
**TEXT BOOKS/ REFERENCES:**


**18CA302 ADVANCED DATABASES**

Introduction to Object Oriented Database: Abstraction, encapsulation, and information hiding, Classes, Inheritance Overloading Polymorphism and dynamic binding - Object-Oriented Data Model.

Complex Data Types – Structured Types and Inheritance in SQL – Table Inheritance – Array and Multiset Types in SQL – Object-Identity and Reference Types in SQL – Implementing OR Features – Persistent Programming Languages – Object – Relational Mapping.


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:

18CA303 ADVANCED SOFTWARE ENGINEERING 3-0-1-4


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

TEXT BOOKS/ REFERENCES:


18CA305 DESIGN AND ANALYSIS OF ALGORITHMS 3-1-0-4


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:


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.


TEXT BOOKS/ REFERENCES:


18CA312DATA MINING AND APPLICATIONS 3-0-1-4


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

TEXT BOOKS/REFERENCES:

1. Jiawei Han, Micheline Kamber and Jian Pei, “Data mining concepts and Techniques”, Third Edition, Elsevier Publisher, 2006.


18CA313 WEB SERVICES AND CLOUD 3 0 1 4


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:


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. 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.

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


**TEXT BOOKS/ REFERENCES:**


**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


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:**

2. Jiawei Han, Micheline Kamber and Jian Pei, “Data mining concepts and Techniques”, Third Edition, Elsevier Publisher, 2006.

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


**TEXT BOOKS/ REFERENCES:**


18CA335 COMPUTER GRAPHICS AND VISUALIZATION 3 0 0 3


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


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.


TEXT BOOKS / REFERENCES:


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.


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:**


**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

**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-
9. Relationships between Pixels - Linear and Nonlinear Operations - Connectivity and Relations
10. between Pixels.
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 - Smoothening Filters in
18. Comparative Study of Filters in Frequency Domain and Spatial Domain.
21. – Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering.
22. Edge Detection - Line Detection - Curve Detection - Edge Linking and Boundary Extraction -
Thresholding Algorithms - Region Based Segmentation - Region Growing - Connected

Components Labeling - Region Growing and Region Adjacency Graph (RAG), Split and
Merge Algorithms - Morphology - Dilation, Erosion, Opening and Closing.

TEXTBOOKS/ REFERENCES:

4. PHI, 1996.

18CA340 ADVANCED OPERATING SYSTEM AND DISTRIBUTED COMPUTING 3 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:

Unit 5
Multiprocessor Operating Systems and Database Operating system:
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:

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 Sort- Merge Sort, performance comparison of sorting algorithms for various classes of inputs like nearly sorted, unsorted etc.
O(V^2) 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.

**18CA384 JAVA PROGRAMMING-II 0-0-3-1**


**TEXT BOOKS/ REFERENCES:**


**18CA385 GUI 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
Programing -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,
Projected
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.

18CA388 OPERATING SYSTEMS LAB 0 0 3 1


18CA391 RESEARCH LEARNING AND PROBLEM FORMULATION 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.

18CA401 DESIGN PATTERNS 3104


TEXT BOOKS / REFERENCES:


18CA402 SYSTEM SECURITY 3 1 0 4


- User Authentication - Trusted Operating System – Lock Down Mechanism

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


Ethical Issues: Protecting Programs and Data - Information and the Law - Rights of Employers and Employees - Redress for Software Failures - Computer Crime - Ethical Issues

Case Study: Privacy Rights, Fraud, Accuracy of Information, Denial Of Service.

TEXT BOOKS/ REFERENCES:


18CA431 INFORMATION RETRIEVAL 3-0-0-3


TEXT BOOKS/ REFERENCES:


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 Breath 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.


Text / Reference Books:

18CA433 MODERN WEB APPLICATION DEVELOPMENT USING MEANSTACK

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


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:**


**18CA435 NETWORK SECURITY 3-0-0-3**


**TEXT BOOKS/ REFERENCES:**


**18CA436 OPEN SOURCE SYSTEMS 3 0 0 3**


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:


18CA437 SEMANTIC WEB TECHNOLOGIES 3-0-0-3


TEXT BOOKS / REFERENCES:


18CA438 SOFTWARE QUALITY ASSURANCE 3-0-0-3


TEXT BOOKS/ REFERENCES:


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.


TEXT BOOKS/ REFERENCES:

18CA440 WIRELESS COMMUNICATIONS AND NETWORKS 3 0 0 3


TEXTBOOK / REFERENCES:
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
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

18CA485 COMPUTER ORGANIZATION AND ARCHITECTURE LAB


18CA496 DISSERTATION Phase I

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

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

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:

2. R.G. Dromey , “How to solve it by Computer”, PHI, 2008

18CSA103 COMPUTER ESSENTIALS 3 0 2 4

Unit-1


Lab Component- PC Assembly,

Unit-2

Operating System Fundamentals


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


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

18CSA113 PROGRAMMING IN C 3 1 0 4

Unit 1
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-storages 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:

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


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


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:


REFERENCE:

1. C.J. Date: An Introduction To Database Systems - Eighth Edition - Pearson Education Asia


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.


