

Concurrency Control: Optimistic concurrency control–Deadlock management – detection, avoidance, and resolution – Distributed deadlock – Structured (top actions, distributed nested) transactions.Distributed Query Processing

Recovery and Commit Protocols: Failure analysis– Reliability and availability– Sources of failure–Recovery techniques: shadow paging and write-ahead logging–Memory and storage management (Undo/redo and steal/force) –Two Phase Commit, Three phase commit.

Spatial and Temporal Data and Mobility: Time in Databases – Spatial and Geographic Data – Multimedia Databases – Mobility and Personal Databases.

Concepts of NoSQL Databases

TEXT BOOKS/ REFERENCES:

1. Database Systems Concepts; Silberschatz, Abraham, Henry F. Korth, and S.Sudarshan.
2. Principles of Distributed Database Systems; Ozsu, M. Tamer and Patrick Valduriez.
3. C. S. R. Prabh, “Object Oriented Database Systems : Approaches and Architectures”, Third Edition, PHI Learning Pvt. Ltd.
4. RamezElmasri and ShamkantNavathe, “*Fundamentals of Database Systems*”, Sixth Edition, Addison Wesley, 2010
5. Hector Garcia-Molina, Jeffrey Ullman and Jennifer Widom, “*Database Systems: The Complete Book*”, Second Edition, Prentice Hall, 2008.

18CA303

ADVANCED SOFTWARE ENGINEERING

3-0-1-4

Software Engineering – Introduction - Software Classification - Layered Technology – Software Process –Practice - Generic Process Model , Process Assessment and Improvement– CMMI framework - Perspective Models - Specialized Models - Agile Process ModelsRequirements Engineering – SRS - Requirement Analysis- Unified Modeling Language –Approaches - Scenario based Modelling - UML Models that supplement Use Cases –Activity and Swim lane Diagrams - Design Engineering - Architectural Design – ModelingComponent level design - Performing User Interface Design.

Software Testing - Strategic Approach to Software Testing - , Test Strategies forconventional and Object Oriented Software - Validation Testing - System Testing – Art ofDebugging - Testing Techniques - White Box Testing – Basis Path Testing,- ControlStructure Testing - Black Box Testing

Quality Management – Overview – Quality Concepts - McCall’s Quality Factors – ReviewTechniques – Defect Removal Efficiency – Formal Technical Reviews – Product MetricsOverview.

Web Engineering – Application – Attributes – Category – WebE Process Framework – WebEBest Practices – Overview on Analysis, Design and Testing of WebApp projects - Requirements Modeling for WebApps, Web App Design, Testing Web Applications.

Introduction to open source SE tools – Github, Introduction to TDD methodology, Overview of popular software components

TEXT BOOKS/ REFERENCES:

1. Roger S. Pressman, “*Software Engineering-A Practitioner’s Approach*”, Seventh Edition, Tata McGraw-Hill, 2010.
2. Ian Sommerville “*Software Engineering*”, Sixth Edition.
3. Richard Fairley , “*Software Engineering concepts*”, Tata McGraw-Hill Publishing Company Pvt. Ltd., Seventh Edition

18CA305 DESIGN AND ANALYSIS OF ALGORITHMS

3-1-0-4

Introduction– Asymptotic Notations- Monotonicity vs. Nonmonotonicity - Examples. Analysis of iterative programs, Analysis of recursive programs: Recurrence Relation: Recursion Tree Methods, Master Method. Sorting: Bubble – Insertion Sort- Selection Sort. Divide and Conquer: Quick Sort- Merge Sort- Bucket Sort-Lower Bounds- Heap Sort – Comparisons of Sorting. Introduction to KMP, BMP Searching, Greedy Algorithm: Fractional Knap-sack Problem- Task Scheduling Problem.

Dynamic Programming: Matrix Multiplication Problem- 0/1 Knap-sack Problem.

Graph Algorithms: Graph Traversals (DFS, BFS with Analysis) - Shortest Path Algorithms (with Analysis) – Dijkstra - Bellman Ford- Floyd Warshall’s all Pair shortest path Algorithm- Minimum spanning Tree (with Analysis) – Kruskal– Prims.

NP Problems: Definition: P-NP-NP Complete-NP Hard. Examples:P-NP.

TEXT BOOKS/ REFERENCES:

1. Cormen T.H ,Leiserson C.E, Rivest R.L and Stein C, “*Introduction to Algorithms*”, Third Edition, Prentice Hall of India, 2009.
2. Baase.S and Gelder A.V., “*Computer Algorithms- Introduction to Design and Analysis*”, Third edition, Pearson Education Asia, 2003.
3. Ellis Horowitz ,Sartaj Sahni.S and Rajasekaran.S, “*Fundamentals of Computer Algorithms*”, Silicon Press, 2008.
4. Goodrich M.T and Tamassia.R, “*Algorithm Design Foundations, Analysis, and Internet Examples*”, Fourth Edition, John Wiley and Sons, 2002.
5. Dasgupta.S, Papadimitriou.C. and Vazirani.U, “*Algorithms*”, Eighth edition, Tata McGraw-Hill, 2009.

18CA311 COMPUTER LANGUAGE ENGINEERING

3 1 0 4

Automata and Language: Chomsky hierarchy of languages, Introduction to Finite Automata – Non-Deterministic Finite Automata- equivalence of NFAs and DFAs- minimization of DFA- Regular Expressions. Context-free Grammar - Parse tree derivations (Top-down, Bottom-up), Context-free languages – Chomsky normal form, GNF.

Introduction to Compilers: Compiler structure – Overview of Translation. Lexical Analysis: From regular expression to Scanner. Implementation of scanner: Lex - Parsers: Expressing syntax – Top-down parsing: Recursive descent parsing, Non-recursive predictive parsing. Bottom-up parsing: LR(0), LR(1) and LALR(1) – Implementation of Parser - YACC

Context-Sensitive Analysis: Type Systems – Attribute – Grammar – Syntax Directed Translation. Intermediate Representations: Graphical and Linear Intermediate Representations – Symbol tables. Procedure Abstraction: Procedure calls – Name Spaces – Communicating Values between Procedures.

Iterative Data Flow Analysis – Instruction selection via Tree Pattern Matching – Register allocation: Local and Global – Introduction to Optimization.

TEXT BOOKS/ REFERENCES:

1. *Peter Linz, "An Introduction to Formal Languages and Automata", Third Edition, 2002.*
2. *Keith Cooper and Linda Torczon, "Engineering a Compiler", Second Edition, Morgan Kaufmann, 2011.*
3. *Alfred V.Aho, Monica S. Lam, Ravi Sethi and Jeffrey D. Ullman, "Compilers: Principles, Techniques and Tools", Prentice Hall, Second Edition, 2006.*
4. *Andrew W. Appel and Jens Palsberg, "Modern Compiler Implementation in Java", Cambridge University Press, Second Edition, 2002.*

18CA312DATA MINING AND APPLICATIONS

3-0-1-4

Introduction: Evolution and Importance of Data Mining-Types of Data and Patterns Mined- Technologies-Applications-Major Issues in Data Mining. Knowing about Data-Data Preprocessing: Cleaning– Integration–Reduction–PCA, Data Transformation and Discretization.

Mining Frequent Patterns: Basic Concept – Frequent Item Set Mining Methods – Mining Association Rules – Association to Correlation Analysis.

Classification and Prediction: Issues - Decision Tree Induction - Bayesian Classification – Rule Based Classification – k-Nearest-Neighbor Classification - Linear SVM - Regression – Linear, Logistic - Accuracy and Error measures –Introduction to Ensemble methods

Clustering: Overview of Clustering – Types of Data in Cluster Analysis – Major Clustering Methods-Partitioning Methods- k-Means, k-Medoids. Hierarchical Methods-Agglomerative and Divisive hierarchical clustering. Density-Based Methods-DBSCAN, Graph-based clustering (CHAMELEON), Evaluation in Clustering

Mining Data Streams- Mining Time-Series Data- Mining Sequence Patterns in Biological Data- Graph Mining – Social network Analysis - Text Mining – Mining the World Wide Web, Applications and Trends in Data Mining

Tools :Implementation of Data mining algorithms using Latest Open Source Data mining Tools.

TEXT BOOKS/ REFERENCES:

1. Jiawei Han, Micheline Kamber and Jian Pei, “Data mining concepts and Techniques”, Third Edition, Elsevier Publisher, 2006.
2. K.P.Soman, Shyam Diwakar and V.Ajay, “Insight into data mining Theory and Practice”, Prentice Hall of India, 2006.

18CA313WEB SERVICES AND CLOUD

3 0 1 4

Introduction to Web Services, Web service Architecture XML, XSD, DTD, XSLT, Parsers. WSDL- Purpose of WSDL, Types of WSDL, Message Exchange Patterns, Message Exchange Formats.

WS- standard, WS- Co-ordination, WS- Reliable messaging, WS- policy, JAX-WS, Web Services in .Net , UDDI, SOAP.

Introduction to Cloud Computing- Architecture, types of Cloud- Public cloud, private cloud, Community Cloud and hybrid clouds, Cloud service models- IAAS, SAAS, PAAS, and XAAS. Cloud an organization perspective- Cloud Migration and Virtualization, Cloud OS.

Cloud Computing Platforms, Cloud service Platforms- storage service, database service, analytical service and application service, Cloud Data center management, Distributed Storage Systems, Cloud usage scenarios, Cloud Security

Amazon Web Services (AWS), Amazon Elastic Cloud, AWS Architecture, Microsoft Azure, Google App Engine, DevOps Services, Open Stack and Open Nebula Private Cloud setup and usage.

TEXT BOOKS/ REFERENCES:

1. Thomas Erl, “Service Oriented Architecture”, Concepts, Technology and Design”, Prentice Hall of India, 2005.
2. Thomas Erl, “Service oriented Architecture: A field guide to integrating XML and web services.
3. Toby Velte, Anthony Velte and Robert Elsenpeter,”Cloud Computing A Practical Approach”, Tata McGraw hills,2009
4. Thomas Erl, Cloud Computing: Concepts, Technology & Architecture and Cloud Computing Design Patterns., Prentice Hall of service technology series.
5. Arshdeep Bahga and Vijay Madisetti, Cloud Computing: A Hands-On Approach, AWS Basics: Beginners Guide, by Gordon Wong.

18CA331

BIG DATA ANALYTICS AND VISUALIZATION

3-0-0-3

Introduction of big data – Big data characteristics - Volume, Veracity, Velocity, and Variety

– Data Appliance Challenges and Issues, Case for Big data, Big data sources, Features of

data. - Evolution of Big data – Best Practices for Big data Analytics - and Integration tools

Introduction to Data Modeling, Data Models Used in Practice: Conceptual data models,

Logical data models, Physical data models, Common Data Modeling Notations , How to Model Data : Identify entity types, Identify attributes, Apply naming conventions, Identify relationships, Apply data model patterns, Assign keys, Normalize to reduce data redundancy, Introduction to elementary data analysis: Measures of center: Mean, Median, Mode, Variance, Standard deviation, Range. Normal Distribution: Center, Spread, Skewed Left, Skewed Right, outlier. Correlations: Correlation Patterns: Direction relationship, Magnitude Relationship. Introduction to Bayesian Modeling: Bayes Rule, Probabilistic Modeling Introduction to Predictive Analytics: Simple Linear regression, Multiple Linear regression, Logistic Linear Regression. History of Visualization, Goals of Visualization, Types of Data Visualization: Scientific Visualization, Information Visualization, Visual Analytics, Impact of visualization

Introduction to Data Processing , Map Reduce Framework , Hadoop ,HDFS , S3 Hadoop Distributed file systems, Apache Mahout, Hive,Sharding, Hbase , Impala , Case studies : Analyzing big data with twitter ,Big data for Ecommerce , Big data for blogs.

TEXT BOOKS/ REFERENCES:

1. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS Businessm.Series, 2012.

28

2. The Data Modeling Handbook: A Best-Practice Approach to Building Quality Data Models 1st Edition by Michael C. Reingruber (Author), William W. Gregory (Author) A Wiley QED publications

3. Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”,Elsevier, 2007

4. Correlation and Regression: Applications for Industrial Organizational Psychology and Management (Organizational Research Methods) 1st Edition, by Philip Bobko (Author)

1. Multiple Regression and Beyond 1st Edition by Timothy Z. Keith (Author)

18CA332

BIO INFORMATICS

3-0-0-3

Introduction to Bioinformatics: Definition - Importance and Uses of Bioinformatics- Information Technology - Systems Biology.

Introduction to Nucleic Acids: DNA and RNA as Genetic Materials - Structure of Nucleic Acids - Nucleosides and Nucleotides - DNA Double Helix. Central Dogma of Molecular Biology - Nature of Genetic Code - Deciphering Genetic Code - Wobble Hypothesis - Universalities and Exceptions.

Applications of Data Mining to Bioinformatics Problems - Biological Data – Databases - Protein Sequencing - Nucleic Acid Sequencing - Sequence to Structure Relationship.

Bioinformatics Software: Clustal V - Clustal W 1.7 - RasMol – Oligo – Molscript – Treeview – Alscript - Genetic Analysis Software- Phylip.

Biocomputing: Introduction to String Matching Algorithms - Database Search Techniques - Sequence Comparison and Alignment Techniques - Use of Biochemical Scoring Matrices – Introduction to Graph Matching Algorithms - Automated Genome Comparison and its Implication - Automated Gene Prediction - Automated Identification of Bacterial Operons and Pathways - Introduction to Signaling Pathways and Pathway Regulation. Gene Arrays - Analysis of Gene Arrays - Machine Learning Methods in Bioinformatics - Hidden Markov models - Applications of HMM in gene identification and Profiles HMMs - Neural Networks and Support Vector machines.

TEXT BOOKS/ REFERENCES:

1. Claverie J.M and Notredame C, “*Bioinformatics for Dummies*”, Second Edition, Wiley, 2003.
2. Pierre Baldi and Soren Brunak, “*Bioinformatics - The Machine Learning Approach*”, Second Edition, A Bradford Book, 2001.
3. Rastogi S.C, Mendiratt N. and Rastogi P “*Bioinformatics: Concepts, Skills & Applications*”, CBS Publishers & Distributors, 2004.
4. Fogel G.B. and Corne D.W, “*Evolutionary Computation in Bioinformatics*”, Morgan Kaufmann, 2003.

18CA333

BUSINESS INTELLIGENCE

3-0-0-3

Introduction to Business Intelligence: Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, 3-tier data warehouse architecture, Data Marts

Data integration: Basics of Data Integration (Extraction Transformation Loading)- Concepts of data integration need and advantages of using data integration. Introduction to common data integration approaches, Introduction to ETL using SSIS, Introduction to data quality, data profiling concepts and applications.

Introduction to Multi-Dimensional Data Modeling-Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi-dimensional modeling, OLAP operations, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, OLAP Servers – MOLAP, ROLAP, OLAP query model and query

processing, indexing OLAP Data, Data Warehouse Implementation

Introduction to business metrics and KPIs, creating cubes using SSAS. Basics of Enterprise Reporting- Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS.

TEXT BOOKS/ REFERENCES:

1. Loshin D, "Business Intelligence", First Edition, Elsevier Science (USA), 2003.
2. Jiawei Han, Micheline Kamber and Jian Pei, "Data mining concepts and Techniques", Third Edition, Elsevier Publisher, 2006.
3. Biere M, " Business intelligence for the enterprise" , Second Edition, IBM Press, 2003.
4. Moss L T, Atre S, "Business intelligence roadmap", First Edition, Addison-Wesley Longman Publishing Co., Inc. , 2003.

