



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

M.Sc. (SE) Second Year (Two Semesters)

Semester-III					
Course Code	Title of the paper	External Credit	Internal Credit	Total Credits	Total No of Classes
SE-301	Advanced Java Programming	3	1	4	40hrs
SE-302	Advanced Database Administration	3	1	4	40hrs
SE-303	Distributed Operating System	3	1	4	40hrs
SE-304	Fuzzy System and Artificial Neural Network	3	1	4	
SE-305	Elective-III	3	1	4	40hrs
	1. Advanced operating System				
	2. Mobile Programming				
	3. Research Methodology				
SE-306	Lab-1 (Java + DBA)	1	1	2	40hrs
SE-307	Lab-2 (FS & ANN + Mini Project)	1	1	2	80hrs
SE-308	Seminar	1	0	1	01hrs
Total Credits		17	8	25	

Semester-IV					
Course Code	Title of the paper	External Credit	Internal Credit	Total Credits	Total No of Classes
SE-401	Data Mining	3	1	4	40hrs
SE-402	Digital Image Processing	3	1	4	40hrs
SE-403	ASP.NET Through C#.NET	3	1	4	
SE-404	Elective-IV	3	1	4	40hrs
	1. Bioinformatics				
	2. Mobile Communications				
	3. Structured Systems Analysis & Design				
SE-405	Project	3	1	4	
SE-406	Lab-1(DIP)	1	1	2	80hrs
SE-407	Lab-4(ASP.NET)	1	1	2	40hrs
SE-408	Open Elective	0	1	1	01hrs
Total Credits		18	7	25	



SE-301

Advanced Java Programming

4 Credits

UNIT I: Introduction to Java and Object Oriented Programming

Why Java is important for Internet, Java Magic: Byte Code, Java Buzzwords, Simple program of java, Using super keyword, Dynamic method dispatch, Final class and Methods, Packages, Access Protections, Interfaces, Exception Handling Fundamentals, Working with finally clause.

UNIT II: Multithreading, Applet and Event Handling

Multithreading Basics, Creating and Running a Thread, Thread life cycle, Thread Priorities, Thread synchronization, Applet Fundamentals, Applet Architectures, An Applet skeleton, The HTML APPLET tag, Passing parameters to Applet, Event class, Event Types and Listener, Action Event, Mouse Event, Key Event, Windows Event.

UNIT III: Introduction to AWT & SWING

AWT Classes, Windows Fundamentals, Working with Frame window, Working with Graphics, Working with Colors & Fonts, Layout Managers, Swing & Its Features, JApplet, Icons & Labels Button & Label, TextField & Toggle Buttons, CheckBoxes, Radio buttons, Combo Box & Lists, Scroll panes, Trees, Tables, Menu Bars & Menus, Tool Bars, Dialog Boxes, File Dialog, Progress Bar, Choosers.

UNIT IV: String Handling, Streams and Input/Outputs Programming

String class, StringBuffer class, Java I/O Stream classes

UNIT V: Java Beans & JDBC

Introduction & Advantages of JavaBeans, Application Building Tools, Bean Development Kit, JAR Files, Developing Simple Bean Using the BDK, The Java Bean API, Introduction to JDBC, Types Of JDBC Connectivity, Accessing Relational Database from java Programs, Establishing database Connection.

UNIT VI: Servlets & JSP (Java Server Pages)

Introduction of Servlet & JSP, Servlet Overview & Architecture, Setting up Apache Tomcat Server, Handling HTTP Get Request, Handling HTTP Get Request Containing Data, Handling HTTP Post Request, JSP Example, Implicit Objects, Scripting, Standard Actions, Page Directives.



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

Reference Books:-

1. Java Complete Reference by Herbert Schildt Tata McGraw-Hill. Publisher: Sams 2000.
ISBN-13: 9780672319853
2. Mastering Java2 J2SE1.4 by John Zukowski PBP Publication
3. Java How to Program By H.M Deitel, P.J. Deitel 6th Edition.
4. Core Servlets & JavaServer Pages By Marty Hall, Larry Brown



SE-302

Advanced Database Administration

(4 Credits)

UNIT I: Database Architecture

Overview of database, pfile, spfile, Instance, Tablespaces, Datafiles, Other files, Oracle managed Files, Users, Schemas, Indexes, View, Sequences, Synonyms, Privileges, Roles, Clusters, Hash Clusters, Internal memory structure, SGA, PGA, Background processes, External structure, Redo logs, Control files, Trace files, Alert logs, Creating database manually

UNIT II: Hardware configuration and consideration

Architectural overview, Standalone hosts, Standalone hosts with disk array, Standalone, Hosts with disk shadowing, Multiple databases, Networked hosts, Networks of databases, Remote updates, Remote application options, Real application, Clusters, Multiple processors, The parallel query and parallel load options, Client/server databases application, Standby databases