UNIT 3


UNIT 4


UNIT 5

I/O Systems: Overview, I/O Hardware

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

Case Study:- Unix System

TEXT BOOK:


REFERENCES:


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:


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
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, Dijkstra’s algorithm


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

Unit 2

Unit 3

Unit 4

Unit 5
Software Maintenance - Reverse Engineering and Reengineering

TEXTBOOK:
REFERENCE:

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

Unit 2

Unit 3

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:
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

TEXTBOOK:

REFERENCE:

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

JavaScript

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, Elliotse 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 covert 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 variables.
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

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 form 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 3003

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
Unit 3

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:

18CSA307 C# AND .NET FRAMEWORK 2023
Unit 1

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:
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

Unit 3

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

TEXTBOOKS:

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).


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


Unit 5


TEXTBOOK:


REFERENCE:

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

Dr T R Padmanabhan N Harini, ”Cryptography and Security Paperback”, Wiley 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 Python Programming, Tk Widgets, Tkinter examples. Python programming with IDE.

**Text Book/References**

**18CSA331 ARTIFICIAL INTELLIGENCE 3 0 0 3**

**Unit 1**


**Unit 2**

Unit 3


Statistical Reasoning – Probability and Baye’s Theorem – Bayesian Networks – Fuzzy Logic.

Unit 4

Game Playing - The Minimax Search Procedure – Adding Alpha-Beta Cutoffs.

Understanding – What is Understanding? What makes Understanding hard?

Unit 5


TEXTBOOKS:


REFERENCES:

2. Introduction to Artificial Intelligence – Eugene Charnaik, Drew McDermott (Pearson Education Asia)

18CSA332 ARCHITECTURE AND DEPLOYMENT OF SECURE AND SCALABLE WAN 3 0 0 3

Unit 1
Introduction to Scaling Networks, Implementing a Network Design, LAN Redundancy, Spanning Tree Concepts and protocols.

Unit 2

Unit 3
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 Shakil Akhtar, "Networks for Computer Scientists and Engineers".

REFERENCES:

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

Unit 2

Unit 3

Unit 4

Unit 5

TEXTBOOK:


REFERENCES:

1. Alex Berson: Client Server Architecture

18CSA334 EMBEDDED SYSTEMS 3 0 0 3

Unit 1

Unit 2

Unit 3

Unit 4
Unit 5

TEXTBOOKS:
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

Business Engineering and ERP

Unit 2
Business Modelling for ERP
Building the Business Model.

ERP Implementation

Unit 3
ERP and the Competitive Advantage
ERP and the Competitive Strategy.

The ERP Domain
Unit 4
Marketing of ERP
Market Dynamics and Competitive Strategy.
Sample Case Studies
Unit 5
Client Server and 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.

TEXTBOOK:
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


REFERENCE:

Knowledge Management: Ganesh Natarajan, President & CEO Aptech

18CSA337 LAN SWITCHING AND ADVANCED ROUTING  3 0 0 3

Unit 1

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

Unit 5
Access Control Lists and operations, Configuring and Troubleshooting Standard & extended IPv4 ACLs, IPv6 ACLs, DHCPv4 (IPV4) DHCPv6(IPv6).

TEXTBOOKS:


REFERENCES:

1. Introduction to Networks-Course Booklet “, Cisco Press
2. Routing and Switching Essentials – Course Booklet”, Cisco Press
Unit 1

Unit 2

Unit 3

Unit 4

Unit 5

TEXTBOOK:

REFERENCE BOOKS:
3. The 8086/88 family – John Uffenbeck – PHI

Unit 1

Unit 2
Making instant Multimedia – Multimedia Authoring tools.
Unit 3

Unit 4
Multimedia Building Blocks: Animation – Video.

Unit 5

TEXTBOOK:

REFERENCES:

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.


Unit 4


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


TEXTBOOK:

*Ethics for Information Age, 3rd Edition, Michael J. Quinn, Pearson/Addison Wesley, 2009*
Unit 5

TEXTBOOK/ REFERENCES:

18CSA342 SYSTEMS AND NETWORK ADMINISTRATION 3003

Unit 1

Unit 2

Unit 3

Unit 4

Unit 5

TEXTBOOKS:
1. Red Hat Linux - System Administration
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.

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.
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 Bean 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**

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.

18EN600 TECHNICAL WRITING 0 0 1 P/F
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:


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


TEXTBOOKS/REFERENCES:


Introduction to Software Project Management: Software Projects-Other Types of Projects - Problems with Software Projects. Project Evaluation and Programme Management:


**TEXTBOOK / REFERENCES:**


**18MA304 BASICS OF OPERATIONS RESEARCH**

Simulation: Definition - Types of Simulations - Monte Carlo Simulation. Queuing Theory: Characteristic of Queuing System - Steady State M/M/1 Model Finite and Infinite Population and M/M/C Infinite Population Model.


TEXT BOOKS/ REFERENCES:

18MAT102 MATHEMATICAL FOUNDATION 3 1 0 4

Unit 1

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:**


**REFERENCES**


Unit 1

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, Baye’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: