CORE - I PROBLEM SOLVING USING PYTHON

OBJECTIVES:

- To introduce the basic features of python programming and impart skills in an Industry standard programming language
- Understand fundamental programming concepts of Python programming and its Libraries
- Create advanced programming features in Python to solve industry standard problems.

OUTCOMES:

- On completion of this course students will be able to develop the emerging applications of relevant field using Python

UNIT - I

Computer systems – Python Programming Language Computational Thinking – Python Data Types: Expressions, Operator, Variables, and Assignments – Strings – Lists – Objects & Classes – Python standard library.

UNIT - II

Imperative programming: Python modules – Built-in-function: print() function –eval() function – user-defined function & assignments -parameter passing.

UNIT - III

Text Data, Files & Exceptions: Strings, revisited – formatted output – files – errors & Exceptions – Execution control Structures: decision control & the IF statement.

UNIT - IV

For LOOP & Iteration Patterns – two-dimensional list- while loop – more loop patterns – additional iteration control statements – Container and Randomness: Dictionaries – other built-in container types – character encodings & strings – module random.

UNIT - V

Namespaces – encapsulation in functions – global vs local namespaces exceptional flow control – modules as namespaces.

TEXT BOOK:

1.Ljubomir Periodic, "Introduction to Computing Using Python : An Application Development Focus", John Wiley & Sons,2012

REFERENCE BOOKS:

1. Sheetal Taneja & Naveen kumar, Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications, Pearson, 2017.
2. Martin C. Brown, Python: The Complete Reference, Osborne/McHraw Hill, 2001.
3. Wesley J. Chun, "Core Python Programming", Pearson Education, Second Edition, 2007.

WEB REFERENCES:

- NPTEL & MOOC courses titled Python programming
- http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English
- http://docs.python.org/3/tutorial/index.html
- http://interactivepython.org/courselib/static/pythonds

PRACTICAL - I PYTHON PROGRAMMING LAB

OBJECTIVES:

- To implement the python programming features in practical applications.
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries and modules.

OUTCOMES:

- Understand the numeric or real life application problems and solve them.
- Apply a solution clearly and accurately in a program using Python.
- Apply the best features available in Python to solve the situational problems.

LIST OF EXERCISES:

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:
   Grade A: Percentage >=80 Grade B: Percentage >=70 and <80
   Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60
   Grade E: Percentage <40
3. Program, using user-defined function to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series.
5. Program to find factorial of the given number.
6. Write a Python program to count the number of even and odd numbers from N numbers.
7. Python function that accepts a string and calculate the number of upper case letters and lower case letters.
8. Python program to reverse a given string and check whether the give string palindrome or not.
9. Write a program to find sum of all items in a dictionary.
10. Write a Python program to construct the following pattern, using a nested loop

```
1
22
333
4444
55555
666666
7777777
88888888
999999999
```

CORE - II OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

OBJECTIVES:

- To inculcate knowledge on Object-oriented programming concepts using C++.
- To gain Knowledge on programming with C++.

OUTCOMES:

- To write programs using OOP concepts like Abstraction, Encapsulation, Inheritance and Polymorphism

UNIT - I

Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If ..else, jump, goto, break, continue, Switch case statements - Loops in C++ : for, while, do - functions in C++ - inline functions – Function Overloading.

UNIT - II

Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

UNIT- III

Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

UNIT - IV

Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.

UNIT - V

Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

TEXT BOOK:

1. E. Balagurusamy, Object-Oriented Programming with C++, 7TH EDITION, TMH, 2013.

REFERENCE BOOKS:

1. Ashok N Kamthane, Object-Oriented Programming with Ansi And Turbo C++, Pearson Education, 2003.
2. Maria Litvin & Gray Litvin, C++ for you, Vikas publication, 2002.
3. John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.

PRACTICAL - II C++ PROGRAMMING LAB

OBJECTIVES:

- To implement the various object oriented programming concepts using C++

1. Write a C++ program to demonstrate function overloading, Default Arguments and Inline function.
2. Write a C++ program to demonstrate Class and Objects
3. Write a C++ program to demonstrate the concept of Passing Objects to Functions
4. Write a C++ program to demonstrate the Friend Functions.
5. Write a C++ program to demonstrate the concept of Passing Objects to Functions
6. Write a C++ program to demonstrate Constructor and Destructor
7. Unary Operator Overloading
8. Binary Operator Overloading
9. Write a C++ program to demonstrate:
    - Single Inheritance
    - Multilevel Inheritance
    - Multiple Inheritance
    - Hierarchical Inheritance
    - Hybrid Inheritance

10 Write a C++ program to demonstrate Virtual Functions.
11. Write a C++ program to manipulate a Text File.
12. Write a C++ program to perform Sequential I/O Operations on a file.
13. Write a C++ program to find the Biggest Number using Command Line Arguments
14. Write a C++ program to demonstrate Class Template
15. Write a C++ program to demonstrate Function Template.
16. Write a C++ program to demonstrate Exception Handling.

CORE - III DATA STRUCTURES

OBJECTIVES:

- To understand the concepts of ADTs
- To learn linear data structures-lists, stacks, queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing

OUTCOMES:

- Implement abstract data types for linear data structures.
- Apply the different linear and non linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.

UNIT - I

Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation-singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal.

UNIT - II

Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- deQueue-applications of queues.

UNIT - III

Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT-Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.

UNIT - IV

Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.

UNIT - V

Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing-Extendible Hashing.

TEXT BOOKS:

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, 4TH Edition, Pearson Education, 2014.
2. Reema Thareja, “Data Structures Using C”, Second Edition, Oxford University Press, 2014.

REFERENCES:

1. Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, “Introduction to Algorithms”, Third Edition, Mcgraw Hill.2009.
2. Aho, Hopcroft and Ullman,”Data Structures and Algorithms”,Pearson Education,2003.

WEB REFERENCES:

- NPTEL & MOOC courses titled Data Structures
- https://nptel.ac.in/courses/106106127/

CORE - IV JAVA PROGRAMMING

OBJECTIVES:

- To understand the concepts of Object Oriented Programming.
- To learn about the control structures, class with attributes and methods used in Java.

OUTCOMES:

- Knowledge of the structure and model of the Java programming language.
- Understand the basic principles of creating Java applications with GUI.
- Demonstrate use of string and String Buffers, Develop multithreaded programs in Java.

UNIT - I

Introduction to OOPS: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming – Differences between Procedure Oriented Programming and Object Oriented programming - Benefits of OOPs – Application of OOPs. Java: History – Java features – Java Environment – JDK – API. Introduction to Java: Types of java program – Creating and Executing a Java program – Java Tokens- Java Virtual Machine (JVM) – Command Line Arguments –Comments in Java program.

UNIT - II

Elements: Constants – Variables – Data types - Scope of variables – Type casting – Operators: Special operators – Expressions – Evaluation of Expressions. Decision making and branching statements- Decision making and Looping– break – labeled loop – continue Statement. Arrays: One Dimensional Array – Creating an array – Array processing – Multidimensional Array – Vectors – ArrayList – Advantages of Array List over Array Wrapper classes.

UNIT - III

Class and objects: Defining a class – Methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members –Nesting of Methods – this keyword – Command line input. Inheritance: Defining inheritance –types of inheritance– Overriding methods – Final variables and methods – Final classes – Final methods - Abstract methods and classes – Visibility Control- Interfaces: Defining interface – Extending interface - Implementing Interface - Accessing interface variables. Strings: String Array – String Methods – String Buffer Class.

UNIT - IV

Packages: Java API Packages – System Packages – Naming Conventions –Creating & Accessing a Package – Adding Class to a Package – Hiding Classes. Exception Handling: Limitations of Error handling – Advantages of Exception Handling - Types of Errors – Basics of Exception Handling – try blocks – throwing an exception – catching an exception – finally statement. Multithreading: Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization –Implementing Runnable interface – Thread Scheduling.

UNIT - V

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams –Character streams. Applets: Introduction – Applet Life cycle – Creating & Executing an Applet –Applet tags in HTML – Parameter tag – Aligning the display - Graphics Class: Drawing and filling lines – Rectangles – Polygon – Circles – Arcs – Line Graphs – Drawing Bar charts AWT Components and Even Handlers: Abstract window tool kit – Event Handlers – Event Listeners – AWT Controls and Event Handling: Labels – Text Component – Action Event – Buttons – Check Boxes – Item Event – Choice– Scrollbars – Layout Managers- Input Events – Menus.

TEXT BOOKS:

1. E. Balagurusamy," Programming with Java", 5th Edition ,TataMc-Graw Hill.
2. Herbert Schildt ,"Java, A Beginner's Guide" , 6th Edition, Oracle Press .

REFERENCES:

1. Herbert Schildt," The complete reference java",7th Edition,TataMc-Graw Hill.

WEB REFERENCES:

- NPTEL & MOOC courses titled Java
- https://nptel.ac.in/courses/106105191/

CORE - V COMPUTER ORGANIZATION

OBJECTIVES :

- To understand the basic architecture and organization of typical of CPU
- To bring the programing features of 8085 Microprocessor
- To understand the principles of Interfacing I/O devices and Direct Memory accesses

OUTCOMES:

- Describe the major components of a computer system and state their function and purpose
- Describe the microstructure of a processor
- Demonstrate the ability to program a microprocessor in assembly language.
- Classify and describe the operation DMA and peripheral Interfaces.

UNIT - I

Data representation: Data types – Complements- fixed point and floating point representation other binary codes. Register Transfer and Microoperations: Register transfer language- Register transfer- Bus and Memory transfers – Arithmetic, logic and shift micro operations.

UNIT - II

Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- RISC - Pipelining - Arithmetic and instruction- RISC pipeline - Vector processing and Array processors.

UNIT - III

Microprocessor Architecture and its Operations - 8085 MPU - 8085 Instruction Set and Classifications.

UNIT - IV

Code conversion - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions. BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division.

UNIT - V

Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts – Direct Memory Access(DMA)and 8257 DMA controller – 8255A Programmable Peripheral Interface.

TEXT BOOKS:

1. M.M. Mano- 1993- “Computer System architecture”. PHI (Third Edition).
2. R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram- 2009.

REFERENCE BOOKS:

1. A. Mathur- “Introduction to Microprocessor”- 3rd Edition- Tata McGraw-Hill-1993.
2 P. K. Ghosh and P. R. Sridhar- “0000 to 8085: Introduction to Microprocessors for Engineers and Scientists”- 2nd Edition- PHI- 1995.
3 A. NagoorKani- “Microprocessor (8085) and its Applications”- 2nd Edition- RBA Publications- 2006.
4 V. Vijayendran- “Fundamentals of Microprocessors – 8085”- S. Viswanathan Pvt. Ltd.- 2008.