UNIT III: Physical databases layouts

Database file layouts, I/O connections among data files, I/O bottlenecks among all data files, Concurrent I/O among background processes, Defining recoverability and performance goals for the system, Defining the system hardware and mirroring architecture, Database space using overview, Implementation of the storage clause, Locally managed Tablespaces, Dictionary managed Tablespaces, Table segments, Index segments, Rollback segments, Temporary, Free space, Resizing Datafiles, Control files, Online redo log Files Deallocate space from segments, Shrinking Datafiles, Shrinking Tables, Clusters and indexes, Oracle managed files(OFA)

UNIT IV: Logical Database Layouts

Describe logical structure of a database, Different types of Tablespaces, Changing the Tablespaces size, Allocating segments for temporary segments, Temporary segments in permanent Tablespaces, Changing tablespace status, changing tablespace storage settings, Oracle Managed Files (OMFs), Oracle Flexible Architecture (OFA), Different segments types and relationships, Extent usages, Block space utilization

UNIT V: Backup –Recovery & Networked ORACLE

Types of Logical and Physical backups, Implementations, Integrations of backup procedures, NOARCHIVELOG Mode, ARCHIVELOG Mode, Backup Methods –Closed Database Backup, Open Database Backup, Recovery in NOARCHIVELOG Mode, Recovery in ARCHIVELOG



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

Mode, Recovery manager architecture, Recovery Manager Features, Using Recovery manager & RMAN, Using OEM backup manager, Generating lists and reports. **Networked Oracle** - Overview of SQL *Net and Net8 , Connect descriptors, Service names and Listeners, Net8 assistants, The multi-protocol interchange, Dedicated Server Processes, Oracle Shared Server, Benefits of Oracle Shared Server, Client Server application, Database links

UNIT VI: Database Security, Auditing & Database Tuning

Security capabilities-Account security, Object privileges, System level roles and privileges, Implementing security-operating system security, Create user, Drop user, User profiles, and Password managements, Preventing password reuse, setting password complexity, Using password file for authentication, Auditing, Login audits, Action audits, Object audits, Protecting the audit trail. **Tuning Databases** -Tuning application design, Tuning SQL,Memory usage, Data storage, Data manipulation,Physical storage, Logical storage,Reducing net traffic using OEM

Reference Books –

1. Oracle 9i DBA Handbook, Eighth Reprint - Kevin Lonely, Marlene Theriault Oracle Press, Tata McGraw Hill Publication ISBN-0- 07-048674-3
2. OCA Oracle 9i Associate DBA Certification Exam Guide, Sixth Reprint, Jason Couchman, Sudheer N. Marishetti Oracle Press, Tata McGraw Hill Publication, 2005 ISBN-0-07-049893-8



SE-303

Distributed Operating System

(4 Credits)

UNIT I: Fundamentals

What is Distributed Computing System? Evolution of Distributed Computing Systems, Distributed Computing System Models, Why are Distributed Computing System Gaining Popularity, What is a Distributed Operating System, Issue in Designing a Distributed Operating System, Introduction to Distributed Computing Environment.

UNIT II: Computer Network and Message Passing

Introduction, Network Types, LAN Technologies, WAN Technologies, Communication Protocols, Internetworking, ATM Technology.

Message Passing: Introduction, Desirable Features of Good Message- Passing System, Issues in IPC by Message Passing, Synchronization, Buffering, Multi-datagram Message, Encoding & Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.

UNIT III: Distributed Shared Memory.

Introduction, General Architecture of DSM Systems, Design & Implementing Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, Thrashing.

UNIT IV: Synchronization

Introduction, Clock Synchronization, Event Ordering, Mutual Exclusion, Deadlock.

UNIT V: Resource Management and Process Management

Introduction, Desirable Features of Good Global Scheduling Algorithm, Task Assignment Approach, Load Balancing Approach, Load Sharing Approach.

Process Management: Introduction, Process Migration, Threads

UNIT VI: Distributed File Systems

Introduction, Desirable Features of Good Distributed File System, File Models, File Accessing, File Sharing Semantics, File Caching Schemes, File Replication, Fault Tolerance.

