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

Semester-III					
course code	**Title of the paper**	**External credit**	**Internal credit**	**Total Credits**	**Total Nor of Classes**
CS-301	Advance Database Administration	3	1	4	40hrs
CS-302	Java Server Pages, Servlets & Struts	3	1	4	40hrs
CS-303	Data Mining and Data Warehousing	3	1	4	40hrs
CS-304	Digital Image Processing Using MATLAB	3	1	4	
CS-305	Elective-III 1. Advanced Operating System 2. Mobile Programming 3. Research Methodology	3	1	4	40hrs
CS-306	Computer laboratory 1 (Adv Database Admin + D.I.P)	1	1	2	60hrs
CS-307	Computer laboratory 2 (JSP & Servlet + DM & DW	1	1	2	60hrs
CS-108	Seminar	0	1	1	40hrs
Total Credits		**17**	**8**	**25**	

Semester-IV					
course code	**Title of the paper**	**External credit**	**Internal credit**	**Total Credits**	**Total Nor of Classes**
CS-401	Fuzzy System and ANN	3	1	4	40hrs
CS-402	Linux Administration	3	1	4	40hrs
CS-403	Elective : 1. Embedded system Design through C & C++ 2. Artificial Intelligence 3. Introduction to Bioinformatics	3	1	4	40hrs
CS-404	Cloud Computing	3	1	4	40hrs
CS-405	Project	3	1	4	40hrs
CS-405	Computer Laboratory 3 (FS&ANN) +Linux	3	1	4	40hrs
CS-407	Computer Laboratory 4 (Elective)	2	1	4	60hrs
CS-408	Open Elective	0	1	1	40hrs
Total Credits		**18**	**7**	**25**	

CS- 301 Advance 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 permanents 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 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

CS-302 Java Server Pages, Servlets & Struts (4 Credits)

UNIT I: An Overview of Servlets, JSP terminology and Servlet Basics

A Servlets jobs, Why build web pages dynamically?, Advantages of Servlets over traditional CGI, The Role of JSP, Installing & Configuring the JDK & Apache Tomcat, Testing your setup, Web application – A Preview, Basic Servlet structure, A Servlet that generate plain text, A Servlet that generate HTML text, A Servlet package, The Servlet life cycle, The Single Thread model interface, Servlet debugging

UNIT II: Handling Client Request: Form DATA,cookies and session tracking

Reading Form Data from Servlet, Example: Reading three parameter, Example: Reading all parameter, Filtering String for HTML –specific character, Benefits of cookies, Some problem with cookies, Sending and receiving cookies, Using cooking to detect first time visitors, Using cookies attributes, The need for session tracking, Session tracking basics, Session tracking API, Browser session Vs server sessions, A Servlets that shows per client access counts

UNIT III: Overview of JSP technology and Invoking Java code with JSP scripting elements & The JSP page directives

The Need for JSP, Benefits of JSP, Installation of JSP, Basic syntax, Invoking Java code from JSP, Using JSP Expression, Using Scriptlets to make parts of the JSP page conditional, The *Import* attribute, The *contentType*and *pageEncoding*attribute, Generating Excel Spreadsheet,The*session* attribute, The *isELIgnored*attribute, The *errorPage*and *isErrorPage*attribute

UNIT IV: Including files and applets in JSP pages and Using Java Beans components in JSP documents

Including pages at request time: the *jsp:include*action, Including pages at page translation time: the *include* directive, Forwarding request with *jsp:Forward*, Including applets for java plug-in, Why use Beans?, What are Beans?, Using Beans: basic task, Example: *StrignBean.*

UNIT IV: Integrating Servlets and JSP, Accessing database with JDBC

Understaning the need for Model View Controller, MVC Framework, Architecture of approach, Implementing MVC with *RequestDispathcher,*, Summarizing MVC code, Using JDBC in General, Basic JDBC Examples, Simplifying Database Access with JDBC Utilities, Using Prepared Statements.

