality. Review techniques: Cost impact of Software defects; Defect amplification and removal; Review metrics and their use; Reviews: A formal spectrum; Informal reviews; Formal technical reviews. Software Quality Assurance: Background issues, Elements of SQA; SQA tasks, goals and metrics; Formal approaches to SQA; Statistical software quality assurance; Software reliability; The ISO 9000 Quality standards; The SQA plan.

Formal Modeling and Verification

6 Hrs

The Cleanroom Strategy; Functional specification; Cleanroom design; Cleanroom testing; Formal methods concepts; Applying mathematical notation for formal specification; Formal specification languages.

Process Improvement, Configuration Management

7 Hrs

Process and product quality; Process classification; Process measurement; Process analysis and modeling; Process change; The CMMI process improvement framework. Configuration management planning; Change management; Version and release management; System building; CASE tools for configuration management.

Software Process and Project Metrics

6 Hrs

Metrics in the Process and Project Domains; Software Measurement; Metrics for software quality; Integrating metrics within the software process; Metrics for small organizations; Establishing a software metrics program.

Software Reuse, CBSE

7 Hrs

The reuse landscape; Design patterns; Generator-based reuse; Application frameworks; application system reuse. Components and component models; The CBSE process; Component composition.

Critical Systems Development and Validation

6 Hrs

Dependable processes; Dependable programming; Fault tolerance; Fault-tolerant architectures. Reliability validation; Safety assurance; Security assessment; Safety and dependability cases.

User Interface Design, Maintenance and Reengineering

7 Hrs

User interface design issues; The UI design process; User analysis; User interface prototyping; Interface evaluation. Software maintenance; Reengineering; Business process reengineering; Software reengineering; Reverse engineering; Restructuring; Forward engineering; The economics of reengineering.

Service-Oriented Software Engineering, Aspect-Oriented Software Development

6 Hrs

Services as reusable components; Service engineering; Software development with services. Aspect-Oriented Software Development: The separation of concerns; Aspects, join points and point cuts; Software engineering with aspects.

Text Book:

1. Roger S. Pressman: Software Engineering: A Practitioner's Approach, 7th Edition, McGraw- Hill, 2007. (Chapters 14, 15, 16, 21, 25, 29)
2. Sommerville: Software Engineering, 8th Edition, Addison-Wesley, 2007. (Chapters 16, 18, 19, 20, 24, 28, 29, 31, 32)

Reference Books:

1. Pfleeger: Software Engineering Theory and Practice, 2nd Edition, Pearson Education, 2001.
2. Waman S Jawadekar: Software Engineering Principles and Practice, Tata McGraw Hill, 2004.

Grid Computing

Course Code : P08MCA533
Total Hours : 52

Credit : 4:1:0=5
CIE:50 SEE:50

Introduction, Grid Computing Organizations and Their Roles 6 Hrs

Early Grid Activities, Current Grid Activities, An Overview of Grid Business Areas, Grid Applications, Grid Infrastructure. Organizations Developing Grid Standards and Best Practice Guidelines, Organizations Developing Grid Computing Toolkits and the Framework, Organizations Building and Using Grid-Based Solutions to Solve Computing, Data and Network Requirements, Commercial Organizations Building and Using Grid-Based Solutions

The Grid Computing Anatomy, Road Map 6 Hrs

The Grid Problem. Anatomy Computing, Business on Demand and Infrastructure Virtualization, Service-Oriented Architecture and Grid, Semantic Grids.

Architectures – 1 7 Hrs

Service-Oriented Architecture, Web Services Architecture, XML, Related Technologies and Their Relevance to Web Services, XML Messages and Enveloping, Service Message Description Mechanisms.

Architectures – 2 7 Hrs

Relationship between Web Service and Grid Service, Web Service Interoperability and the Role of the WS-I Organization, OGSA Architecture and Goals, Commercial Data Center (CDC), National Fusion Collaboratory (NFS), Online Media and Entertainment

The OGSA Platform Components, OGSi - 1 6 Hrs

Native Platform Services and Transport Mechanisms, OGSA Hosting Environment, Core Networking Services Transport and Security, OGSA Infrastructure, OGSA Basic services. Grid Services, A High-Level Introduction to OGSi (Open Grid Services Infrastructure).

OGSI – 2 7 Hrs

Technical Details of OGSi Specification, Introduction to Service Data Concepts, Grid Service: Naming and Change Management Recommendations

OGSA Basic Services – 1

7 Hrs

Common Management Model (CMM), Service Domains, Policy Architecture, Security Architecture, Metering and Accounting.

OGSA Basic Services – 2, Toolkit

6 Hrs

Common Distributed Logging, Distributed Data Access and Replication. GLOBUS GT3 Toolkit Architecture.

Text Books:

Joshy Joseph, Craig Fellenstein: Grid Computing, IBM Press, 2007.

Reference Books:

Prabhu: Grid and Cluster Computing, Prentice-Hall of India, 2007.