Reference Book-

1. Distributed Operating Systems By- P. K. Sinha, PRINT EDITION, ISBN: 978-81-203-1380-4



SE-304 Fuzzy System and Artificial Neural Network (4 Credits)

Unit 1: Introduction to Fuzzy Logic and operations on fuzzy sets

Crisp Sets: an Overview ,Fuzzy Sets: Basic Types, Fuzzy Sets: Basic Concepts, Fuzzy Sets Vs Crisp Sets, Additional Properties of alpha cuts, Presentation of fuzzy sets, Extension principle for fuzzy sets, Fuzzy complements, Fuzzy Union, Fuzzy Intersections, Crisp & Fuzzy Relation , Binary Fuzzy Relation, Binary Relation on single set, Fuzzy Equivalence Relations, Fuzzy Compatibility Relation

Unit 2: Introduction to Neural Networks

Biological Neuron and their Artificial Neuron, McCulloch-Pits Neuron Model, Perceptron Classification-Linearly Separability-NOR Problem, Overview of Neural Network Architecture, Learning Rules-Supervised Learning-Unsupervised Learning-Perceptron Learning-Reinforcement Learning-Delta Learning Rule

Unit 3: Multilayer Feed forward Network

Generalized Delta Learning, Back propagations training algorithm and derivation of weight, Variant in Back propagations, Radial Basis Function (RBF), Application of BP and RBF N/W

Unit 4: Recurrent Network and Unsupervised Learning

Hopfield Network, Counter propagation networks, Boltzman Machine.

Unit 5: Associative Memories

Auto Associative Memory, Bidirectional Associative Memory (BAM), Matrix Associative Memory, Hetro Associative Memory

Unit 6: Fuzzy System, Neuro Fuzzy System and Applications

Fuzzy neurons, Fuzzy Neural Network, Fuzzy associative memory, Application in Pattern Recognition, Character, Face, Finger, Palm, Iris Recognitions, Application in Expert System

Reference Books:

1. Fuzzy Sets and Fuzzy Logic Theory and Application by George J. Klir, Bo Yuan, Seventh Edition, Prentice Hall PTR, ISBN 0-13-101171-5.
2. Fuzzy Sets Uncertainty and Information, George J. Klir, Tina A. Floger, Pearson education, First Edition, ISBN 978-0133459845
3. Introduction to the Theory of Neural Competition by John hertz, Krogh and Richard AddisionWesely, , ISBN 978-0201515602.



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

4. Introduction to Artificial Neural Network by Jaack M. Zurada, Jaico publishing house, ISBN 81-7224-650-1
5. Neural Network and Fuzzy System -A Dynamic System By- Koska PHI Edition.
6. Programming Matlab by E. Herniter Thomson Brooks ISBN 981-240-230-6.



SE -305 Elective III (1) Advanced Operating System (4 Credits)

UNIT I Introduction to UNIX/Linux Kernel

System Structure, User Perspective, Assumptions about Hardware, Architecture of UNIX Operating System (TextBook-3: Chapter Topics: 1.2, 1.3, 1.5, 2.1), Concepts of Linux Programming-Files and the File system, Processes, Users and Groups, Permissions, Signals, Inter-process Communication (TextBook-1: Chapter 1- relevant topics)

UNIT II File and Directory I/O

Buffer headers, structure of the buffer pool, scenarios for retrieval of a buffer, reading and writing disk blocks, inodes, structure of regular file, open, read, write, lseek, close, pipes, dup (TextBook- 3: Chapter Topics: 3.1-3.4, 4.1, 4.2, 5.1-5.3, 5.5-5.7, 5.12, 5.13) open, creat, file sharing, atomic operations, dup2, sync, fsync, and fdatsync, fcntl, /dev/fd, stat, fstat, lstat, file types, Set-User-ID and Set-Group-ID, file access permissions, ownership of new files and directories, access function, umask function, chmod and fchmod, sticky bit, chown, fchown, and lchown, file size, file truncation, file systems, link, unlink, remove, and rename functions, symbolic links, symlink and readlink functions, file times, utime, mkdir and rmdir, reading directories, chdir, fchdir, and getcwd, device special files (TextBook-4: Chapter Topics: 3.3, 3.4, 3.10 3.14, 3.16, 4.2-4.23)

UNIT III: Process Environment, Process Control and Process Relationships

Process states and transitions, layout of system memory, the context of a process, saving the context of a process, sleep, process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process, changing the size of the process, The Shell, Process Scheduling (TextBook-3: Chapter Topics: 6.1-6.4, 6.6, 7.1-7.8, 8.1)

UNIT IV: Memory Management

The Process Address Space, Allocating Dynamic Memory, Managing Data Segment, Anonymous Memory Mappings, Advanced Memory Allocation, Debugging Memory Allocations, Stack-Based Allocations, Choosing a Memory Allocation Mechanism, Manipulating Memory, Locking Memory, Opportunistic Allocation (TextBook-1: Chapter 8) Swapping, Demand Paging (TextBook-3: Chapter Topics: 9.1, 9.2)

UNIT V. Signal Handling

Signal concepts, signal function, unreliable signals, interrupted system calls, reentrant functions, SIGCLD semantics, reliable-signal technology, kill and raise, alarm and pause, signal sets, sigprocmask, sigpending, sigsetjmp and siglongjmp, sigsuspend, abort, system function revisited, sleep (TextBook-4: Topics: 10.2-10.13, 10.15-10.19)