UINT VI: Introduction to Struts &Model, View and Controller Layer

Two Development Models, Struts & Evolution of Struts, Basic Components of Struts, Building simple Struts Application, What is model?, Struts & Model, Struts & View Layer, Struts & the controller Layer, The ActionServlet Class, The Request Processing Engine, The Action Class.

Reference Books:-

1.Core Servlets and Java Server Pages-By- Marty Hall & Larry Brown vol-1 Low price edition
2. The Complete reference Struts-By James Holmes

CS-303 Data Mining & Data Warehousing (4 Credits)

UNIT I: Introduction

Basic Data Mining task, Data Mining Vs Knowledge discovery in databases, Data mining metrics, Social Implication of Data Mining

UNIT II: Related Concepts and Data Mining Techniques

Database/OLTP systems, Information Retrieval, Decision Support Systems, Dimensional Modeling, OLAP, Web Search Engines, Statistical perspective on Data Mining, Decision Tree, Neural networks

UNIT III: Classification

Introduction, Statistical based algorithms, Distance based algorithms, Decision tree based algorithms, Neural network based algorithm.

UNIT IV: Clustering andAssociation Rules

Introduction, Hierarchical algorithms, Partitioned algorithms, Clustering large databases, Basic algorithms, Parallel and distributed algorithms

UNIT V: Web Mining

Introduction, Web content mining, Web structure mining, Web usage mining.

UNIT VI: Data Warehousing

Data Warehousing – the only viable solution, Data Warehouse defined

Reference Books

1. Data Mining Introductory and Advanced Topics, 2008, Margaret H.Dunham and S. Sridhar, Pearson Education, ISBN 81-7758-785-4
2. Data Warehousing Fundamentals, 2009, PaulrajPonniah, Wiley India Publication, ISBN 978-81-265-0919-5

CS-304 Digital Image Processing Using MATLAB (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 MATALB, Converting to other Color Space, Introduction to Wavelets - Fast wavelet transform, Working with Wavelet Decomposition structures, Inverse Fast Wavelet transform

References:

1. Digital Image Processing by R.C. Gonsales R. E. Woods, Second Edition, Pearson Education ,ISBN: 978-0201180756.
2. Fundamentals of Image Processing by Anil K. Jain, First Edition, PHI, ISBN 9788120309296.
3. Digital Image Processing using MATLAB by R.C. Gonsales R. E. Woods,Second Edition, Pearson Education,ISBN 9780130085191

Practical List: 15 Programs from the above syllabus

CS-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 fdatasync, 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

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, byMaurice J. Bach.
4. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard Steve

CS -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, u0supporting multiple screen sizes

UNIT IV: User InterfaceWidgets

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

CS-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.

References:

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

CS-401 Fuzzy System and Artificial Neural Network (4 Credits)

UNIT I: Introduction to Fuzzy Logic

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.

UNIT II: Operations on 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 III: Introduction to Neural Networks

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

UNIT IV: 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 V: Recurrent Network and Unsupervised Learning

Hopfield Network, Counter propagation networks, Boltzmann Machine, Adaptive Resonance theory(ART).

UNIT VI: 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" byGeorge 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.

4.“ Introduction to Artificial Neural Network” by Jaeck M. Zurada,Jaico publishing house, ISBN 81-7224-650-1

5. Neural Network and Fuzzy System -A Dynamic SystemBy- Koska PHI Edition.

6. Programming Matlab by E. Herniter Thomson Brooks ISBN 981-240-230-6.

CS- 402 Linux Administration (4 Credits)

UNIT I : Introduction to RED Hat LINUX

Hardware Requirements, Red Hat LINUX Installation, Advantages of LINUX, Other LINUX distributions, Concept of Linux loader

UNIT II: Working with Linux

LINUX file system, Shells, Text editors, Changing User Information, File Permissions, Virtual Consoles

UNIT III: The X Window System

Basic X window system, Configuring X window systems, Starting X, Selecting & using X window.