18CA334

COMPUTATIONAL INTELLIGENCE

3-0-0-3

Artificial Intelligence – a Brief Review – Pitfalls of Traditional AI – Need for Computational Intelligence – Importance of Tolerance of Imprecision and Uncertainty – Constituent Techniques – Overview of Artificial Neural Networks - Fuzzy Logic – Evolutionary Computation.

Neural Network: Biological and Artificial Neuron, Neural Networks, Supervised and Unsupervised Learning. Single Layer Perceptron - Multilayer Perceptron – Backpropagation Learning.

Neural Networks as Associative Memories - Hopfield Networks, Bidirectional Associative Memory. Topologically Organized Neural Networks – Competitive Learning, Kohonen Maps.

Fuzzy Logic: Fuzzy Sets – Properties – Membership Functions - Fuzzy Operations. Fuzzy Logic and Fuzzy Inference - Applications. Evolutionary Computation – Constituent Algorithms. Swarm Intelligence Algorithms - Overview of other Bio-inspired Algorithms - Hybrid Approaches (Neural Networks, Fuzzy Logic, Genetic Algorithms etc.).

TEXT BOOKS/ REFERENCES:

1. Laurene Fausett, Fundamentals of Neural Networks, 2nd edition, Pearson, 1993
2. Ross T J, "*Fuzzy Logic with Engineering Applications*", McGraw Hill, 1997.
3. Eiben A E and Smith J E, "*Introduction to Evolutionary Computing*", Second Edition, Springer, Natural Computing Series, 2007.
4. Kumar S, "*Neural Networks - A Classroom Approach*", Tata McGraw Hill, 2004.

5. Engelbrecht, A.P, “*Fundamentals of Computational Swarm Intelligence*”, John Wiley& Sons, 2006.

6. Konar. A, “*Computational Intelligence: Principles, Techniques and Applications*”, Springer Verlag, 2005.

18CA335 COMPUTER GRAPHICS AND VISUALIZATION 3 0 0 3

Computer Graphics Fundamentals: Overview of CG - Video Displays -Color Models- OutputPrimitives.

Introduction to OpenGL- Points, Lines – Specifying a 2D World Coordinate ReferenceFrame in OpenGL- OpenGL Point Functions, Line Functions Polygon Fill Area Functions,Vertex Arrays - Line Drawing Algorithms - Circle Generation Algorithm Filled AreaPrimitives OpenGL fill Area Functions - Scan Line Polygon Filling Algorithms – BoundaryFill - Flood Fill Algorithms

Attributes of Output Primitives. Geometric Transformations: Basic 2Dtransformations-Other Transformations- Reflection and Shearing. OpenGL Geometric Transformation Functions.

3D Object Representation: Fractals - Geometrical Transformation for - 3D Objects - Viewing and Clipping 2D Viewing Functions Clipping Operations. Three Dimensional Viewing:

Viewing Pipeline, Viewing Coordinates. Projections: Parallel Projections, Perspective

23

Projections. OpenGL Two-Dimensional and Three-Dimensional Viewing Functions- OpenGL Animation.

Visible Surface Detection and Illumination Models: Visible SurfaceDetection Methods – Illumination Methods and Surface Rendering – Polygon. Rendering Methods: Constant Intensity Shading, Gouraud Shading, Phong Shading. OpenGL Illumination and Surface Rendering Functions, GUI – OpenGL Interactive Input Device Functions. The User Dialog – Interactive Picture Construction Techniques – Color Models - Computer Animation.

TEXT BOOKS / REFERENCES:

1. Donald Hearn and Pauline Baker, “*Computer Graphics with OpenGL*”, Third Edition, Prentice Hall of India, 2009.
2. Roy A. Plastock and Gordon Kalley, “*Schaum's Outline Series - Theory and Problems of Computer Graphics*”, Second Edition, Tata McGraw-Hill, 2000.
3. Foley J.D, Van Dam A, Eiener S.K. and Hughes J.F., “*Computer Graphics Principles and Practice*”, Second Edition, Pearson Education, 1996.

Introduction: DBMS Architecture and Data Independence - DBA Roles and Responsibilities.

SQL * PLUS Overview: SQL plus Fundamentals, Producing more readable outputs,

Accepting Values at Runtime, Using iSQL *Plus.

Modifying Data: Using DML, TCL- Managing Constraints -Managing Views. User Access

and Security: Creating and Modifying User Accounts, Managing User Groups with Profiles.

Oracle Overview and Architecture: Overview of Logical and Physical Storage Structures.

Managing Oracle Instances.

Control and Redo Log Files: Managing the Control Files. Managing Tables, Indexes and

Constraints. Managing Users and Security.

Introduction to Network Administration: Network Design Considerations, Network

Responsibilities for the DBA, Network Configuration, Overview of Oracle Net Features,

Oracle Net Stack Architecture.

Backup and Recovery Overview: Defining a Backup and Recovery Strategy, Testing- The

Backup and Recovery Plan. Introduction to Performance Tuning: Brief Overview of Tuning

methodology, General Tuning Concepts

TEXT BOOKS/REFERENCES:

1. Craig S. Mullins, “*Database Administration: The Complete Guide to DBA Practices and Procedures*”, Second Edition, Addison Wesley, 2012.

2. C.J. Date, “*Introduction to Database Systems*”, Eighth Edition, Addison Wesley, 2003.

3. Chip Dawes, Biju Thomas, “*Introduction to Oracle 9i SQL*”, BPB, 2002.

4. Bob Bryla, Biju Thomas, “*Oracle 9i DBA Fundamental I*”, BPB, 2002.

5. Joseph C. Johnson, “*Oracle 9i Performance Tuning*”, BPB, 2002.

18CA337DEEP LEARNING FOR NATURAL LANGUAGE PROCESSING 3 0 0 3

Intro to NLP and Deep Learning, Simple Word Vector representations: word2vec-GloVe: Global Vectors for Word Representation

Advanced word vector representations: language models, softmax, single layer networks- Neural Networks and backpropagation -- for named entity recognition

Introduction to Tensorflow-Recurrent neural networks -- for language modeling and other tasks-RUs and LSTMs -- for machine translation-Recursive neural networks -- for parsing-Parsing with Compositional Vector Grammars-Recursive neural networks -- for different tasks (e.g. sentiment analysis)

Convolutional neural networks -- for sentence classification-The future of Deep Learning for NLP: Dynamic Memory Networks

TEXT BOOKS/ REFERENCES:

2. Jurafsky and James H. Martin. Speech and Language Processing (3rd ed. draft)
3. Yoav Goldberg. A Primer on Neural Network Models for Natural Language Processing
4. Ian Goodfellow, Yoshua Bengio, and Aaron Courville. Deep Learning. MIT Press.

18CA338

DIGITAL IMAGE PROCESSING

3-0-0-3

5. Introduction and Fundamentals of Image Processing: Origins of Digital Image Processing –
6. Examples - Fundamental Steps in Digital Image Processing - Elements of Visual Perception -
7. A Simple Image Formation Model - Basic Concepts in Sampling and Quantization-
8. Representing Digital Images- Zooming and Shrinking Digital Images - Some Basic
9. Relationships between Pixels - Linear and Nonlinear Operations - Connectivity and Relations
10. between Pixels.
11. Simple Operations- Arithmetic, Logical, Geometric Operations. Image Enhancement in the
12. Spatial Domain and Frequency Domain: Some Basic Gray Level Transformations -
13. Histogram Processing – Basics of Spatial Filtering - Smoothing Filters-Mean, Median, Mode
14. Filters - Edge Enhancement Filters – Sobel, Laplacian, Robert, Prewitt filter, Contrast Based
15. Edge Enhancement Techniques.
16. Design of Low Pass Filters - High Pass Filters- Edge Enhancement - Smoothing Filters in
17. Frequency Domain. Butter Worth Filter, Homomorphic Filters in Frequency Domain.
18. Comparative Study of Filters in Frequency Domain and Spatial Domain.
19. Image Restoration - Segmentation and Morphology: A Model of the Image
20. Degradation/Restoration Process - Noise Models - Restoration in the Presence Of Noise Only
21. – Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering.
22. Edge Detection - Line Detection - Curve Detection - Edge Linking and Boundary Extraction -

23. Thresholding Algorithms- Region Based Segmentation - Region Growing - Connected
24. 26
25. Components Labeling - Region Growing and Region Adjacency Graph (RAG), Split and
26. Merge Algorithms - Morphology - Dilation, Erosion, Opening and Closing.
27. **TEXTBOOKS/ REFERENCES:**
28. 1. Rafael C. Gonzalez and Richard E. Woods,"*Digital Image Processing*",Third Edition,
29. Addison Wesley, 2007.
30. 2. Arthur R.Weeks, Jr., "*Fundamentals of Electronic Image Processing*",First Edition,
31. PHI,1996.
32. 3. Milan Sonka, Vaclav Hlavac and Roger Boyle,"*Image processing, Analysis, and Machine*
33. *Vision*",ThirdEdition,Vikas Publishing House, 2007.

18CA340 ADVANCED OPERATING SYSTEM AND DISTRIBUTED COMPUTING3 0 0 3

Unit 1

Introduction:

Review of core Operating systems, network Operating systems, Real-time Operating systems, Mobile Operating system.

Distributed Operating System- Introduction, design issues, Communication primitives, Limitations of distributed system.lamp ports logical clocks - vector clocks - casual ordering of messages - global state - cuts of a distributed computation - termination detection.

Unit 2

Distributed Mutual Exclusion:

Token based Algorithms, non-taken based algorithms, comparative analysis, Deadlock handling Strategies, Classification of agreement Problems.

Unit 3

Distributed File system, shared Memory and Distributed scheduling:

Distributed File system-Mechanisms, design issues, Distributed Shared Memory: Architecture, Algorithms for implementing DSM, Memory coherence, coherence protocols, Design issues.

Distributed Scheduling- Issues, Components, Load distributing algorithms, Performance comparison.

Unit 4

Failure Recovery, Fault Tolerance, Protection and Security:

Failure Recovery and Fault Tolerance -Basic concepts, Classification of failures, Backward and forward recovery, Basic approaches, recovery in concurrent systems, Fault tolerance issues, Atomic actions & protocols, Commit, non-blocking, voting-static, dynamic protocols. Protection & Security: Preliminaries, Access matrix model, Implementation and safety, Data security- model, conventional, modern, private-public key Cryptography, multiple encryptions, Authentication.

Unit 5

Multiprocessor Operating Systems and Database Operating system:

Multiprocessor Operating System: Introduction, Architecture, Interconnection networks for Multiprocessing, Caching, Structure of multiprocessing Operating System, Threads. Various types of Threads, processor synchronization.

Database operating systems: Introduction, requirements of Database OS, database systems, Concurrency control-model, problem, distributed database systems Concurrency control algorithms – synchronization primitives, lock based, timestamp based and data replication algorithms.

Text Books:

1. Mukesh Singhal, Niranjana G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", Tata McGraw-Hill Publishing Company Limited.
2. Silberschatz-Galvin, "Operating System Concepts" 6th edition. Addison Willey Publications. (only for first unit: review of OS)

Reference Books:

1. Andrew S.Tanenbaum, "Modern operating system", PHI
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson Education
4. Relevant Research Papers from the Journals/Conferences.

18CA383DATA STRUCTURES AND ALGORITHMS LAB-II

0-0-3-1

Posteriori analysis of iterative and recursive algorithms, plotting of growth rate.

Implementation of singly linked list, doubly linked list, circular linked list. Stack and Queue implementation using array and SLL, comparison of efficiencies, Applications of Stack and Queue –Infix to postfix, postfix expression evaluation, Implementation of Polynomial ADT using SLL.

Binary search tree implementation. Heap implementation using array, Heap sort,

Implementation of sorting algorithms – Bubble sort, Insertion Sort, Selection Sort, Quick

30

Sort- Merge Sort, performance comparison of sorting algorithms for various classes of inputs like nearly sorted, unsorted etc.

O(V²) and O(E log V) implementations of Dijkstra algorithm, BFS and DFS implementation,

graph cycle detection using BFS. Topological sort using DFS, Prims and Kruskals MST.

Dynamic Programming based solution for 0-1 Knapsack problem, Recursive matrix chain multiplication.

18CA384JAVA PROGRAMMING-II

0-0-3-1

Overview of the Language: Compiling and Interpreting Java Applications. JDK Objects and Classes: Defining Class- Creating Object- Constructors- Access Modifiers - Encapsulation. Input / Output Streams: Overview of Streams - Bytes vs. Characters - File Object- Binary Input and Output - Reading and Writing Objects. Inheritance in Java: Casting - Method Overriding - Polymorphism - Super - Interfaces and Abstract Classes. Packages: The Import Statement - Static Imports. Package Scope Multithreading: Introduction to Threads - Creating Threads - Thread States - Runnable Threads - Coordinating Threads - Interrupting Threads. Runnable Interface Applets: Applet Architecture- Parameters to Applet - Embedding Applets in Web page. Designing Graphical User Interfaces in Java: Components and Containers - Layout Managers - AWT Components- Adding a Menu to Window- Extending GUI Features using Swing Components.

TEXT BOOKS/ REFERENCES:

1. Naughton P. and Schildt H., "*Java: The Complete Reference*", 9th Edition, Oracle Press, 2014.
2. Eckel.B, "*Thinking in Java*", *Fourth Edition*, Prentice Hall, 2006.
3. Arnold, Gosling and Holmes, "*The Java Programming Language*", Fourth Edition, Addison-Wesley, 2005.

18CA385GUI PROGRAMMING USING VB.NET

0-0-3-1

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. The environment:

Editor tab, format tab, general tab, docking tab. visual development & event drive

Programming -Methods and events.

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function.

Control flow statements: conditional statement, loop statement. MsgBox&Inputbox. Working with Forms : Loading, showing and hiding forms, GUI Programming with Windows Form: Common Controls, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar. Properties, Methods and events. OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. Designing menu. Object oriented Programming: Classes & objects, fields Properties, Methods & Events, constructor, inheritance. Access Specifiers: Public Private, Protected

Database programming with ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid.

31

TEXT BOOKS/ REFERENCES:

1. Vb.net programming black book by Steven Holzner –Dreamtech publications
2. Mastering vb.net by EvangelosPetroutsos- bpb publications Introduction to .net framework-Worx publication

18CA386ANDROID APPLICATION DEVELOPMENT

0-0-3-1

Menu, Dialog, List and Adapters

What is Menu?-Custom Vs. System Menus-Creating and Using Handset menu Button (Hardware)-What are Android Themes. What is Dialog? How to create an Alter Dialog?