Unit VI: Windows Thread Management



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

Thread Internals Data Structures, Kernel Variables, Performance Counters, Relevant Functions, Birth of a Thread Examining Thread Activity: Limitations on Protected Process Threads, Worker Factories (Thread Pools) Thread Scheduling Overview of Windows Scheduling, Priority Levels, (TextBook-2: Chapter 5 [relevant topics])

References:

1. Linux System Programming, O'Reilly, by Robert Love.
2. Windows Internals, Microsoft Press, by Mark E. Russinovich and David A. Soloman.
3. The Design of the UNIX Operating System, PHI, by Maurice J. Bach.
4. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard Steve



SE -305 Elective III (2)

Mobile Programming

(4 Credits)

UNIT I: Introduction

About Mobile Programming & Android, Smartphones future, preparing the Environment- Installing the SDK, Creating Android Emulator, Installing Eclipse, Installing Android Development Tools, Choosing which Android version to use, Android Stack, Android applications structure

UNIT II: Android Architecture

Android Stack, Android applications structure, Creating a project, Working with the, AndroidManifest.xml, Using the log system, Activities

UNIT III: UI Architecture

Application context, Intents, Activity life cycle, Supporting multiple screen sizes

UNIT IV: User Interface Widgets

Text controls, Button controls, Toggle buttons, Images, **Notification and Toast**- Parameters on Intents, Pending intents, Status bar notifications, Toast notifications

UNIT V: Menus, Dialogs & Animation

Localization, Options menu, Context menu, Dialogs- Alert dialog, Custom dialog, Dialog as Activity, Animation -View animation, Draw able animation

UNIT VI: Working with data storage

Shared preferences, Preferences activity, Files access, SQLite database

References:

1. Professional Android 4 Application Development, Edition 3, Reto Meier, Wrox John Wiley & Sons, 2012, ISBN 1118237226, 9781118237229.
2. Beginning Android 4 Application Development, Edition illustrated, Wei-Meng Lee, John Wiley & Sons, 2012, ISBN 1118240677, 9781118240670.
3. Sams Teach Yourself Android Application Development in 24 Hours, Edition illustrated, Lauren Darcey & Shane Conder, Sams Publishing, 2012, ISBN 0672335697, 9780672335693



SE -305 Elective III (3)

Research Methodology

(4 Credits)

UNIT I: Introduction, the Purpose and Product of Research

What is research?, Evaluating Research, The 6Ps of research, Reasons for doing Research, possible products, Finding and choosing research topics, evaluating the purpose and product of research.

UNIT II: Overview of the Research Process, Internet Research

A model of the research process, Alternative models of the research process, evaluating the research process, Background of the Internet and WWW, Internet research topics, The Internet and a literature review, The Internet and research strategies and methods, Internet research, the law and ethics.

UNIT III: Reviewing the literature, Surveys and Design Creation

Purpose of literature review, literature resources, The Internet and literature reviews, conducting literature reviews, evaluating literature reviews, Define Surveys, Planning and Designing surveys, the internet and surveys, Example of Surveys, Defining design and creation, Planning and conducting design and creation research, Creative computing and digital art.

UNIT IV: Experiments, Case studies, Action Research

Defining experiments, Planning and conducting experiments, The internet and experiments, Defining case studies, Planning and conducting case studies, The internet case studies, Defining Action research, Planning and conducting Action research, The internet and Action research

UNIT V: Interviews, Observations, Questionnaires

Defining Interviews, Planning and conducting Interviews, Group Interviews Internet based Interviews, Defining Observations, Planning and conducting systematic Observations, Planning and conducting participant Observations, The internet and Observations.

UNIT VI: Quantitative data analysis, Qualitative data analysis and Presentation of Research

Defining Quantitative data analysis, Types of Quantitative data analysis, Data coding, Visual aids for Quantitative data analysis, Using statistics for Quantitative data analysis, Qualitative data analysis-Introduction, Analysis textual data, Analyzing non-textual qualitative data, Grounded theory, Presentation of Research- writing up the research, conference paper presentations, Posters and exhibitions, software demonstrations, Presenting yourself, PhD vivas.