WEB REFERENCES:

- NPTEL & MOOC courses titled Computer organization
- https://nptel.ac.in/courses/106105163/
- https://nptel.ac.in/courses/106103068/

PRACTICAL - III DATA STRUCTURES USING JAVA LAB

OBJECTIVES:

- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To implement graph traversal algorithms
- To get familiarized to sorting and searching algorithms

OUTCOMES:

- Write functions to implement linear and non-linear data structure operations.
- Suggest appropriate linear and non-linear data structure operations for solving a given problem.
- Analyze various sorting methods.

LIST OF EXERCISES:

1. Write a Java programs to implement the List ADT using arrays and linked lists.

2. Write a Java programs to implement the following using a singly linked list. Stack ADT (b) Queue ADT

3. Write a java program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).

4. Write a Java program to implement priority queue ADT.

5. Write a Java program to perform the following operations:
   (a) Insert an element into a binary search tree.
   (b) Delete an element from a binary search tree.
   (c) Search for a key element in a binary search tree.

6. Write a Java program to perform the following operations
   (a) Insertion into an AVL-tree
   (b) Deletion from an AVL-tree

7. Write a Java programs for the implementation of BFS for a given graph.

8. Write a Java programs for the implementation of DFS for a given graph.

9. Write a Java programs for implementing the following searching methods:
   (a) Linear search
   (b) Binary search.

10. Write a Java programs for implementing the following sorting methods:
    (a) Bubble sort
    (b) Selection sort
    (c) Insertion sort
    (d) Radix sort.

CORE - VI RELATIONAL DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- Gain a good understanding of the architecture and functioning of Database Management Systems
- Understand the use of Structured Query Language (SQL) and its syntax.
- Apply Normalization techniques to normalize a database.
- Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.

OUTCOMES:

- Describe basic concepts of database system
- Design a Data model and Schemas in RDBMS
- Be Competent in use of SQL
- Analyze functional dependencies for designing robust Database

UNIT - I

Introduction to DBMS– Data and Information - Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages.

UNIT - II

Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.

UNIT - III

Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.

UNIT - IV

SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

UNIT - V

PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

TEXT BOOK:

1. S. Sumathi, S. Esakkirajan, "Fundamentals of Relational Databse Management Systems ", Springer International Edition, 2007.

REFERENCE BOOKS:

1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", 7th McGrawHill, 2019.
2. Alexis Leon & Mathews Leon, "fundamentals of DBMS", 2nd Edition, Vijay Nicole Publications, 2014.

WEB REFERENCES:

- NPTEL & MOOC courses titled Relational Database Management Systems
- https://nptel.ac.in/courses/106106093/
- https://nptel.ac.in/courses/106106095/

CORE - VII MANAGEMENT INFORMATION SYSTEMS

OBJECTIVES:

- To understand the basic principles and working of information technology.
- Describe the role of information technology and information systems in business.

OUTCOMES:

- To contrast and compare how internet and other information technologies support business processes.
- To give an overall perspective of the importance of application of internet technologies in business administration.

UNIT- I

Information systems in Global Business Today: The role of information systems in business today, Perspectives on information systems, Contemporary approaches to information systems. Global E-Business and Collaboration : Business process and information systems, Types of business information systems, Systems for collaboration and social Business, The information systems function in business. A Case study on E business.

UNIT- II

Information Systems, Organizations and Strategy: Organizations and information systems, information systems impact organization and business firms, Using information systems to gain competitive advantage, management issues**, .**Ethical and Social issues in Information Systems: Understanding ethical and Social issues related to Information Systems, Ethics in an information society, The moral dimensions of information system. A Case study on business planning.

UNIT - III

IT Infrastructure and Emerging Technologies :IT infrastructure, Infrastructure components, Contemporary hardware platform trends, Contemporary software platform trends, Management issues. Securing Information Systems: System vulnerability and abuse, Business value of security and control, Establishing framework for security and control, Technology and tools for protecting information resources. A case study on cybercrime.

UNIT - IV

Achieving Operational Excellence and Customer Intimacy: Enterprise systems, Supply chain management(SCM) systems, Customer relationship management(CRM) systems. E-commerce: Digital Markets Digital Goods: E-commerce and the internet, E-commerce-business and technology, The mobile digital platform and mobile E-commerce. A Case study on ERP.

UNIT - V

Managing Knowledge: The knowledge management landscape, Enterprise- wide knowledge management system, Knowledge work systems, Intelligent techniques. Enhancing Decision Making: Decision making and information systems, Business intelligence in the enterprise. Business intelligence constituencies. Building Information Systems: Systems as planned organizational change, Overview of systems development.

TEXT BOOK :

1. Kenneth C. Laudon, Jane P. Laudon, "Management information Systems – Managing the Digital Firm", Pearson Publications,13th Edition,2014.

REFERENCE BOOKS :

1. O'Brien James, "Management Information Systems", TMH Publishing Company Ltd., 10th Edition, 2010.
2. S.Sadagopan,"management Information System", PHI Publications, 2nd Edition, 2014.

WEB REFERENCES:

- NPTEL & MOOC courses titled management Information Systems
- https://nptelvideos.in/2012/11/management-information-system.html

CORE - VIII E-COMMERCE TECHNOLOGIES

OBJECTIVES:

- To provide students with an overview and understanding of e-commerce with a specific emphasis on Internet Marketing.
- To explore the major issues associated with e-commerce-security, privacy, intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities.

OUTCOMES:

- Obtain a general understanding of basic business management concepts.
- Have complete knowledge about basic technical concepts relating to E-Commerce.
- Obtain thorough understanding about the security issues, threats and challenges of E-Commerce.

UNIT - I

History of E-commerce and Indian Business Context: E-Commerce –Emergence of the Internet –Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate. Business Models for E-commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

UNIT - II

Enabling Technologies of the World Wide Web: World Wide Web – Internet Client-Server Applications – Networks and Internets – Software Agents – Internet Standards and Specifications – ISP. e-Marketing :Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – E-branding.

UNIT - III

E-Security: Information system Security – Security on the Internet – E-business Risk Management Issues – Information Security Environment in India. Legal and Ethical Issues : Cybers talking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright – Internet Gambling – Threats to Children.

UNIT - IV

e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet – Risk and e-Payment Systems – Designing e-payment Systems – Digital Signature – Online Financial Services in India - Online Stock Trading.

UNIT - V

Information systems for Mobile Commerce: What is Mobile Commerce? – Wireless Applications –Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce – Wireless Technologies –Different Generations in Wireless Communication – Security Issues Pertaining to Cellular Technology. Portals for E-Business: Portals – Human Resource Management – Various HRIS Modules.

TEXT BOOK:

1. P.T.Joseph, S.J., “E-Commerce - An Indian Perspective”, 4 Edition, PHI 2012.

REFERENCE BOOKS:

1. David Whiteley , “E-Commerce Strategy, Technologies and Applications”, Tata Mc-Graw-Hill, 2001
2. Ravi Kalakota, Andrew B Whinston, “Frontiers of Electronic Commerce”. Twelfth Impression, Pearson, 2006

WEB REFERENCES:

- https://www.docsity.com/en/e-commerce-notes-pdf-lecture-notes-university-level/2484734/
- https://magnetoitsolutions.com/blog/advantages-and-disadvantages-of-ecommerce
- https://www.researchgate.net/publication/320547139ECommerce_Merits_and_Demerits_A_Review_Paper

PRACTICAL - IV PL / SQL LAB

OBJECTIVES:

- Learn the various DDL and DML commands
- Understand queries in SQL to retrieve information from data base
- Understand PL/SQL statements : Exception Handling, Cursors, Triggers.
- Develop database applications using front-end tools and back-end .

OUTCOMES:

- Implement the DDL , DML Commands and Constraints
- Create, Update and query on the database.
- Design and Implement simple project with Front End and Back End.

LIST OF EXERCISES:

1) DDL commands with constraints.
2) DML Commands with constraints.
3) SQL Queries: Queries, sub queries, Aggregate function
4) PL/SQL : Exceptional Handling
5) PL/SQL : Cursor
6) PL/SQL : Trigger
7) PL/SQL : Packages
8) Design and Develop Application for Library Management
9) Design and Develop Application for Student Mark Sheet Processing
10) Design and Develop Application for Pay Roll Processing

CORE – IX COMPUTER NETWORK

OBJECTIVES:

- To understand the concept of Computer network
- To impart knowledge about networking and inter networking devices

OUTCOMES:

- Analyse different network models
- Describe,analyse and compare a number of data link, network and transport layer
- Analysing key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI

UNIT - I

Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media.

UNIT - II

Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction.

UNIT - III

Elementary Data Link Protocols - Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth.

UNIT - IV

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols.

UNIT - V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography.

TEXT BOOK:

1. A. S. Tanenbaum, “Computer Networks”, Prentice-Hall of India, 4th Edition, 2008.

REFERENCE BOOKS:

1. Stallings, “Data and Computer Communications”, 7th Edition,Pearson Education, 2012
2. B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition, 2007.
3. F. Halsall, “Data Communications, Computer Networks and Open Systems”, Pearson Education, 2008.
4. D. Bertsekas and R. Gallagher, “Data Networks”, PHI, 2nd Edition, 2008.
5. Lamarca, “Communication Networks”, Tata McGraw Hill, 2002.

WEB REFERENCES:

- NPTEL & MOOC courses titled Computer Networks
- https://nptel.ac.in/courses/106106091/

CORE - X OPERATING SYSTEM

OBJECTIVES:

- To understand the fundamental concepts and role of Operating System.
- To learn the Process Management and Scheduling Algorithms
- To understand the Memory Management policies
- To gain insight on I/O and File management techniques

OUTCOMES:

- Understand the structure and functions of Operating System
- Compare the performance of Scheduling Algorithms
- Analyze resource management techniques
- Identify the features of I/O and File handling methods

UNIT - I

Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

UNIT - II

Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

UNIT - III

Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.

UNIT - IV

Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System: File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management.

UNIT - V

I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming 1/0 Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

TEXTBOOK:

1. Abraham Silberschatz, Peter B Galvin, Gerg Gagne, “Operating System Concepts”, 9th Ediiton, Wiley India Pvt.Ltd, 2018.

REFERENCES:

1. William Stallings, “Operating Systems Internals and Design Princples”, 9th Edition, Pearson, 2018.
2. Andrew S. Tanenbaum, Herbert Bos, “Modern Operating Systems”, 4rd Edition, Pearson 2014.

WEB REFERENCES:

- NPTEL & MOOC courses titled Operating Systems
- https://nptel.ac.in/courses/106106144/

CORE - XI OPEN SOURCE TECHNOLOGIES

OBJECTIVES:

- To provide a basic idea of Open source technology, their software development process to understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.

OUTCOMES:

- To recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves

UNIT- I

Introduction – Why Open Source – Open Source –Principles, Standards Requirements, Successes – Free Software – FOSS – Internet Application Projects

UNIT- II

Open source – Initiatives, Principles, Methodologies, Philosophy, Platform, Freedom, OSSD, Licenses – Copy right, Copy left, Patent, Zero Marginal Technologies, Income generation opportunities, Internalization

UNIT- III

Case Studies – Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

UNIT- IV

Open Source Project –Starting, Maintaining –Open Source – Hardware, Design, Teaching & Media

UNIT- V

Open Source Ethics – Open Vs Closed Source – Government – Ethics – Impact of Open source Technology – Shared Software – Shared Source

TEXT BOOK:

1. Kailash Vadera, Bhavyesh Gandhi, "*Open Source Technology*", Laxmi Publications Pvt Ltd, First Edition, 2012.

REFERENCE BOOK:

1. Fadi P. Deek and James A. M. McHugh, "Open Source: Technology and Policy, Cambridge University Press, 2007.

WEB REFERENCES:

1. Coursera online course – Open Source Software Development Methods - https://www.coursera.org/learn/open-source-software-development-methods

PRACTICAL - V OPERATING SYSTEMS LAB

OBJECTIVE:

- To learn Process management and scheduling.
- To understand the concepts and implementation of memory management policies.
- To understand the various issues in Inter Process Communication.

OUTCOME:

The student can be able to

- Understand the process management policies and scheduling process by CPU.
- Analyse the memory management and its allocation policies.
- To evaluate the requirement for process synchronization.

PROGRAM LIST:

1. Basic I/O programming.
2. To implement CPU Scheduling Algorithms.
3. To implement reader/writer problem using semaphore.
4. To implement Banker's algorithm for Deadlock avoidance.
5. Program for page replacement algorithms.
6. To implement first fit, best fit and worst fit algorithm for memory management.
7. Program for Inter-process Communication.

OPERATING SYSTEMS(LINUX PROGRAMMING):

1. Write a script to find the greatest of three numbers (numbers passed as command line parameters)
2. Write a script to check whether the given no. is even/odd
3. Write a script to calculate the average of n numbers
4. Write a script to check whether the given number is prime or not
5. Write a script to check whether the given input is a number or a string
6. Write a script to compute no. of characters and words in each line of given file
7. Write a script to print the Fibonacci series up to n terms
8. Write a script to calculate the factorial of a given number
9. Write a script to calculate the sum of digits of the given number
10. Write a script to check whether the given string is a palindrome

PRACTICAL - VI OPEN SOURCE TECHNOLOGIES LAB

OBJECTIVES:

- To be aware of the variousopen source software available for different problem needs
- To be familiar with the usage of the software like installation and configuration

OUTCOMES:

- Students must be able to use appropriate open source tools based on the nature of the problem
- Students should be able to code and compile different open source software

1. Study and usage of Libre Office Suite – Writer, Calc& Impress
2. Text Processing with PERL
3. Simple Applications using PHP
4. Simple Applications using Python
5. Image editing using GIMP
6. Study and usage of Business Intelligence tools – BIRT, JMagallanes
7. Creation of network diagrams using GraphViz
8. Linux Installation
9. Software Configuration in Linux environment.
10. Version Control System using Git.

CORE - XII SOFTWARE ENGINEERING

OBJECTIVES:

- To introduce the software development life cycles
- To introduce concepts related to structured and objected oriented analysis & design co
- To provide an insight into UML and software testing techniques

OUTCOMES:

- The students should be able to specify software requirements, design the software using tools
- To write test cases using different testing techniques.

UNIT- I

Introduction – Evolution – Software Development projects – Emergence of Software Engineering.
Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – Spiral Model

UNIT- II

Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System Specification

UNIT- III

Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches
Function Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design

UNIT- IV

Object Modelling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity, State Chart – Postscript

UNIT- V

Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration, OO Testing, Smoke testing.

TEXT BOOK:

1. Rajib Mall, "Fundamentals of Software Engineering", PHI , Fifth Edition, 2018.

REFERENCE BOOKS:

1. Roger S. Pressman, "Software Engineering - A Practitioner's Approach", McGraw Hill, Seventh Edition, 2010.
2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Publishing House, Third Edition, 2011.

WEB REFERENCES:

- NPTEL & MOOC courses titled Software Engineering
- https://nptel.ac.in/courses/106105182/

CORE - XIII DATA MINING

OBJECTIVES:

- To learn about data mining Concepts
- To study the different data mining techniques

OUTCOMES:

- To have knowledge in Data mining concepts
- To apply Data mining concepts in different fields

UNIT - I

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.

UNIT - II

Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT - III

Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision.

UNIT - IV

Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitioned Algorithms.

UNIT - V

Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

TEXT BOOK:

1. Jiawei Han & Micheline Kamber, Data Mining Concepts & Techniques, 3rd Edition, 2011.

REFERENCE BOOK:

1. Margaret H.Dunbam, Data Mining Introductory and Advanced Topics, Pearson Education – 2003.

WEB REFERENCES:

- NPTEL & MOOC courses titled Data Mining
- https://nptel.ac.in/courses/106105174/

CORE - XIV MOBILE APPLICATION DEVELOPMENT

OBJECTIVES:

- To make the student understand the basic concepts of mobile application development, be aware of Characteristics of mobile applications, User-interface design, basics of graphics and multimedia.
- To gain knowledge about testing and publishing of Android application

OUTCOMES:

- To explain the basics of mobile application development
- Develop Android application with User interface, networking and animation.
- Use simulator tools to test and publish the application.

UNIT - I

Mobile Application Development - Mobile Applications and Device Platforms - Alternatives for Building Mobile Apps -Comparing Native vs. Hybrid Applications -The Mobile Application Development Lifecycle-The Mobile Application Front-End-The Mobile Application Back-End-Key Mobile Application Services-What is Android-Android version history-Obtaining the Required Tools- Launching Your First Android Application-Exploring the IDE-Debugging Your Application-Publishing Your Application

UNIT - II

Understanding Activities-Linking Activities Using Intents-Fragments-Displaying Notifications- Understanding the Components of a Screen-Adapting to Display Orientation-Managing Changes to Screen Orientation-Utilizing the Action Bar-Creating the User Interface Programmatically Listening for UI Notifications

UNIT - III

Using Basic Views-Using Picker Views -Using List Views to Display Long Lists-Understanding Specialized Fragments - Using Image Views to Display Pictures -Using Menus with Views-Using WebView- Saving and Loading User Preferences-Persisting Data to Files-Creating and Using Databases.

UNIT - IV

Sharing Data in Android-Creating Your Own Content Providers -Using the Content Provider- SMS Messaging - Sending Email-Displaying Maps- Getting Location Data- Monitoring a Location.

UNIT - V

Consuming Web Services Using HTTP-Consuming JSON Services- Creating Your Own Services - Binding Activities to Services -Understanding Threading .

TEXT BOOK:

1. "Beginning Android Programming with Android Studio" 4thEdition by Jerome DiMarzio.

REFERENCE BOOKS:

1. "Head First Android Development: A Brain-Friendly Guide Paperback – 2017" By Dawn Griffiths, David Griffiths.
2. "Android Studio 3.0 Development Essentials: Android 8 Edition" by Neil Smyth
3. "Android Application Development (With Kitkat Support), Black Book" Paperback – 2014 by Pradeep Kothari.

WEB REFERENCES:

1. https://developer.android.com/guide
2. https://en.wikipedia.org/wiki/Android_10
3. Develop App for Free
4. https://flutter.dev/
5. http://ai2.appinventor.mit.edu
6. https://en.wikipedia.org/wiki/Android_version_history
7. https://aws.amazon.com/mobile/mobile-application-development/
8. https://en.wikipedia.org/wiki/Mobile_app_development

PRACTICAL - VII MOBILE APPLICATION DEVELOPMENT LAB

OBJECTIVES:

- To give overall view of Mobile application development
- Develop and Publish Android applications using Graphical user interface
- Develop and Publish Android application which can use Location and network services

OUTCOMES:

At the end of the course, the student should be able to:

- Use Emulator tools to design and develop applications

Exercises

1. Develop an application that finds greatest among three numbers using GUI Components
2. Develop an application to display your personal details using GUI Components
3. Develop an application that uses the radio button
4. Develop an application that uses the image button
5. Develop an application that uses Alert Dialog Box
6. Develop an application that uses Layout Managers.
7. Develop an application that uses audio mode (NORMAL, SILENT, VIBRATE)
8. Develop an application that uses to send messages from one mobile to another mobile.
9. Develop an application that uses to send email
10. Develop an application for mobile calls.
11. Develop an application for Student Marksheet processing
12. Develop an application for Login Page in Database.
13. Develop an application for Google map locator (optional)

WEB REFERENCES:

Develop the App online

1. https://flutter.dev/
2. http://ai2.appinventor.mit.edu

PRACTICAL – VIII **MINI PROJECT**

OBJECTIVES:

The aim of the mini project is that the student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem, he/she has selected and the language / software, he/she is using.

Project planning:

The B.Sc (Computer Science)/BCA Major Project is an involved exercise, which has to be planned well in advance. The topic should be chosen in the beginning of final year itself. Related reading training and discussions of first internal project viva voce should be completed in the first term of final year.

I Selection of the project work

Project work could be of three types.

a) Developing solution for real life problem

In this case a requirement for developing a computer-based solution already exists and the different stages of system development life cycle is to be implemented successfully. Examples are accounting software for particular organization, computerization of administrative function of an organization, web based commerce etc.

b) System Software Project

Projects based on system level implementation. An example is a Tamil language editor with spell checker, compiler design.

b) Research level project

These are projects which involve research and development and may not be as a structured and clear cut as in the above case. Examples are Tamil character recognition, neural net based speech recognizer etc. This type of projects provides more challenging opportunities to students.

II Selection of team

To meet the stated objectives, it is imperative that major project is done through a team effort. Though it would be ideal to select the team members at random and this should be strongly recommended, due to practical consideration students may also be given the choice of forming themselves into teams with three members. A team leader shall be selected. Team shall maintain the minutes of meeting of the team members and ensure that tasks have been assigned to every team member in writing. Team meeting minutes shall form a part of the project report. Even if students are doing project as groups, each one must independently take different modules of the work and must submit the report.

III Selection of Tools

No restrictions shall be placed on the students in the choice of platform/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

IV Project management

Head of the Department / Principal of the college should publish the list of student's project topic, internal guide and external organization and teams agreed before the end of July. Changes in this list may be permitted for valid reasons and shall be considered favorably by the Head of the department / Principal of the college any time before commencement of the project. Students should submit a fortnightly report of the progress, which could be indication of percentage of completion of the project work. The students should ideally keep a daily activity book. Team meeting should be documented and same should be submitted at the end of the project work.

V Documentation

Three copies of the project report must be submitted by each student (one for department library, one for the organization where the project is done and one for the student himself/herself). The final outer dimensions of the project report shall be 21cm X 30 cm. The color of the flap cover shall be light blue. Only hard binding should be done. The text of the report should be set in 12 pt, Times New Roman, 1.5 spaced.

Headings should be set as follows: CHAPTER HEADINGS 16 pt,

Arial, Bold, All caps, Centered.

1. Section Headings 14 pt Bookman old style, Bold, Left adjusted.

1.1 Section Sub-heading 12 pt, Bookman old style.

Title of figures tables etc are done in 12 point, Times New Roman, Italics, centered.

Content of the Project should be relevant and specify particularly with reference to the work. The report should contain the requirement specification of the work, Analysis, Design, Coding, testing and Implementation strategies done.

- Organizational overview (of the client organization, where applicable)
- Description of the present system
- Limitations of the present system
- The Proposed system - Its advantages and features
- Context diagram of the proposed system
- Top level DFD of the proposed system with at least one additional level of expansion
- Program List (Sample code of major functions used)
- Files or tables (for DBMS projects) list. List of fields or attributes (for DBMS projects) in each file or table.
- Program – File table that shows the files/tables used by each program and the files are read, written to, updated, queried or reports were produced from them.
- Screen layouts for each data entry screen.
- Report formats for each report.

Some general guidelines on documentation are:

1. Certificate should be in the format**: "Certified that this report titled…….is a bonafide record of the project work done by Sri/ Kum …….under our supervision and guidance, towards partial fulfillment of the requirement for award of the Degree of B.Sc Computer Science/BCA of XXX College**" with dated signature of internal guide, external guide and also Head of the Department/ College.

2. If the project is done in an external organization, another certificate on the letterhead of the organization is required: **"Certified that his/her report titled …….is a bonafide record of the project work done by Sri/Kum…….under my supervision and guidance, at the ……..department of…… (Organization) towards partial fulfillment of the requirement for the award of the Degree of B.Sc (Computer Science)/BCA of XXX College**.

3. Page numbers shall be set at right hand bottom, paragraph indent shall be set as 3.

4. Only 1.5 space need be left above a section or subsection heading and no space may be left after them.

5. References shall be IEEE format (see any IEEE magazine for detail) While doing the project keep note of all books you refer, in the correct format and include them in alphabetical order in your reference list.

VI Project Evaluation:

Internal Assessment

There shall be six components that will be considered in assessing a project work with weightage as indicated.

1. Timely completion of assigned tasks as evidenced by team meeting minutes 20%
2. Individual involvement, team work and adoption of industry work culture 10%
3. Quality of project documentation (Precision, stylistics etc) 10%
4. Achievement of project deliverables 20%

5 Effective technical presentation of project work 10%

6. Viva 30%

Based on the above 6 components internal mark (10) can be awarded.

External Assessment

Dissertation/Project submitted at the end of third year shall be valued by two examiners appointed by the Controller for the conduct of practical exam. The board of examiners shall award 40 marks based on the following components.

1. Achievement of project deliverables - 15 Marks
2. Effective technical presentation of project work - 10 Marks
3. Project Viva - 15 Marks

There shall be a common written examination conducted for all the candidates in each group together for a minimum of 10 minutes.

(i) Requirement Specification of Project

(ii) Design of Project

(iii) Testing and Implementation of Project

NON MAJOR ELECTIVE - I OFFICE AUTOMATION

OBJECTIVES:

- The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point. The course is highly practice oriented rather than regular class room teaching.

UNIT - I

Introductory concepts: History - Generation - Classification - Block diagram - Memory unit – CPU.

UNIT - II

Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX – Windows. Introduction to Programming Languages: C, C++ and its features.

UNIT - III

Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, merge .

UNIT - IV

Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing.

UNIT - V

Power point: Introduction to Power point - Features – Understanding slide types – creating & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects.

TEXT BOOK:

1. Peter Norton, “Introduction to Computers” –Tata McGraw-Hill.

REFERENCE BOOK:

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGraw-Hill.

NON MAJOR ELECTIVE - II OFFICE AUTOMATION LAB

OBJECTIVE:

- To acquire knowledge on editor, spread sheet and presentation software.

MS-WORD

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following. Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare at least five letters.

MS-EXCEL

1. Data sorting-Ascending and Descending (both numbers and alphabets)
2. Mark list preparation for a student
3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

MS-POWERPOINT

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts
3. Create a slide show presentation to display percentage of marks in each semester for all students
    1. Use bar chart (X-axis: Semester, Y-axis: % marks).
    2. Use different presentation template different transition effect for each slide.

ELECTIVE - I SOFTWARE PROJECT MANAGEMENT

OBJECTIVES:

- To define and highlight importance of software project management.
- To formulate and define the software management metrics & strategyin managing projects

OUTCOMES :

- Knowledge gained to train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process

UNIT - I

Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

UNIT - II

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project -Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

UNIT - III

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

UNIT - IV

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

UNIT - V

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study

TEXT BOOK:

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, “Quality Software Project Management”, Pearson Education, Asia, 2002.

REFERENCE BOOKS:

1. Pankaj Jalote, “Software Project Management in Practice”, Addison Wesley, 2002.
2. Hughes, “Software Project Management, 3/E”, Tata McGraw-Hill, 2004.

WEB REFERENCES:

- NPTEL & MOOC courses titled Software Project Management
- www.smartworld.com/notes/software-project-management

ELECTIVE - I OBJECT ORIENTED ANALYSIS AND DESIGN

OBJECTIVES:

- The objectives of this course are to show the importance of modeling concept for object oriented development in system and to differentiate advance object-oriented approach from the traditional approach for design and development of system using UML. It also aims to impart knowledge about quality assurance tests and its strategies.

OUTCOMES:

- To apply Unified Modeling Language (UML) for representation of an object-oriented system using different modeling views.
- Construct various UML models for various development stages of system using the appropriate UML notation.
- Understand the different quality assurance tests and its strategies

UNIT - I

System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

UNIT - II

Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Class and Object responsibilities - Case Studies.

UNIT - III

Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.

UNIT - IV

User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

UNIT - V

Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

TEXT BOOK:

1.Ali Bahrami, Reprint 2009, Object Oriented Systems Development, Tata McGraw Hill International Edition.

REFERENCES:

1. G.Booch,1999,ObjectOrientedAnalysisanddesign,2nd Edition, Addison Wesley,
2. Roger S.Pressman, 2010, Software Engineering A Practitioner’s approach, Seventh Edition, Tata McGraw Hill, NewDelhi.
3. Rumbaugh, Blaha, Premerlani , Eddy, Lorensen, 2003, Object Oriented Modeling And design , Pearson Education, Delhi.

WEB REFERENCES:

1. https://edutechlearners.com/object-oriented-system-development-by-ali-bahrami/
2. https://www.docsity.com/en/ooad-notes/552267/
3. https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_pdf_version.html

ELECTIVE I **MULTIMEDIA AND ITS APPLICATIONS**

OBJECTIVES:

- To understand the basic concepts of Multimedia Systems
- To learn representations, perceptions and applications of Multimedia

OUTCOMES:

- To understand the technologies behind multimedia applications

UNIT- I

Definition - Classification - Multimedia application -Multimedia Hardware - Multimedia software - CDROM - DVD.

UNIT-II

Multimedia Audio: Digital medium - Digital audio technology - sound cards - recording - editing - MP3 - MIDI fundamentals - Working with MIDI - audio file formats - adding sound to Multimedia project.

UNIT-III

Multimedia Text: Text in Multimedia -Multimedia graphics: coloring - digital imaging fundamentals - development and editing - file formats - scanning and digital photography

UNIT-IV

Multimedia Animation: Computer animation fundamentals - Kinematics - morphing - animation s/w tools and techniques.

Multimedia Video : How video works - broadcast video standards - digital video fundamentals – digital video production and editing techniques - file formats.

UNIT-V

Multimedia Project : stages of project - Multimedia skills - design concept - authoring - planning and costing – Multimedia Team.

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing

TEXT BOOKS:

1. Multimedia Magic - S.Gokul, Second edition – BPB Publications
2. Multimedia Making it Work - Tay Vaughen 6th edition – TMH

REFERENCE BOOKS:

1. Kiran Thakrar,Prabhat k.andleigh, Multimedia System Design, First edition, Prentice Hall India.
2. Malay k Pakhira ,Computer graphics,Multimedia and Animation, Secoond edition, Prentice Hall India.

WEB REFERENCES:

- NPTEL & MOOC courses titled Multi media
- https://nptel.ac.in/courses/106105163/
- W3schools.com/html/html-media.asp

ELECTIVE - II PRINCIPLES OF INFORMATION SECURITY

OBJECTIVES:

- It is effective only when it is balanced with business requirements, cost, and risk mitigation.
- Learn how to determine security requirements that mesh effectively with your business objectives, create policies that work for your organization, and use technology to implement your policies.

UNIT - I
Protection versus security; aspects of security–data integrity, data availability, privacy; security problems, user authentication, Orange Book.

UNIT - II
Program threats, worms, viruses, Trojan horse, trap door, stack and buffer overflow; system threats- intruders; communication threats- tapping and piracy.

UNIT - III
Substitution, transposition ciphers, symmetric-key algorithms-Data Encryption Standard, advanced encryption standards, public key encryption - RSA; Diffie-Hellman key exchange, ECC cryptography, Message Authentication- MAC, hash functions.

UNIT - IV
Symmetric key signatures, public key signatures, message digests, public key infrastructures.

UNIT - V
Intrusion detection, auditing and logging, tripwire, system-call monitoring;

TEXT BOOKS:

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March 2013.
2. C. Pfleeger and SL Pfleeger, *Security in Computing* (3rd ed.), Prentice-Hall of India, 2007.

REFERENCE BOOK:

1. D. Gollmann, *Computer Security*, John Wiley and Sons, NY, 2002

WEB REFERENCES:

- NPTEL & MOOC courses titled Information security
- https://nptel.ac.in/courses/106106129/

ELECTIVE - II IOT AND ITS APPLICATIONS

OBJECTIVES:

- To understand the concepts of Internet of Things and the application of IoT.
- To Determine the Market perspective of IoT.
- To Understand the vision of IoT from a global context

OUTCOMES:

After learning the course, the student ableto:

- Use of Devices, Gateways and Data Management in IoT.
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform

UNIT - I

IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

UNIT - II

M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT - III

IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT - IV

IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and GasIndustry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

UNIT - V

Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

TEXT BOOK:

1. Vijay Madisetti and ArshdeepBahga, “Internet of Things: (A Hands-on Approach)”, 1st Edition, VPT, 2014

REFERENCE BOOKS:

1. Michael Miller, “The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities AreChanging the World ‘, kindle version
2. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, st Edition, Apress Publications, 2013
3. WaltenegusDargie,ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice
4..CunoPfister, Getting Started with the Internet of Things, O‟Reilly Media, 2011, ISBN: 978-1-4493-9357-1

WEB REFERENCES:

- https://github.com/connectIOT/iottoolkit
- https://www.arduino.cc/
- http://www.zettajs.org/

ELECTIVE - II DATA ANALYTICS USING R

OBJECTIVE:

- To make the student understand the basic concepts of data analytics, be familiar with the data analytics life cycle, learn the basics of R Language, be exposed to data pre-processing, model creations and visualizing the results using R .

OUTCOMES:

- Write R program to pre-process the data for analytics.
- Understand the various methods to analyse the data and create models.
- Present the analytics results to using visualization techniques.

UNIT - I

Introduction to Big Data Analytics - Big Data Overview - State of the Practice in Analytics-Key Roles for the New Big Data Ecosystem -Examples of Big Data Analytics - Data Analytics Lifecycle - Data Analytics Lifecycle Overview - Phase 1: Discovery -Phase 2: Data Preparation -Phase 3: Model Planning -Phase 4: Model Building -Phase 5: Communicate Results -Phase 6: Operationalize- What is R - Why R -Advantages of R Over Other Programming Languages-Handling Packages in R

UNIT - II

Getting Started with R-Working with Directory- Data Types in R-Few Commands for Data Exploration-Challenges of Analytical Data Processing- Expression, Variables and Functions-Missing Values Treatment in R - Using the 'as Operator to Change the Structure of Data - Vectors -Matrices -Factors -List -Few Common Analytical Tasks- Aggregating and Group Processing of a Variable-Simple Analysis Using R- Methods for Reading Data-Comparison of R GUIs for Data Input- Using R with Databases and Business Intelligence

UNIT - III

Exploring Data in R-Data Frames-R Functions for Understanding Data in Data frames-Load Data Frames-Exploring Data-Data Summary-Finding the Missing Values - Invalid Values and Outliers - Descriptive Statistics-Spotting Problems in Data with Visualisation -Linear Regression Using R - Model Fitting - Linear Regression-Assumptions of Linear Regression-Validating Linear Assumption-Logistic Regression-What is Regression-Introduction to Generalised Linear Models-Logistic Regression- Binary Logistic Regression-Diagnosing Logistic Regression -Multinomial Logistic Regression Models

UNIT - IV

Decision Tree-What is a Decision Tree-Decision Tree Representation in R-Appropriate Problems for Decision Tree Learning- Basic Decision Tree Learning Algorithm-Measuring Features- Hypothesis Space Search in Decision Tree Learning-Inductive Bias in Decision Tree Learning-Why Prefer Short Hypotheses - Issues in Decision Tree Learning-What is Time Series Data - Reading Time Series Data - Plotting Time Series Data - Decomposing Time Series Data-Forecasts using Exponential Smoothing-ARIMA Models .

UNIT - V

Clustering -What is Clustering-Basic Concepts in Clustering- Hierarchical Clustering -k-means Algorithm-CURE Algorithm -Clustering in Non-Euclidean Space-Clustering for Streams and Parallelism - Association Rules - Frequent Itemset- Data Structure Overview - Mining Algorithm Interfaces - Auxiliary Functions-Sampling from Transactions-Generating Synthetic Transaction Data -Additional Measures of Interestingness - Distance based Clustering Transactions and Associations.

TEXT BOOKS:

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data - EMC Education Services, 2015
2. Data Analytics using R - Seema Acharya. McGraw Hill Education; First edition , 2018

REFERENCE BOOKS:

1. Data Analytics Made Accessible - Anil Maheshwari
2. Head First Data Analysis -Michael Milton
3. Data Science and Analytics -V.K.Jain

WEB REFERENCES:

1. https://analytics.google.com/analytics/academy/course/6
2. https://www.youtube.com/watch?v=D2YcHRiIzCk

B.C.A. DEGREE COURSE COMPUTER APPLICATIONS

OLD SYLLABUS

Title of the Course/ Paper	Fundamentals Of Digital Computers		
Core	I Year & First Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of computers and fundamentals of Digital Principles		
Course outline	Unit 1: Fundamentals of computers – Characteristics of computers – Computer Language – Operating Systems – Generation of Computers.		
	Unit-2: Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.		
	Unit 3: Boolean Algebra - Axioms - Truth table simplification of Boolean function - map method (upto 5 Variables) - Mc-Clausky tabulation method		
	Unit-4: Sequential logic – RS, JK, D and T Flip flops - Registers –Shift Registers - Counters – Ripple Counters – Synchronous Counter – Design of Counters		
	Unit-5 :Adders – Subtractors – Decoders – Encoders – Multiplexer - Demultiplexer – Design of Circuits using decoders/Multiplexers – ROM – PLA – Designing circuits using ROM/PLA		

1.Recommended Texts

i. M.M. Mano, Digital Logic and Computer Design, Pearson Education .

ii. V.Rajaraman,2002, Fundamentals of Computers, Third Edition, PHI, New Delhi.

2.Reference Books

i .T.C.Bartee,1991,Computer Architecture and logical Design, McGraw Hill.

PRACTICAL – I : PC - SOFTWARE

Title of the Course	PC Software Lab		
Core	I Year & First Semester	Credit: 4	
Objective	This course gives an exposure to Various Software of Office Package		

Course outline	MSWORD 1. Text Manipulations. 2. Usage of Numbering, Bullets, Footer and Headers. 3. Usage of Spell check, and Find & Replace. 4. Text Formatting. 5. Picture insertion and alignment. 6. Creation of documents, using templates. 7. Creation templates 8. Mail Merge Concepts 9. Copying Text & Pictures from Excel MS-EXCEL 10. Cell Editing 11. Usage of Formulae and Built-in Functions 12. File Manipulations 13. Data Sorting (both number and alphabets) 14. Worksheet Preparation 15. Drawing Graphs 16. Usage of Auto Formatting POWER POINT 17. Inserting Clip arts and Pictures 18. Frame movements of the above 19. Insertion of new slides 20. Preparation of Organisation Charts 21. Presentation using Wizards 22. Usage of design templates

title of the course /	Allied Paper I – Mathematics I

paper			
core	I Year & First Semester	Credit: 4	
objective of the course	This course introduces the basic concepts integration and differentiation		
	Unit I ALGEBRA AND NUMERICAL METHODS: Algebra : Summation of series simple problems. Numerical Methods : Operators E, Δ, V, difference tables, Newton-Raphson method, Newton's forward and backward interpolation formulae for equal intervals, Lagrange's interpolation formula.		
	Unit II MATRICES : Symmetric, Skew-Symmetric, Orthogonal, Hermetian, Skew-Hermetian and Unitary matrices, Eagen values and Eigen vectors, Cayley-Hamilton theorem (without proof) – verification – Computation of inverse matrix using Cayley – Hamilton theorem.		
	Unit III THEORY OF EQUATIONS: Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equation, Newton's method to find a root approximately – simple problems. Unit IV TRIGONOMETRY:		
	Expansions of sinnΘ and cosnΘ in a series of powers of sinΘ and cosΘ – Expansions of sinΘ, cosΘ, tanΘ in a series of sines, cosines and tangents of multiples of "Θ" – Expansions of sinΘ, cosΘ and tanΘ in a series of powers of "Θ" – Hyperbolic and inverse hyperbolic functions – Logarithms of complex numbers.		
	Unit V DIFFERNTIAL CALCULUS: Successive differentiation, nth derivatives, Leibnitz theorem (without proof) and applications, Jacobians, Curvature and radius of curvature in Cartesian co-ordinates, maxima and minima of functions of two variables, Lagrange's multipliers – Simple problems.		

Allied Paper I – Mathematics I

Book for Reference:

1. S.Narayanan and T.K.MinickavasagamPillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai

2. P.Duraipandian and S.UdayaBaskaran, Allied Mathematics, Vol I & II Muhil Publications, Chennai

Title of the Course	Programming in C		
Core	I Year & Second Semester	Credit: 4	
Objective	This course introduces the basic concepts of C programming		
Course outline	Unit 1: Fundamental Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.		
	Unit-2:Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while , for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.		
	Unit 3: Functions –Definition - proto-types - Passing arguments – Recursions- Storage Classes - Automatic, External, Static, Register Variables – Multi-file programs.		
	Unit-4:Arrays - Defining and Processing - Passing arrays to functions – Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures – Unions - Bit wise operations.		
	Unit-5:Pointers-Declarations- Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers – Files- Creating , Processing ,Opening and Closing a data file.		

1. Recommended Texts

i.E.Balaguruswamy, 1995,Programming in ANSI C, TMH Publishing Company Ltd.

2. Reference Books

i.H. Schildt, 2004, The Complete Reference, 4th Edition, TMH

iiGottfried,B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi .

iii.Kanetkar Y,1999, Let us C, BPB Publications., New Delhi.

iv. Kamthane,2002,Programming with ANSI & Turbo C , First Edition,Pearson Education , New Delhi

Title of the Course	Programming in C Lab		
Core	I Year & Second Semester	Credit: 4	
Objective	This course gives hands on training in C programming		
course outline	ISummation of Series : 1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)		
	II String Manipulation : 1. Counting the no. of vowels, consonants, words, white spaces in a line of text and array of lines 2. Reverse a string & check for palindrome. 3. Substring detection, count and removal 4. Finding and replacing substrings		
	III Recursion : 1. ${}^{n}P_{r}$, ${}^{n}C_{r}$ 2. GCD of two numbers 3. Fibonacci sequence 4. Maximum & Minimum 5. Towers of Hanoi.		
	IV Matrix Manipulation : 1.Addition & Subtraction 2.Multiplication 3.Transpose, and trace of a matrix 4.Determinant of a Matrix 5.Inverse of Matrix		

	V Sorting and Searching : 18. Insertion Sort 19. Bubble Sort 20. Linear Search 21. Binary Search

title	Allied Paper II – Mathematics II		
core	II Year & Third Semester	Credit: 4	
objective	This course introduces the basic concepts trigonometry and theory of equations		
	Unit I INTEGRAL CALCULUS Bernoulli's formula, Reduction formulae, (m,n being positive integers), Fourier series for functions in (α, α +2Π), Half range sine and cosine series.		
	Unit – II DIFFERENTIAL EQUATIONS Ordinary Differential Equations:second order non-homogeneous differential equations with constant coefficients of the form ay"+by'+cy=X where X is of the form $e^{ax}\cos \beta x$ and $e^{ax}\sin \beta x$. Partial Differential Equations: Formation, complete integrals and general integrals, four standard types and solving lagrange's linear equation P p + Q q = R		
	Unit –III LAPLACE TRANSFORMS Laplace transformations of standard functions and simple properties, inverse Laplace transforms, Application to solution of linear differential equations up to 2^{nd}order – simple problems.		