List & Adapters

Database SQLite

IntroducingSQLite-SQLiteOpenHelper and creating a database-Opening and closing a

database

Working with cursors Inserts, updates and deletes

Location Based Services and Google Maps

Using Location Based Services -Working with Google Maps

Multimedia Programming using Android

Multimedia audio formats-Creating and Playing -Multimedia audio formats-Kill / Releasing (Memory Management)-How to associate audio in any application-How to associate video playback with an event

WebView

How to develop your own custom made Web browser -How to use WebView object in XML

Permission for using the Internet-Methods for associated with 'Go', 'Back', 'Forward' etc

TEXT BOOKS/ REFERENCES:

1. Head first Android Development

18CA387WEB DEVELOPMENT USING ASP.NET

0-0-3-1

Understanding role of Web Server and Web Browser - Form Tag and comparison between

Get and Post methods - Understanding HTML Form Tag and elements within it –

ASP.NET Introduction - First ASP.NET Application - Auto Postback Property - Event

Handler Parameters - Comparison between HtmlControls and WebControls - ASP.NET

Architecture

Life Cycle of ASP.NET Page - Master Pages - Validation Controls - ASP.NET State

Management - Cookies-HttpCookie - Sessions-HttpSessionState

Application-HttpApplicationState -WebConfiguration File and Global.asax - Data Bound

Controls - Publishing Web Application

Creating web application in IIS - Using Virtual Directory - Publishing ASP.NET Website.

18CA389DATABASE MANAGEMENT SYSTEMS LAB -II

0-0-3-1

Table Design- Data Definition Language (DDL) commands - Table creation and alter(include integrity constraints such as primary key, referential integrity constraints, check, unique and null constraints both column and table level, Drop - Other database objects such as view, index, cluster, sequence, synonym etc. - Practice SQL Data Manipulation Language (DML) commands - Row insertion, deletion and updating - Retrieval of data - Simple select query - Select with where options (include all relational and logical operators) - Functions: Numeric, Data, Character, Conversion and Group functions with having clause - Set operators - Sorting data - Sub query (returning single row, multiple rows, more than one column, correlated sub query) - Joining tables(single join, self-join, outer join) - Data manipulations using date

functions - User defined functions in a query- Transaction Control Language (TCL) commands (Grant, revoke, commit and save point options) - Usage of triggers, functions and procedures using PL/SQL constructs.

18CA388OPERATING SYSTEMS LAB

0 0 3 1

Basic Linux commands – System calls – fork, exec, getpid, exit, wait, close, stat, open, read, write etc- IPC – pipes, Signals, Message Queues, Shared memory – Threads – Process synchronisation using semaphore, monitor – implementation of scheduling algorithms – FCFS, SJF, Priority – implementation of banker’s algorithm – implementation of page replacement algorithms.

18CA391 RESEARCH LEARNING AND PROBLEMFORMULATION 0 0 2 1

This is a case study which is a prerequisite for dissertation phase 1 in 5th semester. The students must read papers on the topic selected by them for the project and present a seminar in this regard.

18CA401DESIGN PATTERNS 3104

Introduction to Design Patterns - Observer Pattern - Decorator Pattern - Factory Pattern- Singleton Pattern - Command Pattern- Adapter and Facade Patterns - Template Method Pattern - Iterator and Composite Patterns - The State Pattern- The Proxy Pattern - Compound Patterns – MVC-Overview of other patterns – GRASP and Anti-Patterns: Case study: Use of patterns in the Design of a Modern Web Framework.

TEXT BOOKS / REFERENCES:

1. Erich Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra “Head First Design Patterns”, O’Reilly Media Inc., October 2004.
2. Erich Gamma, Richard Helm, Ralph Johnson and John M. Vlissides, “Design Patterns: Elements of Reusable Object Oriented Software”, Second Edition, Addison Wesley, 2000.
3. James W. Cooper, “Java Design Patterns: A Tutorial”, Second Edition, Pearson Education, 2003.
4. Mark Grand, “*Patterns in Java – A Catalog of Reusable Patterns Illustrated with UML*”, Wiley – Dream tech India, 2002.

18CA402SYSTEM SECURITY

3 1 0 4

Physical Security - Overview of Information Security:Confidentiality – Integrity – Access Control – Availability– Malicious Software (Viruses, Trojans, Rootkits, Worms, Botnets)

Program Security: Secure Program -Non Malicious Program Errors -Malicious Code - Program Controls.

Operating System Security: Memory Protection -Access Control -File ProtectionMechanisms
-User Authentication -Trusted Operating System – Lock Down Mechanism

Database Security: Security Requirements -Reliability and Integrity-Sensitive Data –
Inference -Multilevel Security

Network Security: Threats in Networks -Security Controls – Firewalls-Intrusion
DetectionSystems

Ethical Issues: Protecting Programs and Data -Information and the Law -Rights of
Employersand Employees -Redress for Software Failures -Computer Crime -Ethical Issues.
Case Study:Privacy Rights, Fraud, Accuracy of Information, Denial Of Service.

TEXT BOOKS/ REFERENCES:

1. Charles P. Pfleeger and Shari Lawrence Pfleeger, “*Security in Computing*”, Fourth Edition, Prentice Hall, 2007.
2. Ross J. Anderson and Ross Anderson, “*Security Engineering: A Guide to Building Dependable Distributed Systems*”, Wiley India Pvt Ltd, 2001.
3. C.K Shyamala, N. Harini and T.R.Padmanabhan, “*Cryptography and Security*”, First Edition, Wiley India Pvt Ltd, 2011.
4. Matthew Bishop, “*Computer Security: Art and Science*”, Addison-Wesley, 2003.
5. William Stallings, “*Cryptography and Network Security: Principles and Practice*”, Fifth Edition, Pearson Education, 2011.

18CA431

INFORMATION RETRIEVAL

3-0-0-3

Boolean Expression Based Retrieval: Vocabulary and Postings – Lists – Dictionaries and Tolerant Retrieval – Index Construction and Compression - Scoring and Vector Space Model– Score Computation – Evaluating Information Retrieval Systems – Relevance Feedback and Query Expansion – XML Based Retrieval– Probabilistic Models – Language Models –Text Classification – Vector Space Classification – SVM Based Document Classification –Latent Semantic Indexing – Web Search – Web Crawlers – Link Analysis – UnstructuredData Retrieval Semantic Web – Ontology - Implementations using Natural Language Toolkit.

TEXT BOOKS/ REFERENCES:

1. C. Manning, P. Raghavan and H. Schütze, “*Introduction to Information Retrieval*”, Cambridge University Press, 2008.
2. R. Baeza-Yates and B. Ribeiro Neto, “*Modern Information Retrieval: The Concepts and Technology Behind Search*”, Second Edition, Addison Wesley, 2011.
3. David A. Grossman and Ophir Frieder “*Information Retrieval: Algorithms and Heuristics*”, Second Edition, Springer 2004.

Introduction to AI and Production Systems: Introduction to AI-Problem formulation, Problem Definition - Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics - Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing - Depth first and Breadth first, Constraints satisfaction - related algorithms, Measure of performance and analysis of search algorithms.

Representation of Knowledge: Game playing- The min-max search procedure, adding alpha-beta cutoffs - Knowledge representation, Knowledge representation using Predicate logic - Production based system, Frame based system. Knowledge Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

Introduction to Machine Learning - Types of machine learning, Supervised learning, unsupervised learning, basic concepts of machine learning, Review of probability, Computational learning theory. Dimensionality reduction using principal component analysis, Generative models of discrete data- Classifying documents using bag of words, Linear regression, Logistic regression, classification using Neural networks.

Text / Reference Books:

1. Elaine Rich, Kevin Knight, Artificial Intelligence, 2nd edition- (Tata McGraw-Hill)
2. Donald A. Waterman, A Guide to expert systems- (Addison-Wesley).
3. Kevin P. Murphey, “Machine learning, a probabilistic perspective”, The MIT Press Cambridge, Massachusetts, 2012.
4. Alex Smola and SVN. Viswanathan, “Introduction to machine learning”, Cambridge university press, 2008.

**18CA433 MODERN WEB APPLICATION DEVELOPMENT USING MEANSTACK
3-0-0-3**

1. Basics of HTML, CSS, and Javascript

HTML, CSS, Bootstrap, Javascript basics – Variables, functions, and scopes, Logic flow and loops, Events and Document object model, Handling JSON data, Understanding Json callbacks.

2. Introduction to Node JS

Installation, Callbacks, Installing dependencies with npm, Concurrency and event loop fundamentals, Node JS callbacks, Building HTTP server, Importing and exporting modules, Building chat application using web socket.

3. Building REST services using Node JS

REST services, Installing Express JS, Express Node project structure, Building REST

services with Express framework, Routes, filters, template engines - Jade, ejs.

4. MongoDB Basics and Communication with Node JS

Installation, CRUD operations, Sorting, Projection, Aggregation framework, MongoDB indexes, Connecting to MongoDB with Node JS, Introduction to Mongoose, Connecting to MongoDB using mongoose, Defining mongoose schemas, CRUD operations using mongoose.

5. Building Single Page Applications with AngularJS

Single Page Application – Introduction, Two-way data binding(Dependency Injection), MVC in Angular JS, Controllers, Getting user input, Loops, Client side routing – Accessing URL data, Various ways to provide data in Angular JS – Services and Factories, Working with filters, Directives and Cookies, The digest loop and use of \$apply.

18CA434 NETWORK MANAGEMENT AND SYSTEM ADMINISTRATION 3-0-0-3

Basic Hardware: Network Fundamentals: Local Area Networking - Defining Networks with the OSI Model - Wired and Wireless Networks - Internet Protocol - Implementing TCP/IP in the Command Line- Working with Networking Services - Understanding Wide Area Networks - Defining Network Infrastructures and Network Security.

27

Security Fundamentals: Security Layers – Authentication – Authorization - Accounting - Security Policies - Network Security - Server and Client Protection.

Windows Server Fundamentals: Server Overview - Managing Windows Server 2008 R2 - Managing Storage - Monitoring and Troubleshooting Servers - Essential Services - File and Print Services - Popular Windows Network Services and Applications.

Linux Fundamentals: System Architecture-Determine and Configure Hardware Settings- Boot the System - Change Run Levels and Shut Down or Reboot System -Linux Installation and Package Management - File Systems- Create Partitions and File systems - Maintain the Integrity of File Systems - Control Mounting and Unmounting of File Systems.

Manage Disk Quotas - File Permissions and Ownership - Create and Change Hard and Symbolic Links. Network Management Lab: Windows Network Configurations and Linux

Network Configurations.

TEXT BOOKS / REFERENCES:

1. 98-366: “*Networking Fundamentals, Microsoft Official Academic Course* (Microsoft Corporation)”, Wiley, 2011.
2. 98-367: “*MTA Security Fundamentals, Microsoft Official Academic Course*(Microsoft Corporation)”, Wiley, 2011.
3. 98-365: “*Windows Server Administration Fundamentals, Microsoft Official Academic Course* (Microsoft Corporation)”, Wiley, 2011.
4. Adam Header, Stephen Addison Schneiter, James Stanger and Bruno Gomes Pessanha, LPI “*Linux certification in Nut shell*”, Third edition, O’Reilly, 2010.

18CA435

NETWORK SECURITY

3-0-0-3

Cryptographic Protocols and their Integration into Distributed Systems and other Applications - Authentication: Overview – Requirements - Functions-Protocols –Applications –Kerberos – X.509 Directory Services.

Electronic Mail Security: Email Architecture – Security –Pretty Good Policy Variations – Operational Descriptions – PGP Session Keys Key Rings – Key management – MessageExchange formats – Trust Model

IP Security:Introduction to IP - IP security Overview- Pros and Cons – IP Sec Applications – IP SecurityArchitecture – IPSec Services - Authentication Header -Encapsulating Security Payload –IPSec Modes - Combining Security Associations - Key Management.

Web Security: Web Security Requirements- Secure Sockets Layer Objectives – Versions – Certificates – Protocols – Transport Level Security - Secure Electronic Transaction Entities – Certificates – DS Verification.

TEXT BOOKS/ REFERENCES:

1. C K Shyamala, N Harini and T R Padmanabhan, “*Cryptography and Security*”, FirstEdition, Wiley India Pvt. Ltd, 2011.
2. Stallings W, “*Cryptography and Network Security*”, Third Edition, PearsonEducation Asia. Prentice Hall, 2000.
3. Forouzan B A, “*Cryptography and Network Security*”, Special Indian Edition, TataMcGraw Hill, 2007.

18CA436

OPEN SOURCE SYSTEMS

3 0 0 3

Overview of Free/Open Source Software: Definition - Examples of OSD – CompliantLicenses - Example Product - Development Process – History – BSD - The Free SoftwareFoundation – Linux - Apache – Mozilla.Open Source Software Qualification: Specific Characteristics of Open Source Software

Transformation -Development Process - Taboos and Norms in OSS Development – LifeCycle.

Deriving a Framework for Analyzing OSS :Zachman's Framework for IS Architecture - CATWOE and Soft System Method. Deriving the Analytical Framework for OSSEnvironment. World View: Classifying OSS Motivations - Technological Micro-level Motivation - Economic Micro level and Macro-level Motivation - Socio-Political Micro-level and Macro-level Motivation.

Open Source Server Applications: Infrastructure Services - Web Servers - Database Servers - Mail Servers - Systems Management.

Open Source Desktop Applications: Graphical Desktops - Web Browsers - The Office Suite - Mail and Calendar Clients - Personal Software - Cost of OSS – Licensing. FOSS Programming: Python.

TEXT BOOKS/ REFERENCES:

Joseph Feller, Brian Fitzgerald and Eric S. Raymond, “*Understanding Open Source Software Development*”, Addison Wesley Professional, 2000.

18CA437

SEMANTIC WEB TECHNOLOGIES

3-0-0-3

Introduction to Semantic Web: Semantic Web Concepts- Need for the Semantic Web- Information Overload - Stovepipe Systems - Poor Content Aggregation - XML and the Semantic Web - Web Services and the Semantic Web -Current Applications of the Semantic Web - Business Case for the Semantic Web Decision Support

Business Development - Information Sharing and Knowledge. Understanding the Resource Description Framework: What Is RDF - Capturing Knowledge with RDF - Other RDF

24

Features - RDF Schema – Non-Contextual Modelling. Web Ontology Language: Motivation and Overview –

The OWL Language- Defining the Ontology Spectrum - Thesaurus, Logical Theory - Ontology - Topic Maps Standards and Concepts – Occurrence – Association - Subject Descriptor – Scope.

Ontologies: Overview of Ontologies - Ontology Example – Definitions – Syntax – Structure – Semantics - and Pragmatics - Expressing Ontologies Logically - Ontology and Semantic Mapping Problem.

Knowledge Representation: Languages - Formalisms, Logics - Description Logics - Ontology Design and Management using the Protege Editor - Ontology Reasoning with Pellet/FACT++, Ontology Querying with SPARQL.

TEXT BOOKS / REFERENCES:

1. Michael C. Daconta, Leo J. Obrst and Kevin T. Smith, “*The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management*”, Fourth Edition, Wiley Publishing, June 2003.
2. Jeffrey T. Pollock, “*Semantic Web FOR DUMMIES*”, Wiley Publishing, 2009.
3. John Davies, Rudi Studer and Paul Warren John, “*Semantic Web Technologies: Trends and Research in Ontology-based Systems*”, John Wiley and Sons, 2006.
4. John Davies, Dieter Fensel and Frank Van Harmelen, “*Towards the Semantic Web: Ontology-Driven Knowledge Management*”, John Wiley and Sons, 2003.

18CA438

SOFTWARE QUALITY ASSURANCE

3-0-0-3

Introduction: The Software Quality Challenge - Software Quality Factors-The Components of Software Quality System-Integrating Quality Activities in the Project Life Cycle.