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

References:

1. Researching Information System and Computing by Briony J Oates, SAGE Publications, ISBN 978-81-7829-759-0



SE-401

Data Mining

4 Credits

UNIT I: Introduction

Basic Data Mining Tasks, Data Mining Versus Knowledge Discovery in Databases, Data Mining Issues, Data Mining Metrics

UNIT II: Related Concepts

Database /OLTP Systems, Fuzzy sets & Fuzzy Logic, Information Retrieval, Data Ware housing

UNIT III: Data Mining Techniques

Introduction, A Statistical Perspective on Data Mining

UNIT IV: Classification

Introduction, Statistical-Based Algorithms, Distance –Based Algorithms

UNIT V: Clustering

Introduction, Similarity and Distance Measures, Outliers, Hierarchical Algorithms, Partition Algorithms, Minimum Spanning Tree, Squared Error Clustering Algorithm, K-Means clustering, Clustering Large Database

UNIT VI: Web mining

Introduction, Web Content Mining, Web Structure Mining, Web Usage Mining

Reference Books

1. Data Mining Introductory and Advanced Topics, 2008, Margaret H. Dunham and S.Sridhar, Pearson Education, ISBN 81-7758-785-4.



SE-402

Digital Image Processing

4 Credits

UNIT I Digital Image Processing Systems:

What is DIP, Fundamental steps in DIP, Components of an Image Processing System, Elements of Visual Perception, Lights and Electromagnetic Spectrum, Image sensing and acquisition, Image sampling and quantization

UNIT II Introduction to Digital Image Representation

Digital Image Representation, Read & Displaying Images, Data Classes & Image types, converting between Data Classes and Image types

UNIT III Intensity transformation & spatial filtering

Intensity Transformation function, Histogram processing & Function plotting, Spatial filtering

UNIT IV Frequency Domain Processing

2D –discrete Fourier transform, filtering in frequency domain, Obtaining Frequency Domain Filters from spatial filters

UNIT V Image Restoration

A Model of the Image Degradation /Restoration Process, Noise Models, Restoration in presence of Noise only –spatial filtering, Periodic Noise Reduction by Frequency domain Filtering

UNIT VI Color Image Processing and Introduction to Wavelets

Color Image Representation in MATLAB, Converting to other Color Space, Fast wavelet transform, working with Wavelet Decomposition structures, Inverse Fast Wavelet transform

References:

1. *Digital Image Processing*, Second Edition, R.C. Gonzalez R. E. Woods, Pearson Education, ISBN 8131726959, 9788131726952.
2. *Fundamentals of Digital Image Processing*, Anil K. Jain, Prentice Hall, 1989, ISBN 0133325784, 9780133325782
3. *Digital Image Processing using MATLAB*, R.C. Gonsales R. E. Woods, Second Edition, Pearson Education, ISBN 8177588982, 9788177588989.

Practical

15 Programs from the above syllabus



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

SE- 403

ASP.NET through C# .NET

(4 Credits)

UNIT I: Introduction to ASP.NET through C# .NET

ASP.NET, Variables, Expressions, Flow control, Defining & using controls, Struct functions, Overloading functions and Delegates, **Class:** Member, Definition, VS member wizard, VS member properties, class member, Interface. Events.

UNIT II: Types, objects and Namespaces

The basic about classes, Value types and reference types, Advanced class programming, Understanding namespaces and assemblies.

UNIT III: Starting with ASP.NET with Web form fundamentals and web controls

Setting up ASP.NET and IIS, Installing ASP.NET, Migrating from ASP, ASP.NET applications, code behind, Global.asax application file, ASP.NET Configuration.

Web form fundamentals and web controls: A simple page applet, Improving currency converter, A deeper look at HTML control classes, The page class, Setting up web controls, Web control classes, AutoPostBack and web control events.

UNIT IV: Validation and state management with Tracing, Logging and Error handling

Calendar control, AdRotator, Validation, Understanding regular expressions, Validated customer form, Other rich controls, A problem of state, View state, Transferring information, custom cookies, Session state and its configuration, Application state

Tracing, Logging and Error handling: Common errors, The .NET exception object, Handling Exceptions, Throwing your own exceptions, Logging Exceptions, Error pages, Page tracing.

UNIT V: Working with Data

Overview of ADO.NET: Characteristics of ADO.NET, The ADO.NET object model, **ADO.NET Data Access:** SQL – Select, update, insert statements, Creating connection, Using command with DataReader, Updating Data, Accessing Disconnected data, Selecting multiple tables, Modifying and Updating disconnected data, Data Binding, DataList, DataGrid and Repeater, Using XML.

UNIT VI: Web Services and Advanced ASP.NET

Web services architecture (WSDL, SOAP), Creating web services, Using web services, **Advanced ASP.NET:** Component based programming, custom controls, Caching and Performance tuning, Implementing Security.

Reference books:-



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

1. Beginning C#.NET (2nd Edition) by Karli Watson (WROX Publication) ISBN-13: 978-1861004987
2. The Complete Reference ASP.NET by Matthew McDonald (TMH Publication) ISBN 13: 9780072195132

Practical List:

Note: At least 20 practical as per following list is to be conducted.