UNIT IV: Managing Services, Software & System Resources

LINUX Boot Process, System services and run levels, controlling services at boot with administrative tools, Starting and stopping services manually, Using RPM for software management, Using RPM on the command line, Extracting a single file from & RPM file, Graphical Package Management, System monitoring tools

UNIT V: Printing with Linux

Configuring & managing print services, Local printer installation, Network printer installation, LINUX printing commands, Using the Common UNIX Printing System (CUPS), Console print control

UNIT VI: Network Connectivity

Networking with TCP/IP, Hardware devices for networking, Using RED HAT Linux network, configuration tools, Using DHCP [Dynamic Host Configuration Protocol], Using the network file system, Wireless networking, Introduction to DNS, Essential DNS concepts, Configuring namespaces with DNS, Installing Samba, Configuring Samba, Running the Samba Server

Reference Books

1. Red Hat Linux Unleashed, Edition illustrated reprint, “Bill Ball, David Pitts”, Sams, 2001, ISBN 0672319853, 9780672319853.

2. Red Hat Fedora 2 Unleashed, Edition illustrated, “Bill Ball, David Pitts”, Sams, 2005, ISBN 067232721X, 9780672327216.

CS-403 Elective IV (1) Embedded Systems Design through C & C++

(4 Credits)

UNIT I: Introduction to Embedded System and Hardware Requirement for the Software Engineer

Embedded Systems, Processor Embedded into as System, Embedded Hardware units & Devices in system, Embedded Software in System, Examples of Embedded system, Hardware Requirement for the Software Engineer – Terminology, Gates, A Few other basic Consideration, Timing diagram, Memory

UNIT II: Advanced Hardware Fundamentals and Interrupts

Microprocessors, Buses, Direct Memory Access, Interrupts, Other Common Parts, Built-ins on the Microprocessor, Conventions used in Schematics, A simple Schematics,. A Last Word about Hardware, Interrupts-Microprocessor Architecture, Interrupts Basics, The Shared Data Problem, Interrupt Latency

UNIT III: Survey of Software Architecture and Introduction to Real-Time Operating System

Round Robin, Round Robin with Interrupts, Functions Queue Scheduling Architecture, Real Time Operating System Architecture, Selecting an Architecture, Introduction to Real-Time Operating System -Task and Task States, Tasks and Data, Semaphores and Shared Data

UNIT IV: More Operating System Services

Message Queue, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt routines in an RTOS Environment

UNIT V: Embedded Software Developments and Debugging Techniques

Host and Target Machines, Linker, Locators for Embedded Software, Getting Embedded Software into the Target System, Debugging Techniques -Testing Your Host Machines, Instruction set Simulator , The Assert Macro, Using Laboratory Tools

UNIT VI: An Example System

What the program does?, Environment in which program operates, A guide to the source code

Reference Books:

1. Embedded System – Architecture, Programming & Design By - Raj Kamal, 2nd Edition edition (March 9, 2009), McGraw-Hill Education (India), ISBN 978-0070151253

2. An Embedded Software Primer By - David E. Simen –Low Price Edition, First Edition, ISBN 078-5342615692

3. Programming Embedded System in C & C++ By – Michael Barr, 1 edition (January 30, 1999), O'Reilly Media;ISBN 978-1565923546.

4. Programming for Embedded System By – DreamtechSoftwate Team, ISBN 978-0764549540 .

CS-403 Elective IV (2) Artificial Intelligence (4 Credits)

UNIT I: INTRODUCTION

Intelligent Agents, Agents and environments, Good behavior, The nature of environments, Structure of agents, Problem Solving, Problem solving agents, Example problems, Searching for solutions, Uniformed search strategies, Avoiding repeated states, Searching with partial information.