	Unit – IV VECTOR DIFFERENTIATION Introduction, Scalar point functions, Vector point functions, Vector differential operator V , Gradient, Divergence, Curl,Solenoidal, irrotational. Identities.
	Unit – V VECTOR INTEGRATION Line, surface and volume integrals, Gauss, Stoke's and Green's theorems (without proofs). Simple problems on these.

Book for Reference:

1. S. Narayanan and T.K. ManickavasagamPillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai
2. P. Duraipandian and S.UdayaBaskaran, Allied Mathematics, Vol. I & II Muhil-Publications Chennai

SEMESTER III

Title of the Course/	Paper –V	PROGRAMMING IN C++ AND DATA STRUCTURES	
Core	II Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in C++ and Data Structures		
Course outline	Unit 1: Introduction to C++; Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Pointers - Functions in C++ - Main Function -Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions		
	Unit-2: Classes and Objects; Constructors and Destructors; and Operator Overloading and Type Conversions - Type of Constructors - Function overloading. Inheritance : Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance. Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations.		

	Unit 3: Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments. Data Structures: Definition of a Data structure - primitive and composite Data Types, Asymptotic notations, Arrays, Operations on Arrays, Order lists.
	Unit-4:Stacks - Applications of Stack - Infix to Postfix Conversion, Recursion, Maze Problems - Queues- Operations on Queues, Queue Applications, Circular Queue. Singly Linked List- Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List - Operations, Applications.
	Unit-5 : Trees and Graphs: Binary Trees - Conversion of Forest to Binary Tree, Operations - Tree Traversals; Graph - Definition, Types of Graphs, Hashing Tables and Hashing Functions, Traversal - Shortest Path; Dijkstra's Algorithm.

PROGRAMMING IN C++ AND DATA STRUCTURES

1. Recommended Texts

i. E. Balagurusamy,1995,Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.

ii..E.Horowitz and S.Shani,1999,Fundamentals of Data Structures in C++ , Galgotia Pub.

2.Reference Books

i. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.

ii.. H.Schildt, C++,1998,The Complete Reference-1998-TMH Edition, 1998

iii.R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C, PHI.

Title of the Course/	Paper - VI - MICROPROCESSORS AND ITS APPLICATIONS		
Core	II Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Microprocessors.		
Course outline	Unit 1: Introduction to microcomputers-microprocessor and assembly languages-microprocessor architecture and its operations-8085 MPU-8085 instruction set and classifications		
	Unit 2: Writing assembly level programs-programming techniques such as looping-counting and indexing addressing modes-data transfer instructions-arithmetic and logic operations-dynamic debugging		
	Unit 3:Counters and time delays-hexadecimal counter modulo 10 counter-pulse timings for flashing lights-debugging counter and time delay program-stack-subroutine-conditional call and return instructions		

	Unit 4:BCD to binary and binary to BCD conversions-BCD to HEX and HEX to BCD conversions-ASCII to BCD to ASCII conversions-BCD to seven segment LED code conversions-binary to ASCII and ASCII to binary conversions-multi byte addition-multi byte subtraction-BCD addition-BCD subtraction-multiplication and division
	Unit 5:Interrupt-implementing interrupts-multiple interrupt 8085-trap-problems on implementing 8085 interrupt-DMA memory interfaces-RAM & ROM –I/O interface-direct I/O memory mapped I/O.

Recommended Texts

i. R.S.Ganokar-1990-Microprocessor architecture-Programming and Application with 8085/8080A-Wiley Eastern Limited.

ii. A.Mathur-1993-Introduction to Microprocessor-3rd Edition-Tata McGraw Hill.

Title of the Course/	Paper - VII NUMERICAL AND STATISTICAL METHODS	
Core	II Year & Third Semester	Credit: 4
Objective of the course	This course introduces the concepts of Numerical Analysis and Statistical Methods	
Course outline	Unit-1: Introduction- Mathematical Preliminaries- Errors: Computations, Formula - Errors in a Series Approximation- Roots of Equations- Linear Equations: Bisection , False Position Methods- Newton-Raphson Method- Secant Method- Muller's Method- Lin-Bairstow's Method- Simultaneous Linear Equations: Matrix Inversion Method- Gauss Elimination, Gauss-Jordan, LU Decomposition Methods- Gauss-Seidel Method.	

	Unit-2: Numerical Differentiation- Errors in Numerical Differentiation- Cubic Spline Method- Numerical Integration- Trapezoidal Rule- Simpson's 1/3 and 3/8 Rules- Romberg Integration- Ordinary Differential Equations- Taylor's Series Method- Euler's Method- Runge-Kutta 2nd and 4th Order Methods-Predictor-Corrector Methods.
	Unit-3: Sampling- Frequency Distribution- Cumulative Frequency Function- Grouped Sample- Measures of Central Tendency: Mean, Median and Mode- Geometric Mean- Harmonic Mean – Dispersion: Range, Mean Deviation, Variance and Standard Deviation- Moments- Computation of Moments
	Unit-4:Probability- Characteristics: Addition, Multiplication and Conditional Probability Laws- Discrete Distributions: Random Variable- Density and Distribution Functions.- Binomial Distribution- Poisson Distribution- Hypergeometric Distribution- Mathematical Expectation.
	Unit-5 : Correlation and Regression Analysis: Linear Least Squares Fit- Nonlinear Fit- Fitting a Polynomial Function- Coefficient of Correlation- Properties- Multiple Correlation – Partial Correlation- Rank Correlation- Tests of Significance- Chi square Test- Goodness of Fit, Algorithm and Analysis of Contingency Tables- *t*-Test and F-Test.

NUMERICAL AND STATISTICAL METHODS

1.Recommended Texts

i. S.S.Sastry, 2005,Introductory Methods of Numerical Analysis, 4th Edition, Prentice- Hall of India Pvt. Ltd..

ii.E.Balagurusamy , 2000, Computer Oriented Statistical and Numerical Methods- Macmillan India Ltd.

2. Reference Books

i. V. Rajaraman,2005, Computer Oriented Numerical Methods, 3rd Edition, Prentice- Hall of India Pvt. Ltd..

ii. K. S. Trivedi,2005,Probability and Statistics with Reliability, Queuing and Computer Science Applications, Prentice-Hall of India Pvt. Ltd.

iii.E. Balagurusamy,1999, Numerical Methods, Tata McGraw-Hill Publishing Co. Ltd..

iv. P. Niyogi,2003,Numerical Analysis and Algorithms, Tata McGraw-Hill Publishing Co. Ltd..

Title of the Course/	Paper - VIII Practical – III PROGRAMMING IN C++ USING DATA STRUCTURES		
Core	II Year & Third Semester	Credit: 3	
Objective of the course	This course deals with practical implementation of Data Structure using C++.		

Course outline	1. Implement PUSH, POP operations of stack using Arrays. 2. Implement PUSH, POP operations of stack using Pointers. 3. Implement add, delete operations of a queue using Arrays. 4. Implement add, delete operations of a queue using Pointers. 5. Conversion of infix to postfix using stack operations 6. Postfix Expression Evaluation. 7. Addition of two polynomials using Arrays and Pointers. 8. Creation, insertion, and deletion in doubly linked list. 9. Binary tree traversals (in-order, pre-order, and post-order) using linked list. 10.Depth First Search and Breadth first Search for Graphs using Recursion.

Title of the Course/ Paper -III	ALLIED PAPER III FINANCIAL ACCOUNTING		
Allied	II Year & Third Semester	Credit: 4	

Objective of the course	This course introduces the concepts of Financial Accounting.
Course outline	Unit-1: Meaning and scope of accounting –Basic Accounting concepts and conversions – Objectives of Accounting – Accounting transactions – Double entry book keeping – journal, Ledger, preparation of Trial Balance – Preparation of Cash Book
	Unit-2: Preparation of Final accounts of sole trading concerns – Adjustments to final accounts.
	Unit-3: Classification and rectification of errors – Preparation of suspense Account – Bank Reconciliation Statements.
	Unit-4:Depreciation – Meaning, causes, types – problems based on straight line and diminishing Balance methods.
	Unit-5 :Meaning, Features, defects, Statements of Affairs method and conversion method. (Problems on statement of Affairs method only)

FINANCIAL ACCOUNTING

1.Recommended Texts & Reference

1. Gupta R.L, Advanced Accountancy, S.Chand, Delhi.
2. Agarwala A.N, Higher Science of Accountancy, KitabMahal,Allahabad.
3. S.P. Jain and K.L. Narang, Financial Accounting
4. M.C.Shukla and T.S.Grawel, AdavncedAccounts(Vol. I)

5.Gillespie Accounting system, Procedure & methods, Prentice Hall India Ltd, New Delhi.

SEMESTER IV

Title of the Course/	Paper-IX PROGRAMMING IN JAVA		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in JAVA		
Course outline	Unit-1: Introduction to Java-Features of Java-Basic Concepts of Object Oriented Programming-Java Tokens-Java Statements-Constants-Variables-Data Types-Type Casting-Operators-Expressions-Control Statements: Branching and Looping Statements.		
	Unit-2:Classes, Objects and Methods - Constructors - Methods Overloading-Inheritance-Overriding Methods-Finalizer and Abstract Methods-Visibility Control –Arrays, Strings and Vectors-StringBuffer Class-Wrapper Classes		
	Unit-3:Interfaces-Packages-Creating Packages-Accessing a Package-Multithreaded Programming-Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization-Implementing the Runnable Interface		
	Unit-4:Managing Errors and Exceptions-Syntax of Exception Handling Code-Using Finally Statement-Throwing Our Own Exceptions-Applet Programming-Applet Life Cycle-Graphics Programming-Managing Input/Output Files: Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes – Using Streams-Using the File Class-Creation of Files-Random Access Files-Other Stream Classes.		
	Unit-5 : Network basics –socket programming – proxy servers – TCP/IP – Net Address – URL – Datagrams -Java Utility Classes-Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes- Working with Frames-Working with Graphics-Working with Color-Working with Fonts-Using AWT Controls, Layout Managers and Menus.		