1. Program for demonstrating flow controls in C#.NET
2. Program for demonstrating functions and struct functions in C#.NET
3. Program for demonstrating delegates in C#.NET
4. Program for demonstrating class and Interface in C#.NET
5. Program for demonstrating value type and reference type
6. Program for demonstrating Namespace and assemblies
7. Program for demonstrating HTML control classes
8. Program for demonstrating page class and web control
9. Program for demonstrating AutoPostBack and web control events
10. Program for demonstrating AdRotator
11. Program for demonstrating Validations and regular expressions
12. Program for demonstrating state management
13. Program for demonstrating cookies
14. Program for demonstrating Exception handling and setting error page
15. Program for demonstrating insertion of form data into database
16. Program for demonstrating updating, selecting, and deleting records
17. Program for demonstrating disconnected data architecture
18. Program for demonstrating DataGrid, DataList, DataBinding, and repeater
19. Program for demonstrating use of XML as back end
20. Program for demonstrating creating and using web services
21. Program for demonstrating creating and using custom control
22. Program for demonstrating security



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

SE-404 Elective IV(1)

Bioinformatics

(4 Credits)

UNIT I: Bioinformatics: An Introduction

Introduction, Historical Overview & Definition, Applications, Major Databases

UNIT II: Information Search & Data Retrieval

Introduction, Tools for Web Search, Data retrieval tools, Data mining of Biological Databases

UNIT III: Genome Analysis & Gene Mapping

Introduction, Genome Analysis, Genome Mapping, the Sequence Assembly Problem, Physical Maps, Applications of Genetic Maps, the Human Genome Project (*HGP*)

UNIT IV: Alignments of Pairs of sequences and Tools for Similarity Search & Sequence Alignment

Introduction, Biological Motivations of Alignment Problems, Methods of sequence Alignments, Using Scoring Matrices, **Tools for Similarity Search & Sequence Alignment** –Introduction, Working with FASTA, Working with Blast, FASTA & BALSTA Algorithms Comparison

UNIT V: Introduction to Drug Discovery and Drug Discovery: Technology & Strategies

Introduction, Areas Influencing Drug Discovery, Pharmacokinetics &, Pharmacogenomics Applications, Important parameters in Drug Discovery, Drug Discovery: Technology & Strategies-Introduction, Drug Discovery Technologies, Target Discovery Strategy, Strategy to identify possible Drug Targets, Target Validation

UNIT VI: Computer- Aided Drug Design

Introduction, Introduction to Drug Design, Drug Design Approach, Computer Aided Drug Designing Methods

Reference Books:-

1. Bioinformatics Methods & Applications S.C. Rastogi, Edition III, PHI Learning Pvt. Ltd., 2008, ISBN 8120335953, 9788120335950
2. An Introduction to Bioinformatics V. Kothekar & T. Nandi, Edition I, Duckworth Press, ISBN 9788190469906



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

SE-404 Elective IV (2)

Mobile Communications

(4 Credits)

UNIT I: Introduction

Applications, Vehicles, Emergencies, Business, Replacement of wired networks, Infotainment and more, Location dependent services, Mobile and wireless devices, A short History of wireless communication, A market for mobile communication, Some open research topics, A simplified reference model, Basic Cellular System, Performance Criteria, Operation of Cellular System, Planning a Cellular System

UNIT II: Wireless Transmission

Frequencies for radio transmission, Regulations, Signals, Antennas, Multiplexing, Modulation, Cellular Systems

UNIT III: Medium Access Control

Motivation for specialized MAC, SDMA, TDMA, Fixed TDM, Classical Aloha, Slotted Aloha, CSMA, Multiple Access with collision avoidance, CDMA

UNIT IV: Telecommunication

GSM, Mobile services, System architecture

UNIT V: Satellite Systems

Introduction, Applications of satellite systems

UNIT VI: Wireless LAN

Infra-red Vs. Wireless LAN, Infrastructure and Ad-hoc network, IEEE 802.11, System Architecture, Protocol Architecture, HIPERLAN, HIPERLAN 1, WATM, Bluetooth, Architecture

References

- 1) Mobile Communications, Edition 2nd, Jochen Schiller, Pearson Education Publication, ISBN-9780321123817.
- 2) Mobile Cellular Telecommunications Edition 2nd, William C.Y.Lee, Mc-Graw- Hill Publication, ISBN-0-07-038089-9.



SE-404 Elective IV (3) Structured Systems Analysis & Design (Credits 4)

UNIT I: Introduction

What is a System? The general systems approach to problem solving, Structured approach, The Object Oriented Approach, The Information Engineering Approach, Software Development Life Cycle Models, Waterfall Model, Prototyping Model, RAD Model, Spiral Model, Fourth Generation Techniques.