Software Testing: Strategies and Implementation-Building the Software Testing Process-Software Quality Management Components: Metrics and Costs-Software Quality in the Business Context- Product Quality and Process Quality - ISO 9001:The Origins of ISO 9001-need for ISO 9001-Assessment and Audit Preparation-The Assessment Process

Software CMM and other Process Improvement Models-Software Configuration Management-Introduction to Six Sigma - Case Studies: Indian Software Industry in Perspective.

TEXT BOOKS/ REFERENCES:

1. Daniel Galin, “*Software Quality Assurance: From theory to Implementation*”, Pearson Education, 2008
3. Nina Godbole, “*Software Quality Assurance, Principles and Practice*”, Narosa Publications, 2011.
4. William Perry, “*Effective Methods of Software Testing*”, Third Edition, Wiley, 2006.

18CA439 STRUCTURE AND INTERPRETATION OF COMPUTER PROGRAMS

3-0-0-3

Introduction to the Elements of Programming Languages: Different Types of Programming Languages - Modeling Programming Languages, Computability versus Complexity, Computer Science for Computation.

Introduction to LISP and Scheme - Building Abstractions with Procedures - The Elements of Programming Procedures and the Process they Generate – Formulating Abstractions with Higher-Order Procedures.

Building Abstractions with Data: Introduction to Data Abstraction- Hierarchical Data and the Closure Property – Symbolic Data – Multiple Representations for Abstract Data – Systems with Generic Operations.

Modularity, Objects, and State: Assignment and Local state – The Environment Model of Evaluation – Modeling with Mutable Data – Concurrency- Streams.

Metalinguistic Abstraction: The Metacircular Evaluator – Lazy Evaluation - Variation on a Scheme- Nondeterministic Computing – Logic Programming – Introduction to PROLOG.

TEXT BOOKS/ REFERENCES:

1. Abelson H and Sussman G J, “*Structure and Interpretation of Computer Programs*”, Second Edition, MIT Press, 2005.
2. Sebesta R W, “*Concepts of Programming Languages*”, Ninth Edition, Addison Wesley, 2009.
3. Pierce B C, “*Types and Programming Languages*”, MIT Press, 2002.
4. Sethi R, “*Programming Languages Concepts and Constructs*”, Second Edition, Addison Wesley, 1996.
5. T W Pratt and Marvin V Z, “*Programming Languages: Design and Implementation*”, Third Edition, Prentice Hall, 1995.

18CA440 WIRELESS COMMUNICATIONS AND NETWORKS 3 0 0 3

Introduction to Wireless Systems: Brief History of Wireless Communication. Transmission Fundamentals: Time Domain, Frequency Domain, Bandwidth vs. Data Rate – Channel Capacity - Transmission Media – Protocols and TCP/IP Suite: TCP/IP Protocol Architecture - OSI Model. Antennas and Wave Propagation: Antennas, Propagation Modes, Fading in the Mobile Environment - Free Space Propagation.

Modulation Techniques: Signal Encoding, Digital Data - Analog Signal, Analog Data - Digital Signal, Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), Code Division Multiple Access (CDMA).

Wireless Networking: Satellite Communications- Capacity Allocation – Frequency Division, Time Division, WiMax and IEEE 802.16 Broadband Wireless Access Standards. Wireless LAN Technology: Infrared, Spread Spectrum, Narrowband LANs- Wi-Fi and IEEE 802.11 Standard, Bluetooth and IEEE 802.15 Standard.

Wireless Routing Protocols: Infrastructure, AdHoc Networks, ProActive vs. ReActive, Dynamic Source Routing (DSR), AdHoc On Demand Distance Vector (AODV), Temporarily Ordered Routing Algorithm (TORA), Destination Sequenced Distance Vector (DSDV). Case Study using NS2 / NS3.

TEXTBOOK / REFERENCES:

1. William Stallings, “*Wireless Communication and Networks*”, Pearson Education, Third Edition, 2002.
2. Jochen Schiller, “*Mobile Communications*”, Pearson Education, Second Edition, 2003.

Web server and Application Server - Client vs server-side programming – Servlets.
Session tracking - JSP –scriptlets, declarations, expressions and declaratives – JSP
Tag Libraries – EnterpriseJava Beans –Session Bean – Entity Bean – Message Driven Bean
XML Programming - DTDs & Schemas - XML parsers – DOM parsers - SAX parsers –
Writing XML with Java Introduction to Frameworks – Hibernate – Spring

18CA482ANGULAR AND NODE JS LAB

0 0 3 1

Angular JS

1. AngularJS Expressions
2. AngularJS Modules
3. AngularJS Tables
4. AngularJS HTML DOM

Node JS

5. Node JS introduction
6. My first JS program, Initiate the Node.js File
7. Modules -Include Modules, creating Modules.
8. HTTP modules-Add an HTTP Header
9. Read the Query String and Split the Query String
10. Node JS as web server
11. Node JS as File server.
12. Read File, Create Files, Update Files, Rename Files
13. js URL Module
14. js NPM. Using a Package
15. js MySQL Create Database
16. js MySQL Create Table
17. js MySQL CRUD operations.

18CA483NETWORK AND GRID SIMULATION LAB

0 0 3 1

1. Introduction to NS3
2. Simulation of a simple wired network topology and working with netanim
3. Working with UDP and TCP Sockets
4. Simulation of a wireless network topology
5. Simulation of a heterogeneous topology
6. Working with routing protocols
7. Debugging using gdb tool
8. Introduction and installing SimGrid tool
9. Formation of cluster environment
10. SimGrid as a Grid Simulator
11. SimGrid as a P2P Simulator
12. SimGrid as a Cloud Simulator
13. A simple demonstration on scheduling and load balancing using SimGrid.

18CA484BIO - INFORMATICS LAB

0 0 3 1

1. Biological Databases with Reference to Expasy and NCBI
2. Queries based on Biological databases
3. Sequence databases and string matching
4. Sequence similarity searching using BLAST
5. RNA secondary structure
6. Sequence Alignment
7. Choosing the best-fit substitution model
8. Phylogenetics - the least-squares method.

18CA485 COMPUTER ORGANIZATION AND ARCHITECTURE LAB

0 0 3 1

Basic Organization and Hardware Components of a Personal computer-Assembling of Personal Computer: Formatting- Partitioning the Hard Disk-Installation of Windows and Linux Operating System- Digital Circuits: Realisation of Logic Gates- Realization of logic functions with the help of universal gates-NAND Gate- Half/Full Adder & Half/Full Subtractor - Code Conversion.

18CA496

DISSERTATION Phase I

0-0-0-5

The objective of Dissertation – Phase 1 is to gear up students for preparation of Dissertation-Phase 2 in Semester X. Dissertation provides an opportunity to the students to demonstrate independence and originality in thought and application. Students will select topics from the field of computer application and based on a thorough review of literature on that topic, they will identify the problems and decide on plans of research for dissertation. Under the supervision of faculty members, they will execute their plans involving theoretical and/or experimental work. Students will have to prepare proper documentation consisting of SRS,Modelling Techniques, Development Strategies and Implementation and Testing Strategies.Student may use any Design Methodologies such as SSAD, OOAD and UML etc. This is done during phase 1. Regular reviews will be conducted.

18CA497

DISSERTATION Phase II

0-0-0-12

The results obtained in phase 1 will be analysed to arrive at a conclusion which will lead to some novelty in the field of computer application. Dissertation will be prepared as per the prescribed format/ guidelines and will be presented in the form of regular reviews. The Dissertation work will be evaluated continuously over the span of the semester as per the approved procedure. For the final review, the department may appoint external expert from industry or academics. Also, a technical paper based on the work done has to be submitted and published at a reputed conference which indexes the publications in SCOPUS. The formalities insisted by the department in this regard has to be strictly adhered to.

18CSA101 COMPUTATIONAL THINKING AND PROBLEM SOLVING 3 0 0 3

Unit 1

Basics

Introduction, Information and data, Number Systems-Binary, Hexadecimal, Octal, Conversion, BCD, Data encoding. Boolean Algebra, Simplification of Boolean expression.

Unit 2

Problem Solving

Problem definition, Problem decomposition, Abstraction, Greedy Method, Divide and Conquer.

Unit-3

Algorithmic Thinking

Algorithm and Flowcharting, Name binding, Selection, Repetition.

Unit 4

Data organization: List and Arrays, Modularization, Problem Solving: Factoring and Recursion Techniques,

Unit-5

Searching and Sorting Techniques, Text processing and Pattern matching.

TEXT BOOKS:

1. David Riley and Kenny Hunt , Computational thinking for modern solver, Chapman & Hall/CRC, 2014
2. R.G. Dromey , “How to solve it by Computer”, PHI, 2008

18CSA103

COMPUTER ESSENTIALS

3 0 2 4

Unit-1

Introduction to computers: Characteristics of computers, Classification of Digital Computer Systems: Microcomputers, Minicomputers, Mainframes, Supercomputers. Anatomy of Computer: Introduction, Functions & Components of a Computer, Central Processing Unit, Microprocessor, Storage units, Input and output Devices. How CPU and memory works. Program execution with illustrative examples. Introduction to microcontrollers.

Lab Component- PC Assembly,

Unit-2

Operating System Fundamentals

Operating Systems: Introduction, Functions of an operating System, Classification of Operating Systems, System programs, Application programs, Utilities, The Unix Operating System, Basic Unix commands, Microkernel Based Operating System, Booting,

Lab Component- OS installation, Basic unix commands

Unit-3

Introduction to Database Management Systems

Database, DBMS, Why Database -File system vs DBMS, Database applications, Database users, Introduction to SQL, Data types, Classification of SQL-DDL with constraints, DML, DCL, TCL

Lab Component

Create: Table and column level constraints- Primary key, Foreign key, Null/ Not null, Unique, Default. Check, Alter, Drop, Insert, Update, Delete, Truncate, Select: using WHERE, AND, OR, IN , NOT IN

Unit-4

Internet Basics

Introduction, Features of Internet, Internet application, Services of Internet, Logical and physical addresses, Internet Service Providers, Domain Name System.

Lab Component: Web Browsing, Emails, Searching

Unit-5

Web Basics

Introduction to web,web browsers, http/https, URL, HTML5,CSS

Lab Component -HTML5 & CSS

TextBook

J. Glenn Brookshear,"Computer Science: An Overview", Addison-Wesley, Twelfth Edition, 2014

18CSA111

COMPUTER ORGANIZATION

3 1 0 4

Unit1

SOP and POS Expressions, Karnaugh Map Simplification - Universal gates, Sequential circuits and combinational circuits, Flip Flops, Registers, Counters, Decoder, Encoder, Multiplexer, De-multiplexer, Arithmetic circuits,

Unit 2

Computer Organization and Design - Instruction Codes- Computer Registers- Computer Instructions - Instruction Cycle - Memory Reference Instructions - Input Output configuration

Unit 3

Central Processing Unit: Introduction- General Register Organization - Stack Organization - Instruction Formats - Addressing Modes - Data Transfer and Manipulation - Conditional Branch Instructions - Program Interrupts

Unit 4

Pipeline and Vector Processing

Parallel Processing - Pipelining - Arithmetic Pipeline - Instruction Pipeline - Vector Processing - Array Processors

Unit 5

Memory Organization

Memory Hierarchy - Types of Memory - Main Memory - Auxiliary Memory - Associative Memory - Cache Memory

Computer Arithmetic – Introduction - Multiplication Algorithm - Booth's Algorithm.

TEXTBOOKS:

1. M Morris Mano - Computer System Architecture - PHI - Third Edition
2. Gideon Langholz, Abraha& Joe L Mott - Digital Logic Design - World Scientific Publishing Co Ltd

REFERENCES:

1. P Pal Chaudhuri - Computer Organization and Design - PHI - Second Edition
2. Thomas C Bartee - Digital Computer Fundamentals - Tata Mc Graw Hill - Sixth Edition
3. Carl V Hamcher - Computer Organization 5th Edition – Mc Graw Hill

18CSA113**PROGRAMMING IN C****3 1 0 4****Unit1**

Introduction to C language - structure of 'C' program, Programming elements(tokens) – Classes of data types –Declaration of variables, assigning values to variables, defining symbolic constants, escape sequences (backslash character constants), Operators–operator precedence and associativity, Expressions – Evaluation of expressions, type conversions(type casting).

Unit 2

Input and Output operations – formatted and unformatted input and output–Conversion specifiers- Conditional and Control structures

Unit 3

Arrays – single dimensional arrays - declaration –memory representation– initialization and access. 2D arrays and multidimensional arrays.

Strings – defining strings, initializing, accessing, character handling functions, arithmetic operations on characters, character by character input and output, string handling functions, array of strings and its features.

Pointers –Introduction, declaring and initializing pointer variables, pointer expressions, pointers and arrays, pointers and strings, array of pointers.

Unit 4

Functions – definition-declaration-prototypes and function call- actual and formal arguments- types of functions- call by value-call by reference-nesting of functions-recursive functions- pointers to functions-storage class specifiers.

Enumerated data types- Preprocessor directives – Macros - File inclusion, Command line arguments.

Unit 5

Structures – definition-declaration-initialization-accessing structures- array of structures, array within structures, structures within structures, self-referential structures, pointers to structures, uses of structures.

Union- definition- union of structures.

Files – Reading and writing files - file handling functions – file opening modes – file operations

TEXTBOOKS:

1. “Let us C”, YashavantKanetkar, 13th Edition, BPB Publications.
2. “Programming in ANSI C”, E. Balagurusamy, Sixth Edition, Tata McGraw-Hill Publishing Company Limited.

REFERENCES:

1. “Test your C skills”, YashavantKanetkar,
2. “Exploring C”, YashavantKanetkar,

UNIT 1

Introduction - Data Independence - The Three Levels Of Architecture - The External Level - Conceptual Level - Internal Level - Client/Server Architecture- System Structure , Instance and schema, Data Models, Types of DBMS

UNIT 2

Keys - CODD's Rules, Design Issues -ER – Model –Attribute types- Weak Entity Sets - Extended ER Features –ER to Relational Mapping, Structure Of Relational Databases

UNIT 3

Normalization –Anomalies- Functional Dependency: Armstrong's axioms- closure of a relation and closure of attribute– Lossless decomposition-1NF, 2NF, 3NF, Boyce - Codd Normal Form

UNIT 4

The Relational Algebra -- Query Processing and Optimization: Evaluation of Relational algebra expressions-Query Equivalence-Transaction Processing: ACID properties, states of a transaction-Introduction to concurrency control-Deadlock-Recovery.