PROGRAMMING IN JAVA

1. Recommended Texts

i. E. Balagurusamy ,2004,Programming with JAVA-2nd Edition, Tata McGraw-Hill Publishing Co.Ltd, New Delhi.

ii. Herbert Schildt,The Complete Reference Java™ , 2- 5thEdition,Tata McGraw-Hill Publishing Co. Ltd,New Delhi.

2. Reference Books

i. Y. Daniel Liang ,2003, An Introduction to JAVA Programming ,Prentice-Hall of India Pvt. Ltd.

ii. Cay S. Horstmann and Gary Cornell,2005,Core Java™2 Volume I,Fundamental 7thEdition,Pearson Education.

Title of the Course/	Paper-X OPERATING SYSTEMS		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the functions of operating systems.		
Course outline	Unit 1:Introduction: Views –Goals –Types of system – OS Structure – Components – Services - System Structures – Layered Approach -Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process –Threads - Interprocess Communication. CPU Scheduling : CPU Schedulers – Scheduling criteria – Scheduling Algorithms		
	Unit-2:– Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region – Monitors. Deadlock : Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.		
	Unit 3: Memory Management : Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation . Non Contiguous Allocation: Paging and Segmentation schemes –Implementation – Hardware Protection – Sharing - Fragmentation.		
	Unit-4:VirtualMemory :: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure –Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management.		
	Unit-5 : I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance. Secondary Storage Structures : Protection – Goals- Domain Access matrix – The security problem – Authentication – Threats – Threat Monitoring – Encryption..		

OPERATING SYSTEMS

1. Recommended Texts

i. Silberschatz A., Galvin P.B., Gange,. 2002 , Operating System Principles ,Sixth Edition, John Wiley & Sons.

2.Reference Books

i. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition, Addison Wesley.

Title of the Course/	Paper-XI COMPUTER GRAPHICS		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Computer Graphics.		
Course outline	Unit-1: Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.		
	Unit-2: Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms – Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions .		
	Unit-3: Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms – Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions .		
	Unit-4:Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification – Polygon Surfaces: Polygon Tables, Plane Equations and Polygon Meshes - Three-Dimensional Transformations: Basic, Other and Composite Transformations.		
	Unit-5 : Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer and A-Buffer Methods – -Wireframe Methods.		

1.Recommended Texts

i. D.Hearn and M.P. Baker, 2005, Computer Graphics , C Version,2nd Edition , Pearson Education , New Delhi.

2. Reference Books

i. W.M.Newman and R.F.Sproull,1997,2nd Edition ,Principles of Interactive

Computer Graphics, Tata McGraw-Hill Publishing Co. Ltd.

Ii .D.P.Mukherjee,1999,Fundamentals of Computer Graphics and Multimedia,

1st Edition, Prentice-Hall of India Pvt. Ltd. – 1999.

iii .N. Krishnamurthy ,2002,Introduction to Computer Graphics, 1st Edition,

Tata McGraw-Hill Publishing Co. Ltd..

iv. D.F.Rogers , 2001, Procedural Elements for Computer Graphics , 2nd Edition ,

Tata McGraw-Hill Publishing Co. Ltd..

v.. Xiang and R.A. Plastock ,2002 ,Computer Graphics , Schaum's Outline

Series, Tata McGraw-Hill Publishing Co.

Title of the Course	Paper- XII JAVA PROGRAMMING LAB		
Core	II Year & Fourth Semester	Credit: 4	
Course outline	APPLICATIONS: 1. Substring Removal from a String. Use String Buffer Class. 2. Determining the Perimeter and Area of a Triangle. Use Stream Class. 3. Determining the Order of Numbers Generated randomly using Random Class. 4. Usage of Calendar Class and Manipulation. 5. Implementation of Point Class for Image Manipulation. 6. String Manipulation Using Char Array. 7. Database Creation for Storing E-mail Addresses and Manipulation. 8. Usage of Vector Classes. 9. Interfaces and Packages 10. Implementing Thread based Applications and Exception Handling. 11. Application using Synchronization such as Thread based, Class based and Synchronized Statements.		

	12. Textfiles (copy, display, counting characters, words and lines) 13. Data file creating and processing for electricity billing. 14. Data file creating and processing for telephone billing APPLETS: 15. Working with Frames and Various Controls. 16. Working with Dialog Box and Menus. 17. Working with Colors and Fonts. 18. Drawing various shapes using Graphical statements. 19. Working with panel and all types of Layout. 20. Design a simple calculator with minimal of 10 operations 21. Usage of buttons, labels, text components in suitable application 22. Usage of Radio buttons, check box ,choice list in suitable application

Title of the Course/	ALLIED PAPER IV COST AND MANAGEMENT ACCOUNTING		
Allied	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Cost and Management Accounting		
Course outline	Unit-1: Cost Accounting: Definition, Meaning and objectives - Distinction between Cost and Financial Accounting. Elements of cost and preparation of cost sheets and tender. Management Accounting – Definition and objectives – Distinction between management and financial accounting.		

	Unit-2: Stores Records - Purchase Order - Goods Received. Note - Bin Card - Stores Ledger - Purchase, Receipt and Inspection - Inventory Control - ABC Analysis - Economic Ordering Quantity - Maximum, Minimum and Reordering levels - Methods of Pricing Issued. Labour: Importance of Labour Cost Control - Various Methods of Wage Payment - Calculation of wages - Methods of Incentive for Schemes
	Unit-3:Overheads: Factory, Administration, Selling and Distribution of overheads - Classification - Allocation and Apportionment-Redistribution (Secondary Distribution) - Absorption of Over heads including 'Machine Hour Rate
	Unit-4:Funds Flow and Cash Flow Analysis: Schedule of changes in working capital - Preparation of 'funds flow statement'-Preparation of 'Cash Flow Statement' - Importance of funds flow and cash flow Analysis - Difference between funds flow and cash flow. Ratio Analysis : Utility and limitations of Accounting Ratios - calculation of Accounting Ratios - Ratio Analysis for Liquidity, Solvency, Profitability and Leverage.
	Unit-5 :Marginal Costing: The Concept - Break Even Analysis - Break - Even Chart - Importance and assumptions - Application of Profit Volumes Ratio - Different types of problems (with special emphasis on decision making problems). Budget and Budgetary Control : Procedure and Utility - Preparation of different types of Budget including Flexible Budget

COST AND MANAGEMENT ACCOUNTING

1.Recommended Texts & Reference

1. Wheldon A.J., Cost Accounting and Costing Methods.
2. Iyengar S.P., Cost Accounting : Principles and Practice.
3. Bhar B.K., Cost Accounting : Methods and problems.
4. Bigg W.W., Cost Accounts.
5. Prasad N.K, Cost Accounting : Principles and Problems.
6. Jain S.P. and Narang K.L., Advanced Cost Accounting.
7. Agarwal M., Theory and Practices of Cost Accounting
8. Robert Anthony : Management Accounting : Text and cases.
9. Maheswari S.N., Principles of Management Accounting.

SEMESTER V

Title of the Course/	Paper-XIII DATABASE MANAGEMENT SYSTEMS		
Core	III Year & Fifth Semester	Credit: 4	

Objective of the course	This course introduces the basic concepts of database management systems
Course outline	Unit-1: Advantages and Components of a Database Management Systems – Feasibility Study – Class Diagrams – Data Types – Events – Normal Forms – Integrity – Converting Class Diagrams to Normalized Tables – Data Dictionary.
	Unit-2: Query Basics – Computation Using Queries – Subtotals and GROUP BY Command – Queries with Multiple Tables – Subqueries – Joins – DDL & DML – Testing Queries
	Unit-3: Effective Design of Forms and Reports – Form Layout – Creating Forms – Graphical Objects – Reports – Procedural Languages – Data on Forms – Programs to Retrieve and Save Data – Error Handling.
	Unit-4:Power of Application Structure – User Interface Features – Transaction – Forms Events – Custom Reports – Distributing Application – Table Operations – Data Storage Methods – Storing Data Columns – Data Clustering and Partitioning.
	Unit-5 : Database Administration – Development Stages – Application Types – Backup and Recovery – Security and Privacy – Distributed Databases – Client/Server Databases – Web as a Client/Server System – Objects – Object Oriented Databases – Integrated Applications.

Recommended Texts

1.G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

Reference Books

1.RaghuRamakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.
2.C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley - 2000.

Title of the Course/	Paper -XIV SOFTWARE ENGINEERING

Core	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Life Cycle of Software		
Course outline	Unit-1: Introduction to Software Engineering Some definition – Some size factors – Quality and productivity factors – Managerial issue. Planning a Software Project: Defining the problem – Developing a solution strategy – planning the development process – planning an organization structure – other planning activities		
	Unit-2: Software Cost Estimation: Software – Cost factors – Software cost estimation techniques – specification techniques – level estimation – estimating software maintenance costs.		
	Unit-3: Software requirements definition: The software requirements specification – formal languages and processors for requirements specification.		
	Unit-4:Software Design: Fundamental Design concepts – Modules and modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection – Design guide lines		
	Unit-5 : Verification and validation techniques: Quality assurance – Static analysis – symbolic exception – Unit testing and Debugging – System testing – Formal verification. Software maintenance: Enhancing maintainability during development – Managua aspects of software maintenance – Configuration management – source code metrics – other maintenance tools and techniques.		

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1. Recommended Texts

i. Richard E.Fairly - Software Engineering Concepts - Tata McGraw-Hill book Company.

2. Reference Books

i. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.

ii. Rajib Mall ,2004,Fundamentals of Software Engineering,2nd Edition, PHI.

Title of the Course/	Paper -XV RESOURCE MANAGEMENT TECHNIQUES		
Core	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Resource Management Technique		
Course outline	Unit-1: Basics of Operations Research (OR): Characteristics of O.R - Necessity of O.R in Industry -OR and Decision making - Role of computers in O.R. Linear programming: Formulations and Graphical solution (of 2 variables) canonical & standard terms of Linear programming problem. Algebraic solution: Simplex method.		
	Unit-2: Algebraic solution: Charnes method of penalties - two phase simplex method - concept of Duality - properties of duality - Dual simplex method.		
	Unit-3: Transportation model: Definition - formulation and solution of transportation models - the row - minima, column - minima, matrix minima and vogel's approximation methods. Assignment model: Definition of Assignment model - comparison with transportation model - formulation and solution of Assignment model - variations of Assignment problem.		
	Unit-4:Sequencing problem: Processing each of n jobs through m machines - processing n jobs through 2 machines - processing n jobs through 3 machines - processing 2 jobs through m machines - processing n jobs through m machines - travelling salesman problem. Game Theory: Characteristics of games -Maximin, Minimax criteria of optimality - Dominance property - algebraic and graphical method of solution of solving 2 x 2 games.		
	Unit-5 : Pert - CPM: Networks - Fulkerson's Rule - measure of activity - PERT computation - CPM computation - resource scheduling. Simulation: Various methods of obtaining random numbers for use in computer simulation - Additive, multiplicative and mixed types of congruence random number generators - Monte Carlo method of simulation - its advantages and disadvantages.		