Data Compression

Course Code : P08MCA534

Total Hours : 52

INTRODUCTION

Credit : 4:1:0=5

CIE:50 SEE:50

10 Hrs

Special features of Multimedia - Graphics and Image Data Representations - Fundamental concepts in Video and Digital Audio - Storage requirements for multimedia applications - Need for Compression - Taxonomy of compression techniques - Overview of source coding, source models, scalar and vector quantization theory - Evaluation techniques - Error analysis and methodologies.

Distortion criteria, Differential Entropy, Rate Distortion Theory, Vector Spaces, Information theory, Models for sources, Coding – uniquely decodable codes, Prefix codes, Kraft McMillan Inequality.

TEXT COMPRESSION

4 Hrs

Compaction techniques - Huffman coding, Adaptive Huffman Coding, Arithmetic coding, Shannon - Fanon coding, Dictionary techniques, LZW family algorithms.

AUDIO COMPRESSION

8 Hrs

Audio compression techniques - μ - Law and A - Law commanding. Frequency domain and filtering - Basic sub-band coding - Application to speech coding - G.722 - Application to audio coding - MPEG audio, progressive encoding for audio - Silence compression, speech compression techniques - Formant and CELP Voiceovers.

IMAGE COMPRESSION

11 Hrs

Image Compression – EZW, SPHIT, JPEG 2000. Predictive techniques - DM, PCM, DPCM: Optimal Predictors and Optimal Quantization - Contour based compression - Transform Coding - JPEG Standard - Sub - band coding algorithms - Design of Filter banks - Wavelet based compression - Wavelet Based Compression: Wavelets, Multiresolution analysis & scaling function, Implementation using filters - EZW, SPIHT coders - JPEG 2000 standards - JBIG, JBIG2 standards.

VIDEO COMPRESSION

9 Hrs

Video compression techniques and standards - MPEG Video Coding I - MPEG - 1 and 2 - MPEG Video Coding II - MPEG - 4 and 7 - Motion estimation and compensation techniques - H.261 Standard, DVI technology - PLV performance - DVI real time compression, Packet Video.

TEXT BOOKS:

1. Peter Symes, “Digital Video Compression”, McGraw Hill Pub., 2004.
2. Mark S.Drew, Ze-Nian Li, “Fundamentals of Multimedia”, PHI, 1st Edition, 2003.
3. Khalid Sayood, “Introduction to data compression”, Harcourt India Pvt. Ltd. & Morgan Kaufmann Publishers, 1996.
4. N. Jayant and P. Noll, “Digital Coding of waveforms: Principles and Applications to Speech and Video”, Prentice Hall, USA, 1984.

REFERENCE BOOKS:

1. D. Salomon. “Data Compression: The Complete reference.” Springer, 2000.
2. Z. Li and M. S. Drew, “Fundamentals of Multimedia.” Pearson Education (Asia) Pte. Ltd., 2004.

Elective Group IV

Mobile Computing

Course Code : P08MCA541

Total Hours : 52

Credit : 4:1:0=5

CIE:50 SEE:50

Mobile Devices and Systems, Architectures

8 Hrs

Mobile phones, Digital Music Players, Handheld Pocket Computers, Handheld Devices, Operating Systems, Smart Systems, Limitations of Mobile Devices, Automotive Systems. GSM – Services and System Architectures, Radio Interfaces, Protocols, Localization, Calling, Handover, General Packet Radio Service.

Wireless Medium Access Control and CDMA – based Communication

6 Hrs

Medium Access Control, Introduction to CDMA – based Systems, OFDM

Mobile IP Network Layer, Mobile Transport Layer

7 Hrs

IP and Mobile IP Network Layers Packet Delivery and Handover Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol. Indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP – layer Transmission for Mobile Networks.

Databases

5 Hrs

Database Hoarding Techniques, Data Caching, Client – Server Computing and adaptation, Transactional Models, Query Processing, Data Recovery Process, Issues relating to quality of Service.

Data Dissemination and Broadcasting Systems

5 Hrs

Communication Asymmetry, Classification of Data – Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques, Digital Audio Broadcasting, Digital video Broadcasting.

Data Synchronization in Mobile Computing Systems

6 Hrs

Synchronization, Synchronization Protocols, SyncML – Synchronization Language for Mobile Computing, Synchronized Multimedia Markup Language (SMIL).

Mobile Devices, Server and Management, Wireless LAN, Mobile Internet Connectivity and Personal Area Network **8 Hrs**

Mobile agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems. Wireless LAN (WiFi) Architecture and Protocol Layers, WAP 1.1 and WAP 2.0 Architectures, Bluetooth – enabled Devices Network, Zigbee.

Mobile Application languages – XML, Java, J2ME and JavaCard, Mobile Operating Systems **7 Hrs**

Introduction, XML, JAVA, Java 2 Micro Edition (J2ME), JavaCard.
Operating System, PalmOS, Windows CE, Symbian OS, Linux for Mobile Devices

TEXT BOOK:

1. Raj Kamal: Mobile Computing, Oxford University Press, 2007.

REFERENCE BOOKS:

1. Asoke Talkukder, Roopa R Yavagal: Mobile Computing – Technology, Applications and Service Creation, Tata McGraw Hill, 2005.
2. Reza B'Far: Mobile Computing Principles – Designing and Developing Mobile Applications with UML and XML, 5th Edition, Cambridge University press, 2006.
3. Uwe Hansmann, Lothar Merk, Martin S Nicklous and Thomas Stober: Principles of Mobile Computing, 2nd Edition, Springer International Edition, 2003. Schiller: Mobile Communication, Pearson Publication, 2004.