UNIT 5

Built in SQL functions- Set operations, Sub Queries-Joins-DCL – TCL- Views – Sequences – Index – Locks

PL/SQL Basics – Exceptions – Cursors - Stored Functions – Triggers

TEXTBOOKS:

1. Silberschatz. Korth. Sudarshan: Database System Concepts - 6thEdition Mcgraw-Hill International Edition
2. Ivan Bayross: Sql- PL/SQL The Programming Language Of Oracle- 4rd Edition- Bpb Publications

REFERENCE:

1. C.J. Date: An Introduction To Database Systems - Eighth Edition - Pearson Education Asia
2. Kevin Loney - George Koch: Oracle 9i The Complete Reference Mcgraw-Hill International Edition
3. "Fundamentals of Database Systems" by Elmasri and Navathe

18CSA182 COMPUTATIONAL THINKING AND PROBLEM SOLVING LAB 0 0 2 1

Unit-1 Excel

Unit-2 Excel

Unit3-Flowgarithm

Unit-4-Scratch

18CSA183 DATABASE MANAGEMENT SYSTEM LAB-I 0 0 2 1

Built in SQL functions- Set operations, Sub Queries-Joins-DCL – TCL- Views – Sequences – Index – Locks

PL/SQL – Exceptions – Cursors - Stored Functions – Triggers

18CSA184 PROGRAMMING IN C LAB 0 0 2 1

Operators- Arithmetic, Relational, Ternary, Logical, Bitwise

Control Statements-if, if-else, nested if, if-else if, switch, goto

Looping Control-while, for, do-while

Arrays-one-dimensional- creating, displaying merging, searching, sorting, reversing

Arrays-Two-dimensional- creating, displaying, Operations on 2D arrays

Strings-String functions, manipulation of strings, multi strings

Pointers – Pointer arithmetic, Array of pointers, pointer to array

Functions – passing arguments, returning values, recursive functions, pointers as arguments

Structures-Initializing, members as array, variables as array, passing structures to functions, pointers to structures

Union-Enum types, preprocessors-macros, macro with arguments, nested macro, file inclusion, command line arguments

File Handling

18CSA201 OPERATING SYSTEM 3 1 0 4

Objectives: Fundamental concepts and designs will be covered along with the practical aspects that pertain to the most popular operating systems such as Unix/Linux and Windows, and some instructional operating systems will be studied as well.

UNIT 1

Introduction to Operating Systems: Mainframe systems-Desktop systems-Multiprocessor systems-

Distributed systems-Clustered systems-Real-time systems-Handheld systems

Operating System Structures: System components-Operating System services-System calls-System Programs-

System Structures-System Design and Implementation-System Generation.

UNIT 2

Process Management: Process Concept-Process Scheduling-Operations on processes-Cooperating processes-Inter Process Communication

CPU Scheduling: Basic concepts-Scheduling criteria-Scheduling Algorithms-First Come Firstserved Scheduling, Shortest job First Scheduling, Round Robin Scheduling, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling.

Process synchronisation:Background,critical section problem, semaphores, monitors,producer consumer problem, dining philosophers problem, readers and writers problem.

UNIT 3

Deadlocks: System Model-Deadlock Characterization-Methods for handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock detection-Recovery from deadlock.

UNIT 4

Memory Management: Background-Swapping-Contiguous Memory allocation-Paging-Segmentation-Segmentation with Paging. Virtual Memory: Background-Demand paging-Process creation-Page replacement-Allocation of Frames-Thrashing.

UNIT 5

I/O Systems: Overview, I/O Hardware

Mass storage structure- Disk structure, disk scheduling, disk management.

Case Study:- Unix System

TEXT BOOK:

Abraham SilberSchartz- peter B Galvin-Greg Gagne, Operating system Concepts. Eighth Edition, Addison-Wesley(2003)

REFERENCES:

1. S.Godbole - Operating Systems - Tata McGraw Hill Publications
2. H.M Deitel - Operating Systems - Second Edition - Pearson Edition Asia

18CSA206 OBJECT ORIENTED PROGRAMMING USING C++ 3 1 0 4

UNIT 1

Introduction to C++, Object Oriented Concepts, Basics of C++ environment, Classes & Object, Data members, Access specifiers, Defining member functions, inline member functions, nesting of member functions, Array within a class, Static data members, Constant members , Arrays of objects, Objects as arguments, Returning objects, Constructors, Default Constructors, Parameterized constructors, Copy constructors, Destructors, friend functions, friend classes.

UNIT 2

Compile time polymorphism, function overloading, Overloading operators, Overloading unary, Overloading binary, Overloading using friends, Overloading constructor Manipulation of strings using operators, overloading constructors, Inheritance, Base classes and derived classes, Protected members, Types, constructors in base derived classes,

UNIT 3

Run time Polymorphism, function overriding, virtual base class, Virtual functions, pure virtual function, Abstract classes, class containership. Exception handling- basics of exception handling, exception handling mechanism, throw , catch, rethrow exceptions.

UNIT 4

Fundamentals of pointers, New, Delete operators, pointer declarations, operations on pointers, passing pointers to function, passing an entire array to a function, pointers and two-dimensional arrays, array of pointers, passing functions to other functions, pointers to structures, this pointer.

UNIT 5

class templates, class templates with multiple parameters, function templates, function templates with multiple parameters, Data files -C++ stream classes, unformatted and formatted I/O operations, Opening and closing of files, File modes, File pointers and manipulation, Sequential input and output operations , Updating a file, Error handling during file operations.

TEXT / REFERENCES:

1. E. Balagurusamy “Object-Oriented Programming With C++”, Fifth Edition, Tata Mcgraw-Hill Publishing Company Ltd
2. H.M. Deitel and P.E. Deital,”C++ How to Program”, Eighth Edition Prentice Hall of India,1998.

18CSA207 PRINCIPLES OF MANAGEMENT AND ACCOUNTING 3 0 0 3

OBJECTIVES: *The objective of this course to enable the students to have a basic knowledge of principles of management and to provide theoretical and practical aspects of various systems of accounting.*

Unit 1

Management: meaning and definition, importance of management, administration and management, functional management, functions of management, levels of management

Unit 2

Financial Accounting: Meaning and important terms, accounting concepts, double entry book keeping, types of accounts, journal, ledger, trial balance.

Unit 3

Final Accounts: Preparation of Trading and Profit and Loss Accounts and Balance Sheet, adjustments relating to outstanding expenses, prepaid expenses, accrued income unearned income, depreciation and bad and doubtful debts.

Unit 4

Financial Statement Analysis, Trend Analysis

Unit 5

Cost Accounting: Meaning and Definition, difference between cost accounting and financial accounting, elements of cost, Cost sheet, Expenses excluded from cost.

Reference Books:

1. DinkarPagare – Principles of Management, Sultan Chand and Sons
2. Vineeth, Shabu – Principles of Management and Accounting, Kalyani Publishers
3. S.P. Jain, K.L. Narang – Financial Accounting, Kalyani Publishers
4. S.P. Jain, K.L. Narang – Cost Accounting, Kalyani Publishers

OBJECTIVES: This course is intended to introduce abstract concepts and shows how those concepts are useful in problem solving, and then shows how the abstractions can be made concrete by using a programming language. Equal emphasis is placed on both the abstract and the concrete versions of a concept. The only prerequisite for students is an understanding in programming.

Unit 1. Algorithm Analysis

Basic mathematical review, RAM model of computation, Pseudocode conventions, Worst case, Average case and Best case analysis, Asymptotic Analysis, Back Substitution Method, masters method, Euclid's algorithm, Exponentiation.

Unit 2: Searching and Sorting

Linear Search, Binary Search – Analysis, Bubble Sort, Insertion Sort, Merge sort, Quick Sort

Unit 3. Linear Data Structures

Abstract Data Type, List ADT: Singly linked lists, Doubly linked lists, Circular Linked Lists, Stack ADT implementation and applications, Queue ADT: Implementation and Application. Circular Queue, Priority Queue

Unit 4. Non-Linear Data Structures.

Basic concepts of trees, Implementation of trees, Traversal, Binary tree, Expression tree, Binary search tree, AVL tree, Heap

Unit 5. Graphs

Adjacency matrix, Adjacency list, bfs, dfs, MST Prims and Kruskals, Dijkstras algorithm

Text Book: Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education

References: 1. Samanta, Debasis. Classic data structures. PHI Learning Pvt. Ltd., 2004.

2. Cormen, Thomas H. Introduction to algorithms. MIT press, 2009.

Objectives: Software Engineering presents a broad perspective on software systems engineering, concentrating on widely used techniques for developing large-scale software systems. This course covers a wide spectrum of software processes from initial requirements elicitation through design and development to system evolution.

Unit 1

Introduction – Software - Software Crisis - Software Myths – Process and Product - Software characteristics- SDLC Introduction

Unit 2

Software requirements specification – Approaches – Paradigms – Build and Fix - Waterfall – Prototyping – Spiral – Concurrent – RAD – Incremental – Agile Introduction.

Unit 3

Analysis Modelling - Elements of Analysis Model - Data Modelling - ERD – DFD - Data Dictionary. Introduction to Design concepts - Design Architecture, Design characteristics, Description, Principles. Object oriented diagrams - Class diagrams - Use Case Diagrams – State-transition diagrams – Object diagrams – Interaction diagrams – UML Modelling .

Unit 4

Software Testing Fundamentals - Objectives of Testing - Testing Principles – Testability - Testing Process and Methods – Introduction to Testing Strategies.

Unit 5

Software Maintenance - Reverse Engineering and Reengineering

TEXTBOOK:

Roger S. Pressman, “Software Engineering”, Tata McGraw-Hill Publishing Company Pvt. Ltd, Sixth Edition.

REFERENCE:

Shooman, “Software Engineering”, Tata McGraw-Hill Publishing Company, Pvt. Ltd, 1987

18CSA214

COMPUTER NETWORKS

3 1 0 4

Objectives: *This course presents an in-depth discussion of the most important networking protocols comprising the TCP/IP protocol suite. Students will be able to understand state of the art in network protocols, architectures, and applications.*

Unit 1

Evolution of Computer Networking-Types of Network- networks topologies-Protocols & standards-Network Devices-The OSI reference model- TCP/IP Reference Model.
Physical Layer: transmission media- Analog Transmission- Digital transmission

Unit 2

Data Link Layer Design Issues-Services provided to the Network Layer-Framing-Error Control-Flow Control- Error Detection and Correction- Elementary Data Link Protocols-Sliding Window Protocols- Multiple Access Protocols-An overview of IEEE Standard for LANs, MAC Address.

Unit 3

Introduction to Network Layer – Services - Circuit Switching Vs Packet Switching-Packet Switched Networks-Types of Routing-routing algorithms- congestion control algorithms- Network Protocols-IP- IPV4, IPV6, Subnets, Gateways- Congestion Avoidance in Network Layer.

Unit 4

The Transport Services – Services provided to the upper layers –Elements of transport Protocols –Internet Transport Protocols- Congestion Controls in Transport Layer

Unit 5

Principles of Network Applications-Web and HTTP-Electronic mail-DNS

TEXTBOOK

Computer Networks (Fifth Edition) – Andrew S. Tanenbaum (Prentice Hall of India)

REFERENCES:

1. Computer Networking A Top-Down Approach(Fifth Edition)-James F. Kurose-Keith W. Ross (Pearson)
2. Computer Networks - Protocols, Standards and Interfaces (Second Edition) – UylessBlack(Prentice Hall of India Pvt. Ltd.)
3. Data communication and Networking(Fourth Edition)- Behrouz A Forouzan(Tata Mcgraw Hill)

18CSA215**JAVA PROGRAMMING****3 1 0 4**

Objectives: The main objective of this course is to understand the basic concepts and techniques which form the object oriented programming paradigm using Java Language.

Unit 1

Introduction and Features of Java - Byte Code, Program Translation, JVM.

Unit 2

Program Structure, Data types, Java Statements, Type casting in Java programs - Types of Operators.

Unit 3

Decision Making statements, Looping statements-Arrays, Strings, Vectors, Wrapper classes - Class, methods, Inheritance, Visibility control, Final Classes, methods and Variables.

Unit 4

Interfaces - Interfaces in Java Library - Packages - System Packages, User defined packages – Multithreading - Threads, Runnable Interface, Thread Priorities - Exception Handling - try, catch, throw, throws, finally.

Unit 5

File handling and I/O in java - Stream Classes, Random access Files. Event handling - GUI Programming - AWT, Windows Fundamentals - Applets - Life cycle of an applet.

TEXTBOOK:

E Balagurusamy, Programming with Java – A Primer, Fourth Edition, Tata McGraw Hill Education Private Limited.

REFERENCE:

Java 2 - The Complete Reference – McGraw Hill publication.

18CSA216**WEB TECHNOLOGIES****3 1 0 4****Unit -1**

HTML5 and CSS3

HTML5- Basic Tags, Tables,Forms.HTML5 Tags,HTML Graphics, HTML media, HTML Graphics,HTML APIs.

CSS - Background, Borders,margin, Box model. Styling text, fonts,list,links,tables. CSS overflow,float,inline blocks, pseudoclasses,pseudoelements.CSS border images,rounded corners

Unit-2

Java Script

Client side scripting using java script, Introduction to java script, internal and external Java script files, variables, control statements, loops, Arrays , string handling , How to write functions in JavaScript, inputting and outputting from form elements to JavaScript. DOM

concept, creating html elements using java script. Drawing 2D shapes, handling events.
Introduction to AJAX

Unit-3

Building Single page applications with Angular JS

Single page application – introduction , two way data binding, MVC in angular JS, controllers, getting user inputs , loops , Client side routing – accessing URL data , various ways to provide data in angular JS.

Unit -4

Server Side Programming

Server side scripting, Difference between client side and server side scripting languages. Introduction to PHP, variables, control statements, loops, Arrays, string handling, PHP forms, Global variables in PHP, Regular expression and pattern matching, Database programming: inputting and outputting data from MySQL using PHP, insertion , deletion and updating data.

State management in web applications, cookies, Application and session state.

Unit-5

Introduction to Xml, usage of XML, XML tags, elements and attributes, attribute type, XML validation: DTD and XSD, XML DOM

Case study:-Application Development using Laravel framework

Textbook/Reference:

The Complete Reference, HTML and CSS by Thomas A Powell latest edition

XML Bible by Horold, Ellotte Rusty

Web Reference:- W3Schools.com

18CSA283 DATA STRUCTURES AND ALGORITHMS LAB-I

0 0 2 1

Topic 1: *Sorting – Searching*

1. Write a program to implement Bubble Sort.
2. Write a program to implement selection sort.
3. Write a program to implement Quick Sort.
4. Write a program to implement Insertion Sort.
5. Write a program to implement Merge Sort.
6. Write a program to implement Binary Search.

Topic 2: *Arrays –Stacks-Recursion*

7. Write and test a function that transposes a square matrix.
8. Write and test a recursive function that prints all the permutations of the first n characters of a string.
9. Write and test a recursive function that returns the power x^n
10. Write a program to implement a stack of strings (illustrate the operations push (), pop(), size(), empty() and top()).
11. Write a program to show the linked implementation of the *Stack* class.

12. Write a program to convert infix to postfix.
13. Write a program to implement Towers of Hanoi using Stack.

Queues-Linked-Lists

14. Write a program to implement a linear list and perform the operation such as insert(), search() and delete().
15. Write a program to implement a queue by adding the functions such as
 - (i) Determine the size
 - (ii) input queue
 - (iii) output a queue
 - (iv) split a queue into two queues
16. Write a program to search a circular linked list with a header node.

Topic 3: Binary Trees - Binary Tree Traversal

17. Write a program to implement Binary Search Tree.
18. Priority queue implementation.
19. Write a program to create a binary tree and find the height of a binary tree.
20. Write a program to perform the binary tree traversals.
21. Write a program to perform a deletion from a Binary Tree (using a delete () function).

Topic 4: Graphs

20. Matrix representation of graphs
21. DFS traversal
22. BFS traversal

18CSA284 OBJECT ORIENTED PROGRAMMING USING C++ LAB 0 0 2 1

Class and objects- creating class, objects, private, public data members, member functions, object as array, arguments, returning objects

Constructors & destructors- Default Constructors, Parameterized constructors, Copy constructors, friend functions, friend classes.

Polymorphism- function overloading, operator overloading, overloading unary and binary

Pointers -operations on pointers, passing pointers to function, passing an entire array to a function, pointers and two-dimensional arrays, array of pointers, pointers to objects.