UNIT II: SEARCHING TECHNIQUES

Informed search and exploration, informed search strategies, Heuristic function, Local search algorithms and optimistic problems, Local search in continuous spaces, Online search agents and unknown environments, Constraint satisfaction problems (CSP)

UNIT III: Backtracking search and Local search for CSP

Structure of problems, Adversarial Search, Games, Optimal decisions in games, Alpha Beta Pruning, Imperfect real-time decision, Games that include an element of chance.

UNIT IV: KNOWLEDGE REPRESENTATION and Ontological Engineering

First order logic, Representation revisited, Syntax and semantics for first order logic, Using first order logic, Knowledge engineering in first order logic, Inference in First order logic, Prepositional versus first order logic, Unification and lifting, Forward chaining, Backward chaining, Resolution, Knowledge representation, Ontological Engineering-Categories and objects, Actions, Simulation and events, Mental events and mental objects

UNIT V: LEARNING

Learning from observations - forms of learning, Inductive learning - Learning decision trees, Ensemble learning - Knowledge in learning , Logical formulation of learning, Explanation based learning, Learning using relevant information, Inductive logic programming, Statistical learning methods, Learning with complete data, Learning with hidden variable, EM algorithm - Instance based learning, Neural networks - Reinforcement learning, Passive reinforcement learning, Active reinforcement learning, Generalization in reinforcement learning.

UNIT VI: APPLICATIONS

Communication – Communication as action, Formal grammar for a fragment of English, Syntactic analysis – Augmented grammars, Semantic interpretation – Ambiguity and disambiguation , Discourse understanding – Grammar induction, Probabilistic language processing, Probabilistic language models –, Information retrieval – Information Extraction, Machine translation.

Text Book:

1. “Artificial Intelligence – A Modern Approach”by Stuart Russell, Peter Norvig, 2nd Edition, Pearson Education / Prentice Hall of India, 2004, ISBN 978-0137903955

REFERENCES

1. “Artificial Intelligence: A new Synthesis”, by Nils J. Nilsson,Harcourt Asia Pvt.Ltd.,2000, ISBN: 981 4033 464

2. “Artificial Intelligence” by Elaine Rich and Kevin Knight, 2nd Edition, Tata McGraw-Hill, 2003, ISBN: 0-07-008770-9

3. “Artificial Intelligence-Structures And Strategies For Complex Problem Solving” by George F. Luger,Pearson Education / PHI, 2002, ISBN 9780201648669

CS-403 Elective IV (3) 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 Method

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

CS-404 Cloud Computing (4 Credits)

UNIT I: Enterprise computing: a retrospective

Introduction, Mainframe architecture, Client-server architecture, 3-tier architectures with TP monitors

UNIT II: The internet as a platform and Software as a service and cloud computing

Internet technology and web-enabled applications, Web application servers, Internet of services, Software as a service and cloud computing-Emergence of software as a service, Successful SaaS architectures, Dev 2.0 platforms, Cloud computing, Dev 2.0 in the cloud for enterprises

UNIT III: Cloud computing platforms and Web services, AJAX and mashups

Infrastructure as a service: Amazon EC2, Platform as a service: Google App Engine, Microsoft Azure, Web services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services

UNIT IV: Data in the cloud

Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo, Cloud data stores: Datastore and SimpleDB

UNIT V: MapReduce and extensions

Parallel computing, The MapReduce model, Parallel efficiency of MapReduce, Relational operations using MapReduce, Enterprise batch processing using MapReduce

UNIT VI: Dev 2.0 platforms

Salesforce.com's Force.com platform, TCS InstantApps on Amazon cloud, More Dev 2.0 platforms and related efforts, Advantages, applicability and limits of Dev 2.0

Reference Book:

Enterprise Cloud Computing: Technology, Architecture, ApplicationByGautamShroff, Cambridge University Press,ISBN 978-0521137355.

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

CS -408 Open Elective II Logical Reasoning and Quantitative Aptitude

(1 Credits Internal)

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

CS -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

CS-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.

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

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.