Service Oriented Architecture

Course Code : P08MCA542
Total Hours : 52

Credit : 4:1:0=5
CIE:50 SEE:50

Introduction to SOA, Evolution of SOA

8 Hrs

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).

Web Services and Primitive SOA **6 Hrs**

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

Web Services and Contemporary SOA **12 Hrs**

Message exchange patterns; Service activity; Coordination; Atomic Transactions; Business activities; Orchestration; Choreography. Addressing; Reliable messaging; Correlation; Polices; Metadata exchange; Security; Notification and eventing.

Principles of Service – Orientation **7 Hrs**

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.

Service Layers **6 Hrs**

Service-orientation and contemporary SOA; Service layer abstraction; Application service layer, Business service layer, Orchestration service layer; Agnostic services; Service layer configuration scenarios.

Business Process Design **7 Hrs**

WS-BPEL language basics; WS-Coordination overview; Service-oriented business process design; WS-addressing language basics; WS-Reliable Messaging language basics.

SOA Platforms **6 Hrs**

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.

Data Mining

Course Code : P08MCA543
Total Hours : 52

Credit : 4:1:0=5
CIE:50 SEE:50

Introduction, Data - 1

6 Hrs

What is Data Mining? Motivating Challenges; The origins of data mining; Data Mining Tasks. Types of Data; Data Quality.

Data – 2

6 Hrs

Data Preprocessing; Measures of Similarity and Dissimilarity

Classification

8 Hrs

Preliminaries; General approach to solving a classification problem; Decision tree induction; Rule-based classifier; Nearest-neighbor classifier.

Association Analysis - 1

6 Hrs

Problem Definition; Frequent Item set generation; Rule Generation; Compact representation of frequent item sets; Alternative methods for generating frequent item sets.

Association Analysis – 2

6 Hrs

FP-Growth algorithm, Evaluation of association patterns; Effect of skewed support distribution; Sequential patterns.

Cluster Analysis

7 Hrs

Overview, K-means, Agglomerative hierarchical clustering, DBSCAN, Overview of Cluster Evaluation.

Further Topics in Data Mining

7 Hrs

Multidimensional analysis and descriptive mining of complex data objects; Spatial data mining; Multimedia data mining; Text mining; Mining the WWW. Outlier analysis.

Applications

6 Hrs

Data mining applications; Data mining system products and research prototypes; Additional themes on Data mining; Social impact of Data mining; Trends in Data mining.

Text Books:

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Pearson Education, 2007. (Chapter 1, 2, 4.1 to 4.3, 5.1, 5.2, 6, 8.1 to 8.4, 8.5.1)
2. Jiawei Han and Micheline Kamber: Data Mining – Concepts and Techniques, 2nd Edition, Morgan Kaufmann, 2006. (Chapters 7.11, 10, 11)

Reference Books:

K.P.Soman, Shyam Diwakar, V.Ajay: Insight into Data Mining – Theory and Practice, PHI, 2006.

Decision Support Systems

Course Code: P08MCA544

Total Hours : 52

Credit : 4:1:0=5

CIE:50 SEE:50

Decision Making and Computerized Support – 1

6 Hrs

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.

Decision Making and Computerized Support – 2

6 Hrs

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.

Decision Support Systems: An Overview

6 Hrs

DSS Configuration, What is DSS? Characteristics and Capabilities of DSS, Components of DSS, The Data Management Subsystem, The Model Management Subsystem, The

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

Decision Support Systems Development

6 Hrs

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.

Group Support Systems

6 Hrs

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.

Enterprise Information Systems

7 Hrs

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.

Knowledge Management

6 Hrs

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.

Integration, Impacts, and the Future of Management-Support Systems

6 Hrs

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.

Text Books:

1. Efraim Turban, Jay E. Aronson, Ting-Peng Liang: Decision Support Systems and Intelligent Systems, 7th Edition, Prentice-Hall of India, 2006.
(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.

Mini Project

Course Code: P08MCA504

Total Hours: 52

Credit : 2:0:0=2

CIE:50 SEE:50

Seminar Guideline: (Internal Marks: 20)

Each student must present new technical paper along with the report. Individual submit a

Brief technical report (10 pages) that must include the following:

- Introduction & Objective
- Architecture Model
- Advantages & Disadvantages
- Applications
- Conclusion
- Bibliography

Mini Project Guidelines: (Internal Marks : 30)

- A team of **TWO** students must develop the mini project. However, during the examination, each student must demonstrate the project individually.
- The team may implement a mini project of their choice.
- The team must submit a **Brief Project Report** (25 to 30 Pages) that must include the following:
 - Introduction
 - Requirements
 - Software Development Process Model Adopted
 - Analysis and Design Models
 - Implementation
 - Testing
- The Report must be valuated for 10 marks, Demonstration for 30 marks and Viva for 10 marks.