RESOURCE MANAGEMENT TECHNIQUES

1.Recommended Texts

i. Hamdy A. Taha: ,1996,Operation Research - An Introduction, 5th edition, Prentice Hall of India, Pvt. Ltd., New Delhi .

ii.. Ackoff R.L. and Sasieni M. W,1968, Fundamentals of Operations Research, John Wiley and sons, New York.

iii. Charnes A. Cooper W. and Hendersen A.,1953, Introduction to Linear Programming, Wiley and Sons, New York.

iv. Srinath L.S,1973, PERT and CPM principles and applications, Affiliated East West Press Pvt. Ltd., New York .

Title of the Course/	Paper _XVI RDBMS LAB		
Core	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course gives an exposure to visual programming using Visual Basic software.		

Course outline	Creation of a Database and performing the operations given below using a Menu Driven Program. a) Insertion b)Deletion c) Modification d) Generating a Simple report for the following: 1. Payroll 2. Mark sheet Processing 3. Saving Bank account for banking 4. Inventory System 5. Invoice system 6. Library information system 7. Student information system 8. Income tax processing system 9. Electricity bill preparation system 10. Telephone directory maintenance

ELECTIVE – I

Title of the Course	VISUAL PROGRAMMING		
Elective	III Year & Fifth Semester	Credit: 4	
Objective of the course	To inculcate knowledge on Visual Basic concepts and Programming.		
Course outline	Unit 1: Customizing a Form - Writing Simple Programs - Toolbox - Creating Controls - Name Property - Command Button - Access Keys - Image Controls - Text Boxes - Labels - Message Boxes - Grid - Editing Tools - Variables - Data Types - String - Numbers.		
	Unit-2: Displaying Information - Determinate Loops - Indeterminate Loops - Conditionals - Built-in Functions - Functions and Procedures.		
	Unit 3: Lists - Arrays - Sorting and Searching - Records - Control Arrays - Combo Boxes - Grid Control - Projects with Multiple forms - DoEvents and Sub Main - Error Trapping.		
	Unit-4:VB Objects - Dialog Boxes - Common Controls - Menus - MDI Forms - Testing, Debugging and Optimization - Working with Graphics.		
	Unit-5 : Monitoring Mouse activity - File Handling - File System Controls - File System Objects - COM/OLE - automation - DLL Servers - OLE Drag and Drop.		

1. Recommended Texts

1. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill - 1999.
2. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill – 1999

SEMESTER – VI

Title of the Course/	Paper-XVII WEB TECHNOLOGY	
Core	III Year & Sixth Semester	Credit: 4
Objective of the course	This course introduces the concepts of ASP, VB Script, Java Script.	
Course outline	Unit 1: Introduction to VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators – mathematical- comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – type casting variables - math functions –date functions – string functions –other functions - VBScript Coding Conventions - Dictionary Object in VBScript - Err Object	
	Unit-2: Introduction to Javascript – Advantages of Javascript – Javascript syntax - Data type –Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box .	
	Unit 3: Javascript document object model – Introduction – Object in HTML – Event Handling – Window object – Document object – Browser object – Form object – Navigator object – Screen object – Build in object – User defined object – Cookies.	
	Unit-4: ASP.NET Language Structure – Page Structure – Page event , Properties & Compiler Directives . HTML server controls – Anchor, Tables, Forms, Files . Basic Web server Controls – Label, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List Web Server Controls – Check box list. Radio button list, Drop down list, List box, Data grid, Repeater.	
	Unit-5: Request and Response Objects, Cookies, Working with Data – OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced issues – email, Application issues, working with IIS and page Directives , error handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates	

1.Recommended Texts

i.I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.

ii. A.Russell Jones, Mastering Active Server Pages 3, BPB Publications.

2. Reference Books

i. HathleenKalata, Internet Programming with VBScript and JavaScript, Thomson Learning

ii. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications

iii. T.A. Powell, 2002,Complete Reference HTML , TMH.
iv. J.Jaworski, 1999, Mastering Javascript, BPB Publications.
v. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2009.

Title of the Course/	Paper-XVIII DATA COMMUNICATION AND NETWORKING		
Core	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Networking		
Course outline	Unit-1: Introduction to Data Communication, Network, Protocols & standards and standards organizations - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.		
	Unit-2: Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.		
	Unit-3: Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet - Token Bus - Token Ring - FDDI - IEEE 802.6 - SMDS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.		
	Unit-4:History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol - ATM - ATM Topology - ATM Protocol.		
	Unit-5 :Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.		

1. Recommended Texts

i.Behrouz and Forouzan,2001,Introduction to Data Communication and Networking, 2nd Edition,TMH.

2. Reference Books

i.JeanWalrand 1998,Communication Networks (A first Course),Second Edition, WCB/McGraw Hill.

ii. Behrouz and Forouzan,2006,Data Communication and Networking,3nd Edition, TMH.

Title of the Course/	Paper -XIX SOFTWARE TESTING		
Core	III Year & Sixth Semester	Credit:4	
Objective of the course	This course introduces the basic concepts of software testing		
Course outline	Unit-1: Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.		
	Unit-2: Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques		
	Unit-3: Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing .		
	Unit-4:Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases .		
	Unit-5 : Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.		

1. Recommended Texts

i. B. Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi.
ii. K.V.KK. Prasad , 2005, Software Testing Tools, DreamTech. India, New Delhi.

2. Reference Books

i. Burnstein, 2003, Practical Software Testing, Springer International Edn.
ii. E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
iii. R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi.

Title of the Course/	Paper –XX Practical – VI -WEB APPLICATIONS LAB		
Core	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course gives training in web design and applications.		
Course outline			

VB SCRIPT & JAVASCRIPT

1. Write a program outputs the squares, roots, cubes and complements of integers between 1 and 100.
2.Create a calculator.
3. Write a script to Sort numbers and strings
4. Create a program to generate a hit counter
5. Create a program to verify whether email address provided by user is valid or invalid.
6. Write a program to scroll the text on status bar.
7. The form consists of two multiple choice list and one single choice list
a. the first multiple choice list display the major dishes available.
b. the second Multiple choice list display the stocks available.
c. The single choice list display the miscellaneous
(Milkshakes, soft drinks, softy available etc.)
8. Write a sript to create a digital clock.
9. Create a web page using two image file which switch black and white one another as the mouse pointer moves over the image. Use the On Mouse over and On Mouse event, onDblclick handler
10. Build a WWW page with an image and 3 buttons., Pick three favorite graphics, Label the buttons and make each one swap in the graphic you have chosen
11. Create a frameset that has two frames, side by side.

Make the left-hand frame contain a form with 3 radio buttons

The buttons should be for three search engines:

- Yahoo (http://www.yahoo.com)

- Altavista (http://www.altavista.com)
- Infoseek (http://www.infoseek.com)

When the user clicks on of the option buttons, the frame on the right hand side should be loaded with the right search engine.

12.Write a program to implement Employee database with all validation

ASP

1. Create a login form, to expire, if the user does not type the password within 100 seconds
2.Create an employee database and manipulate the records using command object in ASP
3. Develop an application to illustrate the usage of Request and Response Objects in ASP.
4. Write an ASP program using Request Object to give the exact list of headers sent by the browser to the Web server.
5. Create an Active Server Page to display the records one by one from a student database. The student database should contain roll no, name, marks & total.
7. Design an ASP application that describes books in the Online Bookshop.(Use AD Rotator Component, Content Rotator Component, Content Linking Component)
8. Create a document and add a link to it. When the user moves the mouse over the link it should load the linked document on its own (User is not required to click on the link).
9. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.
10. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

Title of the Course/ Paper	OBJECT ORIENTED ANALYSIS AND DESIGN		
Elective	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces to UML, object oriented analysis and design of any application		
Course outline	Unit-1: System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.		
	Unit-2: Use-Case Models - Object Analysis - Object relations - Attributes - Methods - Class and Object responsibilities - Case Studies.		
	Unit-3: Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.		
	Unit-4:User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.		
	Unit-5 : Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.		

Recommended Texts

1. Ali Bahrami - Object Oriented Systems Development - McGraw Hill International Edition - 1999.

2. Grady Booch- Object Oriented Analysis and design –Addison Wesley.

ELECTIVE III

Title of the Course	MULTIMEDIA SYSTEMS		
Elective	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course gives an exposure to Multimedia and its applications.		
Course outline	Unit-1: What is Multimedia: Definitions - CD-ROM and the Multimedia Highway - Where to use Multimedia - Introduction to MakingMultimedia: The stages of a Project - What You Need - MultimediaSkills and Training: The team - Macintosh and Windows ProductionPlatforms: Macintosh Versus PC - The Macintosh Platform - The Windows Multimedia PC Platform - Networking Macintosh and Windows Computers-Hardware Peripherals: Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices.		
	Unit-2: Basic Tools: Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image-Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools - Helpful Accessories - Making InstantMultimedia: Linking Multimedia Objects - Office Suites - Word Processors - Spreadsheets - Databases - Presentation Tools.Multimedia Authoring Tools: Types of Authoring Tools - Card-and-Page-Based Authoring Tools - Icon-Based Authoring Tools - Time-Based Authoring Tools - Object-Oriented Authoring Tools - Cross-Platform Authoring Notes		
	Unit-3: Text: The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Sound: The Power of Sound - Multimedia System Sounds - MIDI Versus Digital Audio - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your Multimedia Project - Toward Professional Sound: The Red Book Standard - Production Tips		
	Unit-4:Images: Making Still Images -Color - Image File Formats. Animation: The Power of Motion - Principles of Animation - Making Animations That Work - Video: Using Video - How Video works - Broadcast Video Standards - Integrating Computers and Television - Shooting and Editing Video - Video Tips - Recording Formats - Digital Video.		

	Unit-5:.Planning and Costing : Project Planning - Estimating - RFPs and Bid Proposals - Designing and Producing : Designing - Producing - Content and Talent : Acquiring Content - Using Content Created by Others - Using Content Created for a Project - Using Talent -Delivering : Testing - Preparing for Delivery - Delivering on CD-ROM - Compact Disc Technology - Wrapping It Up - Delivering on the World Wide Web.

Recommended Texts:

a. Tay Vaughan - Multimedia: Making it Work. - Fourth Edition - Tata McGraw Hill Edition - 1999.
b) Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London - 1991.
c) John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.