Inheritance, Single, multiple, hierarchical, multi-level, hybrid

Function overriding, virtual base class, Creation of pure virtual function

Using new and delete operator, pointer arithmetic

Data files - unformatted and formatted I/O operations, Opening and closing of files, File modes, File pointers and manipulation, Sequential input and output operations, Updating a file, Error handling

Templates - class templates, class templates with multiple parameters, function templates, function templates with multiple parameters

Exception handling- basics of exception handling, throw, catch, rethrow exceptions.

Unit 1 Java Fundamentals

1. Write a program to print the following triangle of numbers
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
2. Write a simple java application, to print the message , “Welcome to java”
3. Write a program to display the month of a year. Months of the year should be held in an array.
4. Write a program to assign two integer values to X and Y. Using the ‘if’ statement the output of the program should display a message whether X is greater than Y.
5. Write a program to find the area of rectangle.
6. Write a program to list the factorial of the numbers 1 to 10. To calculate the factorial value, use while loop. (Hint Fact of 4 = 4*3*2*1)

Unit 2 OOPs in Java

7. Write a java program to add two integers and two float numbers. When no arguments are supplied, give a default value to calculate the sum. Use function overloading.
8. Write a program to perform mathematical operations. Create a class called AddSub with methods to add and subtract. Create another class called MulDiv that extends from AddSub class to use the member data of the super class. MulDiv should have methods to multiply and divide A main function should access the methods and perform the mathematical operations.
9. Write a program with class variable that is available for all instances of a class .Use static variable declaration. Observe the changes that occur in the object’s member variable values.
10. Write a java program
 - a. To find the area and circumference of the circle by accepting the radius from the user.
 - b. To accept a number and find whether the number is Prime or not
11. Write a java program to create a Student class with following attributes
Enrollment No:, Name, Mark of sub1, Mark of sub2, mark of sub3, Total Marks.
Total of the three marks must be calculated only when the student passes in all three subjects. The pass mark for each subject is 50. If a candidate fails in any one of the subjects his total mark must be declared as zero. Using this condition write a constructor for this class. Write separate functions for accepting and displaying student details. In the main method create an array of three student objects and display the details.
12. In a college first year class are having the following attributes
Name of the class (BCA, BCom, MHA), Name of the staff
No of the students in the class, Array of students in the class
Define a class called first year with above attributes and define a suitable constructor. Also write a method called best Student() which process a first year object and return the student with the highest total mark. In the main method define a first year object and find the best student of this class
13. Write a Java program to define a class called employee with the name and date of appointment. Create ten employee objects as an array and sort them as per their date of appointment. ie, print them as per their seniority.

14. Create a package 'student.fulltime .BCA' in your current working directory
 - a. Create a default class student in the above package with the following attributes: Name, age, sex.
 - b. Have methods for storing as well as displaying

Unit 3 Exception Handling

15. Write a program to demonstrate a division by zero exception
16. Write a program to create an user defined exception say Pay Out Of Bounds.
17. Write a small program to catch Negative Array Size Exception. This exception is caused when the array is initialized to negative values.
18. Write a program to handle Null Pointer Exception and use the "finally" method to display a message to the user.

Units 4 and 5 GUI Programming I and II

19. Write a program which create and displays a message on the window
20. Write a program to draw several shapes in the created window
21. Write a program to create an applet and draw grid lines
22. Write a Java program which creates a frame with two buttons father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother similar details of mother also appear.
23. Create a frame which displays your personal details with respect to a button click
24. Create a simple applet which reveals the personal information of yours.
25. Write a program to move different shapes according to the arrow key pressed.
26. Write a java Program to create a window when we press
 - M or m the window displays Good Morning
 - A or a the window displays Good After Noon
 - E or e the window displays Good Evening
 - N or n the window displays Good Night
27. Demonstrate the various mouse handling events using suitable example.
28. Write a program to create menu bar and pull down menus.
29. Write a program to explain the multithreading with the use of multiplication table. Three threads must be defined. Each one must create one multiplication table.
30. Write a program to illustrate thread priority.
31. Create a GUI program in java with the following components.
 - a. A frame with flow layout.
 - b. Add the following components on to the frame.
 - i. Two Text Field
 - ii. A button with the label display
 - c. Allow the user to enter data into the textfield
 - d. When the button is clicked paint the frame by displaying the data entered in the textfield
 - e. Allow the user to properly close the frame

18CSA286

WEB TECHNOLOGIES LAB

0 0 2 1

1. Create a web page with advanced layouts and positioning with CSS and HTML.
2. Design a website with different methods of embedding CSS in a web page.
3. Create a static web page which displays your personal details. (Hint: CSS3 and HTML5)
4. Create a web page through which the user can enter his / her details to become an authenticated user of that page.
5. Create a web site for a Computer Hardware shop. (Hint: CSS3 and HTML5)
6. Create a web site for Amrita School of Arts and Sciences. (Hint: CSS3 and HTML5)

7. Create a web page that shows different methods of embedding JavaScript.
8. Create a web page with rollover menus. Rollover menus should be created using JavaScript.
9. Create a simple calculator, which can perform the basic arithmetic operations.
10. Validate the registration for with the following criteria:
 - a. Name and Age should be Mandatory Fields.
 - b. Password and Re-enter Password fields should contain same value.
 - c. Name field should accept only character values.
11. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.
12. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
13. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.
14. Create a registration form using Angular JS.
15. Create a simple **AngularJS** calculator application using Angular Services.
16. Create an application Searching for a character and displaying its position using AngularJS.
17. Create an application using angular JS filters.
18. Create single page web applications using the MVC pattern of *AngularJS*.
19. Design an XML document to store information about a student in an engineering college affiliated to Amrita. The information must include USN, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
20. Create an XML document with the following sample real estate data
 - Root element real-estate will contain a sequence of sub-elements agencies, owners, properties and flats, all with an empty content
 - Ensure well-formedness
21. Create an internal DTD for the previous XML document
 - Ensure its validity
 - Then try to break it
22. Move the previous DTD to an external file and validate the XML document again
23. Create an application that loads a text string into an XML DOM object, and extracts the info from it with JavaScript.
24. Create an application which reads data from an XML file into XMLDOM object and retrieves the text value of the first element in the xml file.

18CSA306

ADVANCED JAVA AND J2EE

3 0 0 3

Objectives: *The main Objective of the course is to enable students to understand the concepts underlying technologies in JAVA Enterprise edition with Swings and multithreading, configuring Apache tomcat server, Java beans and Enterprise Java Beans.*

Unit 1

Networking: Classes to be covered Socket, ServerSocket, IPAddress, URL connections – Swing controls – JDBC - Writing JDBC applications using select, insert, delete, update.

Unit 2

SERVLETS: Introduction to Servlets (Life cycle of servlets, Java Servlets Development Kit, creating, Compiling and running servlet). The servlet API: javax. servlet package. Reading the servlet Parameters, Reading Initialization parameter. The javax.servlet.http.

Unit 3

JAVA SERVER PAGES: Configuring Tomcat JSP/Servlet server. Brief Introduction to J2EE Architecture. Advantage of JSP technology. JSP Architecture, JSP Access Model. JSP Syntax Basic (Directions, Declarations, Expression, Scriptlets, Comments) JSP Implicit Object (Out, HttpServlet Request, Http Servlet Response, Exception Handling, Session Management.

Unit 4

Package Handling HTTP Request and Response (GET/ POST Request), Using Cookies, Session Tracking. Exception Handling.

Unit 5

Introduction to EJB – Understanding MVC – Building Controllers, models and views – Integrating hibernate with spring.

TEXTBOOKS:

1. Deitel&Deitel, "Java How to program", Prentice Hall, 4 th Edition, 2000.
2. Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press, 1999.
3. Stephen Asbury, Scott R. Weiner, Wiley, "Developing Java Enterprise Applications", 1998.

18CSA307

C# AND .NET FRAMEWORK

2 0 2 3

Unit 1

.Net Framework Overview- Architecture-.Net Framework class Libraries-CLR-Metadata-Interoperability-Assemblies-the .net Packaging system-CLR-MSIL , Introduction to Visual Studio.Net-C# Programming Concepts-Predefined Types- Value types and reference type, Classes and Objects, Constructors and methods , Conditional statements, loops, arrays , Collection classes: ArrayList , HashTable, Stack ,Queue, indexers and properties.

Unit 2

String class: methods and properties of string class, enumerations, boxing and unboxing, OOPS concepts: Encapsulation, data hiding, inheritance, interfaces, polymorphism, operator overloading, overriding Methods, Static Class members, Delegates and events. Exception Handling, garbage collector, generics and collection

Unit 3

Basics of Windows Programming- Event Driven Programming, Windows Forms, Using common controls-Labels, textboxes, buttons, check boxes, radio button, progress bar, combo box, list box. Components-timer, imagelist, Menus, Modal and Modeless Dialog Boxes, MDI, Mouse and keyboard event handling.

Unit 4

Introduction to ADO.Net-Object Model- System. Data Namespace- Data Bound controls- Connected Mechanism-Disconnected mechanism-.Net Data Providers.

Unit 5:

Files: System.IO, directory and file types, Stream readers and stream writers, working with binary data.

Textbook/Reference:

1. C# 4.0 the Complete Reference by Herbert Schildt
2. Latest version of Andrew Trolsens C# text from Apress(Pro C# 5.0 and the .NET Framework 4.5)
3. Robert Powel, Richard Weeks, C# and the .NET Framework, Techmedia

18CSA317

COMPUTER GRAPHICS

3 0 0 3

Objectives: *The primary objective of this course is to give the basic principles of 2D and 3D computer graphics, to study the elementary mathematical techniques that allow us to position objects in three dimensional spaces and techniques necessary to produce basic 2D/3D dimensional illustrations.*

Unit 1

Applications of Graphics: CAD, Presentation Graphics, Computer Art, Entertainment, Education and Training, Visualization, Image Processing,

Unit 2

Graphical User Interfaces - Overview of Graphics Systems: CRT, Flat Panel Displays, Three Dimensional Viewing Devices, Virtual Reality systems, Raster-Scan Systems, Random-Scan Systems.

Unit 3

Input Devices: Keyboards, Mouse, Data Glove, Digitizers, Touch Panels; Hard Copy Devices: Printers, Plotters. Output Primitives: Bresenham's Line Algorithm, Midpoint Circle Algorithm; Filled Area Primitives: Boundary-Fill Algorithm, Flood-Fill Algorithm; Character Generation; Homogeneous Coordinates.

Unit 4

Two Dimensional Geometric Transformations; Translation, Rotation, Scaling, Reflection, Shear; Two Dimensional Viewing: Cohen Sutherland Line Clipping Three Dimensional Geometric Transformations; Translation, Rotation, Scaling, Reflection, Shear; Three Dimensional Viewing: Projections, Parallel Projections, Perspective Projections, View Volumes and General Projection Transformations.

Unit 5

Graphics Programming: OpenGL Introduction: Command Syntax, Drawing and filling images, patterns, Filling regular and irregular shapes, Outputting Text, Justifying Text, Animation. Drawing with mouse, Building mouse cursors, freehand drawing using mouse, menus using mouse.

TEXTBOOKS:

1. Computer Graphics, C Version, D. Hearn, M.P. Baker, 2nd Edition, Pearson Education
2. OpenGL Programming Guide, M. Woo, J. Neider, T. Davis, D. Shreiner, 3rd edition, Pearson Education

18CSA318

CRYPTOGRAPHY AND CYBER SECURITY

4 0 0 4

Objectives: *The main objective of this course is to introduce the working of various cryptographic methods and how to apply this knowledge to real-world applications. This course will also present an overview of Cyber Security.*

Unit 1

Introduction to Cyber Security - Types of Attacks, Goals for Security, Security threat and vulnerability, Cyber security models (the CIA triad, the star model).

Classical encryption techniques substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers - Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion. Data encryption standard (DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations.

Unit 2

Principals of public key crypto systems, RSA algorithm, security of RSA. Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, Introduction to SSL.

Unit 3

Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions,

Unit 4

Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature algorithm.

Unit 5

Introduction to Cyber Crime and security: Cyber Crimes, types of Cyber Crime, hacking, attack vectors, Cross Site Scripting (XSS), XSS Consequences. Cyber Space and criminal behaviour, traditional problems associated with Cyber Crime, Introduction to Incident Response, Digital Forensics - Phishing.

TEXTBOOK:

William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education, Sixth Edition.

REFERENCE:

Nina Godbole and SunitBelpure, Cyber Security: Understanding Cyber crimes, ComputerForeinsics and Legal Perspectives, Willey India Pvt.Ltd.

Dr T R Padmanabhan N Harini,"Cryptography and Security Paperback", Willey India

18CSA319

PYTHON PROGRAMMING

2 0 2 3

Unit 1

Introduction to Python: Python variables, Python basic Operators, Understanding python blocks. Python Data Types, Declaring and using Numeric data types: int, float etc.

Unit 2

Python Program Flow Control Conditional blocks: if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python,

Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks.

Unit 3

Python Complex data types: Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. Python Functions, Organizing python codes using functions.

Unit 4

Python File Operations: Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations.

Database Programming: Connecting to a database, Creating Tables,INSERT, UPDATE, DELETE and READ operations, Transaction Control,Disconnecting from a database, Exception Handling in Databases.

Unit 5

Python packages: Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc.

GUI Programming: Tkinter introduction, Tkinter and PythonProgramming, Tk Widgets, Tkinter examples.

Python programming with IDE.

Text Book/References

1. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition , Pearson Education, 2016
2. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley, 2015
3. Jeeva Jose &P.SojanLal, “Introduction to Computing and Problem Solving with PYTHON”, Khanna Publishers, New Delhi, 2016
4. Downey, A. et al., "How to think like a Computer Scientist: Learning with Python", John Wiley, 2015
5. Mark Lutz, “Learning Python”, 5th edition, Orelly Publication, 2013, ISBN 978-1449355739
6. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1590282410
7. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009
8. David Beazley, Brian Jones., “Python Cookbook”, Third Edition, Orelly Publication, 2013, ISBN 978-1449340377

18CSA331

ARTIFICIAL INTELLIGENCE

3 0 0 3

Unit 1

What is Artificial Intelligence? – The AI Problems – The Underlying Assumption – What is an AI technique – Criteria for Success.

Problems, Problem Spaces and Search – Defining Problem as a State Space Search – Production Systems – Problem Characteristics – Production System Characteristics – Issues in the design of Search Programs.

Unit 2

Unit 4

PPP Operation and Configuration, HDLC protocol, Troubleshoot WAN Connectivity, Frame Relay concepts and Configurations, NAT Operation & Configuration, Troubleshooting NAT

Unit 5

Tele working, Broadband Solutions, Configuring xDSL Connectivity, Securing Site-to-Site Connectivity, VPNs, Site-to-Site GRE Tunnels, IPsec, Monitoring the Network – Syslog, SNMP, Netflow, Network Troubleshooting with a Systematic Approach.

TEXTBOOKS:

1. Youlu Zheng and ShakilAkhtar, "Networks for Computer Scientists and Engineers".
2. Peterson & Davie, "Computer Networks, A Systems Approach", 5th Edition, Morgan Kaufmann, 2011.

REFERENCES:

1. "Scaling Networks - Course Booklet ", Cisco Press.
2. "Switched Networks - Course Booklet", Cisco Press.

18CSA333

CLIENT SERVER COMPUTING

3 0 0 3

Objectives: Client Server Computing Model defines the way successful organizations will use technology during the next decade. As a result knowledge of client server architecture has become an essential part of computer science. The main objective is to provide the basic concepts of client server computing and the new technologies involved in it.

Unit 1

Client Server System Concepts – Introduction – Concepts - Client Server Architecture - Two-Tier Architecture – Three-Tier Architecture - N-Tier Architecture - N-Tier vs 2-Tier Architecture - Case Study of N-Tier Architecture - Client Server Models - Gartner Classification – Middleware - Characteristics and types of Server - File Server - Database Server - Communication Server - Object Server - Groupware Server - Transaction Server - Characteristics and types of Clients - Thin Client - Fat Client.

Unit 2

Components of Client Server Computing – Client - Role of the Client - Client Services - Request for Service - Components of Client Server Computing – Server - Role of the Server - Server Functionality in detail - Components of Client Server Applications – Connectivity – OSI - Communications Interface Technology.

Unit 3

Client Server System Architecture - Client Server Building Blocks – Hardware - Client Hardware - Server Hardware - Client Server Building Blocks – Software - Client Server Systems Development Methodology - Project Management - Architecture Definition - Systems Development Environment – Middleware - Types of Middleware - DCE, MOM, TP – Monitors – ODBC - Design Overview of ODBC - ODBC Architecture – Components – Applications - Driver Managers - Database Drivers - ODBC Data Sources - Network Operating System - Base Services - External Services.

Unit 4

SQL Database Servers - Server Architecture - Multithread Architecture - Hybrid Architecture - Stored Procedures – Triggers - Client Server Transaction Processing - Rules of Client Server Transaction Processing - Transaction Models - Chained and Nested Transactions - Transaction Management Standards - Data Warehousing - Warehousing Techniques - Data Mining.

Unit 5

Client Server Protocols – RPC – IPC - Recent Trends – Intranet – Extranet – Internet - CORBA.

TEXTBOOK:

Robert Orfali, Dan Harkey and Jerri Edwards: Essential Client/Server Survival Guide, John Wiley & Sons Inc 1996

REFERENCES:

1. Alex Berson: *Client Server Architecture*
2. Patrick Smith, Steve Guengerich: *Client Server Computing, Second Edition, Prentice Hall of India Pvt Ltd.*

18CSA334

EMBEDDED SYSTEMS

3 0 0 3

Unit 1

An Overview of Embedded System - What is an Embedded System? – Categories of Embedded Systems – Requirements of Embedded Systems - Challenges and issues in Embedded Software Development – Trends in Embedded Software Development - Applications of Embedded Systems.

Unit 2

Hardware Fundamentals for the Software Engineer - Gates – Timing Diagrams – memory – Microprocessors – Buses – DMA – Interrupts - Other Common Parts – Built-ins on the microprocessor – Interrupts - Microprocessor Architecture – Interrupt Basics – The Shared Data Problem – Interrupt Latency.

Unit 3

Survey of Software Architectures - Round Robin – Round Robin with Interrupts – Function Queue Scheduling Architecture – Use of real time operating system. RTOS, Tasks, Scheduler, Shared data reentrancy - priority inversion, mutex binary semaphore and counting semaphore – Selecting an Architecture - Introduction to Real Time Operating Systems - Tasks and Task states – Tasks and Data – Semaphores and Shared Data – Message Queues mailboxes and pipes – Timer functions – Events – Memory management – interrupt routines in an RTOS environment.

Unit 4

Basic Design Using a Real Time Operating System - Overview – Principles – Encapsulating Semaphores and Queues – Hard Real - Time Scheduling Considerations – Saving memory space – saving power - Embedded Software Development Tools - Host and Target Machines – linker/Locators for Embedded Software – Getting Embedded software into the target systems.

Unit 5

Debugging Techniques - Testing on Host Machine – Instruction Set simulators – The assert Macro – Using Library Tools - Future Trends in Embedded Systems - System on a chip (SOC) – Smart Cards and the cashless society – Security in Embedded System.

TEXTBOOKS:

1. *Dr.K.V.K.K. Prasad &Vikas Gupta – Programming for Embedded Systems – Wiley 1st edition 2002*
2. *David E. Simon – An Embedded Software Primer- Pearson Education Asia – 1999*

REFERENCES:

1. *Caroline Yao &Quing Li – Real Time Concepts for Embedded Systems*
2. *Kirk Zureli - C Programming for Embedded Systems*

18CSA335 ENTERPRISE RESOURCE PLANNING MANAGEMENT 3 0 0 3

Unit 1

Introduction to ERP

Accommodating Variety – Integrated Management Information – Seamless Integration – Supply Chain Management – Resource Management – Integrated Data Model – Scope – Technology – Benefits of ERP.

Business Engineering and ERP

What is BE? – Significance and Principles of BE – BPR, ERP and IT – BE with IT – ERP and Management Concerns.

Unit 2

Business Modelling for ERP

Building the Business Model.

ERP Implementation

Role of Consultants, Vendors and Users – Customization – Precautions – ERP: Post-implementation Options – ERP Implementation Methodology – Guidelines for ERP Implementation.

Unit 3

ERP and the Competitive Advantage

ERP and the Competitive Strategy.

The ERP Domain

MFG/PRO, IFS/Avalon - Industrial and Financial systems – Baan IV – SAP – SAP R/3 Applications – Example of an Indian ERP Package – The Arrival of ERP III.

Unit 4

Marketing of ERP

Market Dynamics and Competitive Strategy.

Sample Case Studies

Unit 5

Client Server and ERP Architecture

Introduction to Client Server – Advantages and Disadvantages – N tier Architecture – ERP Architecture.

http://ebuild.imtindia.com/erp_software_architecture.html

Open Technology

Background of Open Technology – Introduction – Proprietary v/s Open source – Need for Open Source Solutions – Open Source ERP.

<http://elearning.nic.in/mdp/2-open-technology/opentechnology-mdp.pdf>

Commercial ERP

Commercial ERP – Open Source ERP v/s Commercial ERP.

<http://www.erpwire.com/erp-articles/commercial-and-open-source-erp.htm>

TEXTBOOK:

“Enterprise Resource Planning – Concepts and Practice”, Vinod Kumar Garg, N.K. Venkitakrishnan, Second Edition, Eastern Economy Edition, Prentice-Hall of India Pvt., Ltd., 2008.

18CSA336

KNOWLEDGE MANAGEMENT

3 0 0 3

Unit 1

Introduction – Applied Knowledge Management – Web Warehousing and Knowledge Management – Value Chains and Killer Applications.

Unit 2

Web Warehousing in Action – Traditional Warehousing – Web Based Graphical Geographic Information System.

Unit 3

An Introduction to Text Information Management System – Architecture of Text Information Management System – Text Mining Systems.

Unit 4

Knowledge Management Principles – Knowledge Management at work in Organization.

Unit 5

Technology Foundations – The Internet and Internet Services – Web Components and Communications.

TEXTBOOKS:

Web Warehousing and Knowledge Management: Mattison 1999, Tata McGraw-Hill

Measuring and Managing Knowledge: Tom Housel and Arthur Bell 2001, International Edition, Tata McGraw-Hill

REFERENCE:

Knowledge Management: Ganesh Natarajan, President & CEO Aptech

18CSA337

LAN SWITCHING AND ADVANCED ROUTING 3 0 0 3

Unit 1

IPv4 & IPv6 Network Addresses, IPv6 Network Addresses, Subnetting IP Networks, Network Design & trouble shooting for IPv4 & IPv6. Introduction to Switched Networks, LAN Design.

Unit 2

Basic Switching Concepts and Configuration, Switch Security: Management and Implementation, VLANs.

Unit 3

Routing Concepts & operations, Configuration of a Router, Media Access Control, Inter-VLAN Routing, Layer 3 Switching, Static Routing Implementation, Configure Static and Default Routes, CIDR and VLSM.

Unit 4

Network security, Dynamic Routing Protocols, Distance Vector Routing Protocols, RIP(IPv4) and RIPv6(IPv6) Routing, Link-State Dynamic Routing, The Routing Table, Single-Area OSPF, Configuring Single-Area OSPFv2 (IPv4) & v3(IPv6).

Unit 5

Access Control Lists and operations, Configuring and Troubleshooting Standard & extended IPv4 ACLs, IPv6 ACLs, DHCPv4 (IPv4) DHCPv6(IPv6).

TEXTBOOKS:

1. James F. Kurose and Keith W. Ross “Computer Networking: A Top-Down Approach”, 4th Edition, Addison-Wesley, 2008.

2. Andrew S.Tanenbaum, “Computer Networks”, 3rd Edition, PHI, 2004.

REFERENCES:

1. Introduction to Networks-Course Booklet “,Cisco Press

2. Routing and Switching Essentials – Course Booklet”, Cisco Press

Unit 1

Combinational circuit implementations – Introduction – NAND & NOR implementations – Arithmetic circuits – Flip-flops - counters – Ripple counters – Synchronous counters.

Unit 2

Introduction to Microprocessor and microcomputers – General architecture of a micro computer system – 8086/88 microprocessor - Architecture – software model of 8086/88 – Memory address space – Data organization – Data types – Registers in 8086/88 – Addressing modes – instruction formats – I/O Address space.

Unit 3

8086/88 Microprocessor programming – Instruction set – Data transfer instructions – arithmetic – Logic – shift – rotate – Flag control – compare – jump – subroutines – loops – string handling instructions.

Unit 4

8086/88 microprocessor and their memory interfaces – Introduction – system clock – bus cycle – Hardware organization of the memory address space – read/write bus cycles – memory interface circuits.

Unit 5

I/O interfacing with 8086/88 microprocessor – Types of I/O – I/O data transfer – I/OP instructions – bus cycles – 8255 PPI – 8237A DMA controller Interrupt handling – types – Interrupt address pointer table – Interrupt instructions – enabling and disabling interrupts – 8259A Programmable Interrupt Controller.

TEXTBOOK:

The 8086 and 8088 microprocessors – Programming, Interfacing, Software, Hardware and Applications – Walter A tribbel, AvtarShing – PHI

REFERENCE BOOKS:

1. *Digital Logic Design – Langholz, Kandel, Mott - 1988 Wm C. Brown publishers*
2. *Microcomputer systems: 8086/88 family architecture, programming and design – Yu-ching Liu, Glenn A Gibson – PHI*
3. *The 8086/88 family – John Uffenbeck – PHI*

Unit 1

Introduction: What is Multimedia? – Introduction to making Multimedia - Media Skills – Macintosh and Windows Platforms – Basic software tools.

Unit 2

Making instant Multimedia – Multimedia Authoring tools.

Unit 3

Multimedia Building Blocks: Text – Sound – Images.

Unit 4

Multimedia Building Blocks: Animation – Video.

Unit 5

Multimedia and the Internet: The Internet and how it works – Tools for World Wide Web – Designing for the World Wide Web.

TEXTBOOK:

Tay Vaughan – Multimedia (Making it work) - Tata McGraw Hill – ISBN-0-07-047276-9

REFERENCES:

Nigel Chapman – Digital Multimedia – Wiley – ISBN – 81-265-0489-7

John F. Koegel Buford – Multimedia Systems – PEARSON – ISBN – 81-78-08-162-8

18CSA340 SOCIAL AND PROFESSIONAL ISSUES IN COMPUTING 3 0 0 3

Unit 1

Social Context: Introduction to the social implications of computing, Social implications of networked communication, Growth of, Control of, and access to the Internet, Gender – Related issues, Cultural issues, International Issues, Accessibility Issues (e.g. underrepresentation of minorities, Women and disabled in the computing profession), Public policy issues (e.g. electronic voting).

Unit 2

Analytical Tools: Making and evaluating ethical arguments, Identifying and evaluating ethical choices, Understanding the social context of design, Identifying assumptions and values.

Professional Ethics: Community values and the laws by which we live, The nature of professionalism (Including care, attention and discipline, fiduciary responsibility, and mentoring).

Keeping up-to-date as a professional (in terms of knowledge, tools, skills, legal and professional framework as well as the ability to self-assess and computer fluency), Various forms of professional credentialing and the advantages and disadvantages, The role of the professional in public policy, Maintaining awareness of consequences, Ethical dissent and whistle-blowing.

Codes of ethics, conduct, and practice(IEEE, ACM, SE, AITP, and so forth), Dealing with harassment and discrimination, “Acceptable use” policies for computing in the work place.

Healthy Computing environment (ergonomics)

Unit 3

Risks: Historical examples of software risks (such as the Therac-25 case), Implications of software complexity, Risk assessment and Risk Management; Risk removal, risk reduction and risk control.

Security Operations: Physical security, Physical access controls, Personnel access controls, Operational security, Security polices for systems/networks, Recovery and Response, Dealing with problems (both technical and human)

Unit 4

Intellectual Property: Foundations of Intellectual Property, Copyrights, patents, and trade secrets, Software Piracy, Software Patents, Transactional issues concerning Intellectual Property.

Privacy and Civil Liberties: Ethical and legal basis for privacy protection, Ethical and legal framework for freedom of information, Privacy implications of database systems (e.g. Data gathering, storage and sharing, massive data collecting, computer surveillance systems)

Technological strategies for privacy protection, Freedom of expression in cyberspace, International and intercultural implications.

Unit 5

Computer Crime: History and examples of computer crime, “Cracking” (“Hacking”) and its effects, Viruses, Worms, and Trojan Horses, Identity Theft, Crime Prevention strategies.

TEXTBOOK:

Ethics for Information Age, 3rd Edition, Michael J. Quinn, Pearson/Addison Wesley, 2009

18CSA341

SOFT COMPUTING

3 0 0 3

Unit 1

Basic Concepts - Single Layer Perception - Multilayer Perception - Supervised and Unsupervised Learning - Back Propagation networks - Kohnen’s self-organizing networks - Hop field networks - Distance measures.

Unit 2

FUZZY sets, properties, Membership functions Fuzzy operations, Applications.

Unit 3

Classification and Regression Trees - Data Clustering Algorithms - Rule based Structure identification.

Unit 4

Neuro-Fuzzy Systems.

Unit 5

Evolutionary Computation - Survival of the Fittest - Fitness Computation – Crossover – Mutation – Reproduction - Rank space Method. Case Studies: Applications of soft computing.

TEXTBOOK/ REFERENCES:

1. Laurence Fausett, "Fundamentals of Neural Networks", Seventh Edition, Dorling Kindersley (India) P. Ltd 2006.
2. Satish Kumar - "Neural Networks – A Classroom Approach", Tata McGraw-Hill, 2004.
3. Timothy J.Rose, "Fuzzy Logic with Engineering Applications", Third Edition, John Wiley, 2010.
4. J.S.R Jang, C.T Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", Second Edition, Prentice Hall of India, 2002.
5. D.E.Goldberg "Genetic Algorithms in search, optimization and Machine learning", Second Edition, Addison Wesley, 2007.

18CSA342

SYSTEMS AND NETWORK ADMINISTRATION

3 0 0 3

Unit 1

Understanding System Administration – Network Operating System - Network File System – Admin User - Administration Tools – Commands - Configuration Files – Log Files - Backup and Restore Files.

Unit 2

User Management - Issues - Registration – Account Policy – Login environment – Setting up and Supporting Users – Disk Quotas.

Unit 3

Network Administration – Topologies – Network Devices - Understanding TCP/IP – Administering TCP/IP - Network Configuration – Static and Dynamic.

Unit 4

Introduction to File Server – Setting Up a File Server – Network File Systems - SAMBA – Web Server.

Unit 5

Understanding Directory Services – Active Directory – Network Security – Importance of Port Number – Tracking Services – Monitoring your System – Network Security Tools.

TEXTBOOKS:

1. Red Hat Linux - System Administration
2. Introducing Microsoft Windows Server 2003 – Jerry Homeycutt – PHI

REFERENCE:

Mark Burgess – Principles of Network and System Administration - Second Edition - John Wiley & Sons

18CSA383**COMPUTER GRAPHICS LAB****0 0 2 1**

1. Write a program for 2D line drawing as Raster Graphics Display.
2. Write a program for display basic 2D geometric primitives.
3. Write a program to display a filled square.
4. Write a program to display a series of concentric circles of varying radius.
5. Write a program for line drawing as Raster Graphics Display.
6. Write a program for circle drawing as Raster Graphics Display.
7. Write a program to draw a line using Bresenham line drawing algorithm
8. Write a program to draw a circle using Midpoint algorithm. Modify the same for drawing an arc and sector.
9. Write a program to rotate a point about origin.
10. Write a program to rotate a triangle about origin.
11. Write a program to scale the triangle using 2D transformation.
12. Write a program to translate a triangle using 2D transformation.
13. Write a program to reflect a triangle 2D transformation.
14. Write a program for polygon filling as Raster Graphics Display
15. Write a program for line clipping.
16. Write a program for polygon clipping.
17. Write a program for displaying 3D objects as 2D display using perspective transformation.
18. Write a program for rotation of a 3D object about arbitrary axis.
19. Write a program in openGL for building mouse cursors.
20. Write a program in openGL for freehand drawing using mouse.

18CSA388**ADVANCED JAVA AND J2EE LAB****0 0 2 1**

1. Program to demonstrate Swing components.
2. Program to implement Address Book using Swing components.
3. Program to demonstrate loading of file in an Swing Component.
4. Multithreading program, one of the threads print a....z and other thread print 1...26.
5. Example: 1a2b3c.... 26z.
6. Multithreading program to schedule two jobs.
7. Client Server Socket Programming.
8. Server Socket which receives data from a java client program using JSON
9. Program to fetch a particular Website tags when an URL is specified.
10. Implement stack, queue, hashmap, hashtable, enumeration, ArrayList.
11. Create a table from a java program.
12. Update a table from a java program.
13. Load a table data in Swing components.
14. Delete a record from a table, drop table from a java file.
15. Program which shows use of Statement, Prepared Statement and Callable Statement.
16. Configure Apache Tomcat and write a hello world jsp page.
17. Configure Apache Tomcat server to deploy Servlets.
18. Exceptional handling in a JSP page.
19. Create a login page and authenticate a user in a JSP page using database.

20. Write a program to implement a simple servlet which writes a Welcome HTML page in the web browser.
21. A servlet should receive a parameter from JSP page and process it.
22. Servlet program to implement parameter handling.
23. Servlet program to handle GET and POST request.
24. A website hit counter data which has to be saved in a cookie.
25. Implement a Java Beans to set and get values.
26. Program to illustrate the procedure of handling session and print a Hello world using Java Bean.
27. Enterprise Session Beans, deploy, and run a simple Java EE application which does add, subtract, multiply and division using stateless session bean.
28. An application named account using stateful session bean. The purpose of account is to perform transaction operations (deposit and withdraw) for the customer.
29. The account application consists of an enterprise bean, which performs the transactions, and two types of clients: an application client and a web client.

18CSA389

MOBILE APPLICATION DEVELOPMENT LAB

0 1 2 2

Introduction: About Android, Pre-requisites to learn Android, Dalvik Virtual Machine & .apk file extension, Android API levels (versions & version names)

Android Java Basics: Getting started with Android development, project folder structure, simple programming, running project, generating build/APK of the app from Android Studio

First application: Creating Android Project, Android Virtual Device Creation, Set up debugging environment, Workspace set up for development, Launching emulator, debugging on mobile devices.

Basic UI design: Basics about Views, Layouts, Drawable Resources, Input controls, Input Events, Toasts.

More UI Components: Layouts - GridView and ListView, Action bar, Adapters, Menus: Option menu, context menu, sub menu, Pickers - Date and Time, Spinners.

Activity and Fragment: Activity, Fragment, Activity Lifecycle and Fragment Lifecycle.

Intents: Implicit Intents, Explicit intents, communicating data among Activities.

Navigation Drawer: Panel that displays the app's main navigation screens on the left edge of the screen

Android Notifications – Toast, Dialogs (TimePicker, DatePicker, Progress, Alert), Notification Manager and Push Notification

Introducing SQLite - SQLiteOpenHelper and creating a database - Opening and closing a database, Working with cursors Inserts, updates, and deletes

As a term project students should implement a mobile app with the following:

- Understand the app idea and design user interface/wireframes of mobile app
- Set up the mobile app development environment

TEXTBOOKS/ REFERENCES:

Head first Android Development.

Android Programming: Pushing the Limits, Wiley By Erik Hellman

Android Application Development Black Book, Dreamtech Press, Pradeep Kothari, KLSI

18CSA391 COMPREHENSIVE TECHNICAL VIVA-VOCE 2 cr

The viva may be done based on every course covered till the sixth semester. The objective of this is to enable the students to attend placements and be better performers in their future.

18CSA392 MINOR PROJECT (OPTIONAL – leading to Paper Publication)3 cr

To expose the student to the industry-standard project practices, under time and deliverable constraints, applying the knowledge acquired through various courses done in the programme.

18CSA399 PROJECT 6 cr

To allow students to develop their own ideas and get experienced in industrial and research projects. It provides an opportunity in solving a real life problem by applying the knowledge gained through various courses of study and an exposure on different phases of software /system development life cycle.

18EN600TECHNICAL WRITING 0 0 1 P/F

Introduction to the Course – What is technical writing and how is it different from writing in general? Error detection – Technical Vocabulary. Mechanics of writing: Grammar rules – punctuation - spelling rules - tone and style- graphical Representation.

Different kinds of written documents: Definitions- descriptions- instructions - recommendations-

manuals - reports – proposals, Instructions manual, job applications with Resume Introduction to Writing dissertations, papers, and technical proposals

Technical paper writing: Library research skills- documentation style - document editing – proof reading - formatting

Practice in oral communication: Group Discussion, Interviews, and Technical presentations

TEXT BOOKS/ REFERENCES:

1. Hirsh, Herbert. L “Essential Communication Strategies for Scientists, Engineers and Technology Professionals”. II Edition. New York: IEEE press, 2002

2. Anderson, Paul. V. "Technical Communication: A Reader-Centred Approach". V Edition. Harcourt Brace College Publication, 2003
3. Strunk, William Jr. and White. EB. "The Elements of Style" New York. Alliyen& Bacon, 1999.
4. Riordan, G. Daniel and Pauley E. Steven. "Technical Report Writing Today" VIII Edition (Indian Adaptation). New Delhi: Biztantra, 2004.

18HU433 PRINCIPLES OF ECONOMICS AND MANAGEMENT 3-0-0-3

Introduction to Management: Managers and Management - History Module - The Historical Roots of Contemporary Management Practices, The Management Environment. Planning: Foundations of Planning - Foundations of Decision Making - Quantitative Module Quantitative Decision-Making Aids. Organizing: Basic Organization Designs - Staffing and Human Resource Management - Career Module Building Your Career - Managing Change, Stress, and Innovation .Leading- Foundations of Individual and Group Behavior - Understanding Work Teams - Motivating and Rewarding Employees - Leadership and Trust - Communication and Interpersonal Skills. Introduction to Economics: The Firm and Its Goals - Review of Mathematical Concepts used in Managerial Economics, Supply and Demand - The Mathematics of Supply and Demand, Demand Elasticity - Applications of Supply and Demand, Demand Estimation and Forecasting, The Theory and Estimation of Production - The Multiple-Input Case - Expressing the Production Function with the Use of Calculus, The Theory and Estimation of Cost - A Mathematical Restatement of the Short-Run Cost Function - The Estimation of Cost.

29

Pricing and Output Decisions: Perfect Competition and Monopoly - The Use of Calculus in Pricing and Output Decisions - Break-Even Analysis (Volume-Cost-Profit), Monopolistic Competition and Oligopoly - Special Pricing Practices.

TEXTBOOKS/REFERENCES:

1. Stephen P, Robbins David A. De Cenzo, "*Fundamentals of Management*", Prentice Hall, Sixth Edition, 2008.
2. Philip K. Y. Young, Steve Erfle and Paul G. Keat, "*Managerial Economics: Economic Tools for Today's Decision Makers*", Pearson, Seventh Edition, 2013.

Introduction to Software Project Management: Software Projects-Other Types of Projects - Problems with Software Projects. Project Evaluation and Programme Management: Evaluation of Individual Projects – Cost Benefit Evaluation Techniques – Risk Evaluation. Step Wise: An Overview of Project Planning. Selection of an Appropriate Project Approach: Build or Buy? - Waterfall Model – Spiral Model – Prototyping – Incremental Delivery – RAD – Agile Methods – XP - Scrum.

Software Effort Estimation: Bottom up Estimating – Top down Estimating – FP Analysis – COCOMO II – Cost Estimation. Activity Planning: Project Schedules - Sequencing and Scheduling Projects - Network Planning Models – AOA – AON - CPM - Shortening Project Duration – Crashing - Identifying Critical Activities.

Risk Management: A Framework for Dealing with Risk – Risk Management – PERT.

Resource Allocation: Identifying Resource Requirements – Scheduling Resources – Publishing Resource Schedule – Cost Schedule.

Monitoring and Control: Visualizing Progress - Earned Value Analysis. Managing People in SW Environments: Organizational Behavior – Motivation. Working in Teams: Organizing Teams.

Software Quality Management: Defining Software Quality – Metrics – Process Capability Models – Software Reliability. Case Study: PMBOK - MS Project.

TEXTBOOK / REFERENCES:

1. Mike Cotterell and Bob Hughes, “*Software Project Management*”, Fifth Edition, Tata McGraw-Hill, 2010.
2. Roger S. Pressman, “*Software Engineering a Practitioner’s Approach*”, Seventh Edition, Tata McGraw-Hill, 2010.
3. Jalote P, “*Software Project Management in Practice*”, Addison Wesley, 2002.

18MA304BASICS OF OPERATIONS RESEARCH

3-1-0-4

Linear Programming: Introduction - Mathematical Formulations - Solutions – Graphical Method- Simplex Method - Artificial Variables- Big M - Two Phase Methods - Variants in Simplex Method - Duality Theory and Problems- Dual Simplex Method. Transportation and its Variants: Definition - Transportation Algorithms and Solutions - Assignment Model - Hungarian Method- Traveling Salesman Problem – Transshipment Model.

Simulation: Definition - Types of Simulations - Monte Carlo Simulation. Queuing Theory:Characteristic of Queuing System - Steady State M/M/I Model Finite and Infinite Populationand M/M/C Infinite Population Model.

Game Theory: Competitive Games - Rectangular Game - Saddle point - Minmax (Maxmin)Method of Optimal Strategies - Value of the Game. Solution of Games with Saddle Points -Dominance Principle. Rectangular Games without Saddle Point – Mixed Strategy for 2 X 2Games.

PERT and CPM: Network Representation - Critical Path Method. PERT-time Estimates- Various Types of Floats- Critical Path Computation. Inventory Theory: Cost Involved inInventory Problems - Single Item Deterministic Models - Economic Size Model with andwithout Shortages having Production Rate Infinite and Finite.

TEXT BOOKS/ REFERENCES:

1. Hamdy A. Taha, “*Operations Research – An Introduction*”, Seventh Edition,Macmillan Publishing Company, 2004.
2. Kantiswarup, P. K. Gupta and Manmohan, “*Operations Research*”, Seventh EditionSultan Chand, 1991.
3. F. Hiller and G. J. Lieberman, “*Introduction to Operations Research*”, Eighth Edition, Tata McGraw-Hill, 2006.
4. S. D. Sharma, “*Operations Research*”, Eighth Edition, KedarNath, Ram Nath andCompany, 1997.

18MAT102

MATHEMATICAL FOUNDATION

3 1 0 4

Unit 1

Basic concepts of set theory - Mathematical logic-introduction-statements-connectives-negation, conjunction, disjunction- statement formulas and truth tables- conditional and bi-conditional statements- tautology-contradiction-equivalence of formulas-duality law- Predicates and Quantifiers, Arguments.

Unit 2

Operations on sets - power set- venn diagram Cartesian product-relations -functions- types of functions -composition of functions.

Unit 3

Matrix algebra-Introduction-Types of matrices-matrix operations- transpose of a matrix - determinant of matrix - inverse of a matrix- Cramer’s rule

Unit 4

Matrix: finding rank of a matrix - normal form-echelon form-Cayley Hamilton theorem- Eigen values

Unit 5

Differential calculus - Functions and limits - Simple Differentiation of Algebraic Functions –
– Evaluation of First and Second Order Derivatives – Maxima and Minima

TEXT BOOKS:

P.R.Vittal-Business Mathematics and Statistics, Margham Publications, Chennai,

REFERENCE:

B.S.Vatsa-Discrete Mathematics –New Age International Limited Publishers, New Delhi

18MAT112

DISCRETE MATHEMATICS

3 1 0 4

Unit 1

Binary operations, group, semi group, monoid, abelian group, subgroup (simple theorems without proof) Boolean algebra-definition-principle of duality-theorems.

Unit 2

Basic Counting Principles, Generating Functions, Euler's phi-function and its Application to Cryptography.

Unit 3

Relations and their properties - relation matrix, graph of a relation - types of relations - equivalence relation - n-ary relations

Unit 4

Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence relations, Divide and Conquer Algorithms and Recurrence relations, Generating Functions, Inclusion Exclusion principles and their Applications.

Unit 5

Introduction to Graph Theory: Graphs, Bipartite Graphs, Eulerian and Hamiltonian Graphs, Graph Connectivity.

TEXTBOOK:

Kenneth H. Rosen, Discrete Mathematics and its Applications, McGraw Hill.

REFERENCES

1. R. P. Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, Fifth Edition, 2007.

2. Thomas Koshy, "Discrete Mathematics with Applications", Academic Press, 2005.

Unit 1

Statistics-Introduction -Measures of average-AM-Median-Mode, Measures of dispersion and its coefficients – Range – QD – SD-MD

Unit 2

Correlation- Karl Pearson's and Spearman's rank correlation, Regression- regression equations, regression coefficients

Unit 3

Permutations – combinations – Probability-addition theorem, multiplication theorem, independent events,conditional probability,Bayes's theorem,Probability distribution-Binomial,Poisson, Normal.

Unit 4

Interpolation- Newton's forward &backward method- Lagrange's Method,Curve fitting-fitting a straight line

Unit 5

Solutions of Numerical, Algebraic and transcendental methods- bisection method, Newton Raphson method,Simultaneous linear equations -Gauss elimination

TEXT BOOKS:

P.R.Vittal-Business Mathematics and Statistics,Margham Publications,Chennai,

REFERENCE:

1. H.S.Hall and S.R.Knight: Higher Algebra –AITBS Publishers India.
2. M.K.Venkataraman: Numerical methods in Science and Engineering-National Publishing Company,Chennai