UNIT II: Project Feasibility Study and Requirement Gathering

Operational, technical, economic, Organizational and cultural, feasibility, Defining project costs and project benefits, Cost/Benefit Analysis for a project, Net present value Payback period and return on investment computations, Functional and Technical Requirements, The sources of system requirements, Identifying system requirements, Structured walkthroughs.

UNIT III: Modeling

Modeling System Requirements, The purpose, type and overview of models, Modeling system requirements for events, Modeling system requirement for objects, Roles, devices, organizational units and locations, Data Modeling, Data entities attributes and relationships, The Entity-Relationship diagram, Process Modeling, Developing Data Flow Diagrams, Level of abstraction, Context diagram, Top level DFD, DFD fragments, The event-partitioned system model, Decomposing processes, Physical and Logical DFD, Evaluating DFD quality, Documenting DFD components, Process, data flow, data store, data elements descriptions.

UNIT IV: Designing Databases

Databases and DBMS, Designing Relational DBMS's, Representing entities, Relationships, enforcing integrity constraints and business rules, Designing system inputs outputs and controls, Designing the user interface.

UNIT V: Object Oriented Requirements Specifications and Analysis

The Unified Modeling Language, The Case diagrams, class diagrams, object diagrams, The system activities, Collaboration and sequence diagrams, States, state transitions and state chart diagrams, Activity diagrams, component diagrams and deployment diagrams.

UNIT VI: Designing Different types of Databases

Object Oriented Databases, Designing object databases, representing classes and relationships, Hybrid Object-Relational Databases, Classes and attributes, Relationships, Relational DBMS and object DBMS data types, Distributed databases and distributed systems



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

References:

1. Systems Analysis and Design in a Changing World, Edition 5th, Satzinger, Jackson and Burd, Thomson Learning Publication, ISBN-13-978-0-324-59377-8.
2. Software Engineering - A Practitioner's Approach, Roger S. Pressman, McGraw-Hill Publication, ISBN-13: 978-0078022128



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

SE-408 Open Elective I

Language Aptitude

(1 Credits)

UNIT I: Professional Skills

Interview Techniques, HR Interview Questions, Getting Prepared for the interview, Telephonic Interview

UNIT II: Group Discussion

Meaning, nature and purpose, Do's & Don'ts of Group Discussion, Topics of the GD, Practical Sessions on GD

UNIT III: Personality Development

Interpersonal Skills, Empathy Skills, Negotiation Skills, Problem Solving, Leadership Skills

UNIT IV: Basics of English

Tense: mood, aspect, usage, Prepositions, Basic Sentence Structure, Framing Questions, Model Auxiliary Verbs & usage, Synonyms & Antonyms, Idioms & Phrases

UNIT V: Writing Skills

Resume Building, Curriculum Vita, Email Drafting; Do's & Don'ts, Essay Writing, Covering Letter

UNIT VI: Presentation Skills and English Aptitude

Body language, eye contact, facial expressions, Opening of Presentation, Public Speaking: Do's & Don'ts, Topics for the presentation, Seminars: Practical Sessions, **English Aptitude**: Spotting Errors, Closet Test, Sentence Correction, Ordering of Sentences, Comprehension, Sentence Formation, Sentence Improvement

References:

1. English Grammar & Composition, First Edition, Rajendra Pal & Prem
2. Lata Suri, Sutan Chand & Sons Delhi, 2012, ISBN: 978-81-8050-868-0
3. Personality Development & Communicative English, Fifth Edition, Dr. T. Bharathi, Neelkamal Publication Private Limited, 2004, ISBN: 81-8316-007-7
4. R. Gupta's Group Discussion & Interviews, First Edition, Anand Ganguly, Ramesh Publication House Delhi, ISBN: 81-7812-050-X.
5. Practical English Grammar, Fourth Edition, A.J. Thomson & A.V. Martinet, Oxford India, 1986, ISBN-13: 978-0-19-562053-5.



Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

6. Developing Communication Skill, First Edition, Krishana Mohan & Meera Banerji, Macmillan India, 1990, ISBN-0333929195.
7. Essential English Grammar, Second Edition, Raymond Murphy Cambridge University Press, 1998, ISBN- 13:978-81-7596-029-9.



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M.Sc. (Software Engineering) Second Year (Two Semester)

SE -408 Open Elective II Logical Reasoning and Quantitative Aptitude

(1 Credits)

UNIT I: General Mental Ability-I

Series Completion, Coding and Decoding, Blood relations, Seating Arrangement, Comparison type questions.

UNIT II: General Mental Ability-II

Directions sense test, logical venn diagrams, Inserting the missing character, data sufficiency.

UNIT III: Logical Deduction

Logic, statement arguments, statement assumptions, statement conclusion.

UNIT IV: Arithmetical Ability-I

Numbers, Simplification, Average, Problems on ages, Percentage, Probability.

UNIT V: Arithmetical Ability-II

Profit and loss, ratio and proportion, time and work, simple interest compound interest, calendar.

UNIT VI: Data Interpretation

Tabulation, Bar graphs, Pie charts, line graphs

Reference books:

1. Quantitative Aptitude by Dr. R S Aggarwal, Revised edition, ISBN 81-219-2498-7
2. A Modern Approach to Verbal Reasoning by Dr. R S Aggarwal, S. Chand and Company pvt. Ltd., ISBN 81-219-0552-4



SE -408 Open Elective III: DBMS Administration

(1 Credits)

UNIT I: Client/Server Concepts

Client server Architecture, Invoking Client Programs, MySQL Client Program-Using MySQL interactively, Statement Terminators, Using Script Files with MySQL, MySQL Output Formats, Client Commands and SQL Statements, Using Server-Side Help, Using the – safeupdates Option,

UNIT II: MySQL Architecture

Client/Server Overview, Communication Protocols, the SQL Parser and Storage Engine Tiers, How MySQL Uses Disk Space, How MySQL Uses Memory, Types of MySQL Distributions, Starting and Stopping MySQL Server on Windows, Starting and Stopping MySQL Server on UNIX, Runtime MySQL Configuration, Log and Status Files, Loading Time Zone Tables, Security-Related Configuration, Setting the Default SQL mode , Upgrading MySQL

UNIT III: Locking

Locking Concepts, Explicit Table Locking, Advisory Locking

UNIT IV: Storage Engines

MySQL Storage Engines, The MyISAM Engine, The MERGE Engine, The InnoDB Engine, The MEMORY Engine, The FEDERATED Engine, The Cluster Storage Engine, Other Storage engines,

UNIT V: Data (Table) Maintenance

Types of Table Maintenance Operations, SQL Statements for Table Maintenance, Client and Utility Programs for Table Maintenance, Repairing, InnoDB Tables, Enabling MyISAM Auto-Repair

UNIT VI: Data Backup and Recovery Methods

Introduction, Binary Versus Textual Backups, Making Binary Backups, Making Text Backups, Backing Up Log and Status Files, Replication as an Aid to Backup, MySQL Cluster as Disaster Prevention, Data Recovery



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Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

SE-408 Open Elective IV: Cyber Crime & Cyber Security (1 Credits)

Why Learn About Cyber Crime.

Introduction to Cyber Crime.

Types of Cyber Crime.

Hacking passwords of MS-Office Files & Email for ethical use.

Sending Fake Emails/SMS.

Email Tracing.

Chatting In LAN/ Transferring Files in LAN. Sharing Desktop.

Preventing Credit/Debit card Fraud.

Screen Recording.

Introduction to Cyber Security.

Online Safety Tips.

Protecting Password.

Stenography/Hiding Information.

Encrypting Decrypting Information.

Identifying secure websites.

Cyber Laws.



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Choice Based Course Credit System (distribution and details of CBCS System)

M.Sc. (Software Engineering) Second Year (Two Semester)

SE-408 Open Elective V: Internet Programming (1Credits)

UNIT I: BASIC NETWORK AND WEB CONCEPTS

Internet standards - TCP and UDP protocols - URLs - MIME - CGI - Introduction to SGML.

UNIT II: JAVA PROGRAMMING

Java basics - I/O streaming - files - Looking up Internet Address - Socket programming - client/server programs - E-mail client - SMTP - POP3 programs - web page retrieval - protocol handlers - content handlers - applets - image handling - Remote Method Invocation.

UNIT III: SCRIPTING LANGUAGES

HTML - forms - frames - tables - web page design - JavaScript introduction - control structures - functions - arrays - objects - simple web applications.

UNIT IV: DYNAMIC HTML

Dynamic HTML - introduction - cascading style sheets - object model and collections - event model - filters and transition - data binding - data control - ActiveX control - handling of multimedia data

UNIT V: SERVER SIDE PROGRAMMING

Servlets - deployment of simple servlets - web server (Java web server / Tomcat / Web logic) - HTTP GET and POST requests - session tracking - cookies - JDBC - simple web applications - multi-tier applications.

REFERENCES

1. Deitel, Deitel and Nieto, "Internet and World Wide Web - How to program", Pearson Education Publishers, 2000.
2. Elliotte Rusty Harold, "Java Network Programming", O'Reilly Publishers, 2002
3. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
4. Thomno A. Powell, "The Complete Reference HTML and XHTML", fourth edition, Tata McGraw Hill, 2003.
5. Naughton, "The Complete Reference - Java2", Tata McGraw-Hill, 3rd edition, 1999.