M.C.A. – Master of Computer Applications

CURRICULUM & SYLLABI

Regulations 2016

(Applicable to candidates admitted in the academic year 2016-2017 onwards)

K.S.R. College of Engineering

(Autonomous)
K.S.R. Kalvi Nagar, Tiruchengode – 637 215
Namakkal (Dt), Tamilnadu, India
Email : info@ksrce.ac.in Website : www.ksrce.ac.in

	K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE, New Delhi & Affiliated to Anna University) **K.S.R. Kalvi Nagar, Tiruchengode – 637 215**	**CURRICULUM** **PG** **R - 2016**

Department	Master of Computer Applications
Programme	M.C.A – Master of Computer Applications

SEMESTER - I

Sl. No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	BA16131	Accounting and Financial Management	FC	3	2	0	4	30	70	100
2.	CA16112	Digital Fundamentals and Computer Organization	PC	3	2	0	4	30	70	100
3.	CA16113	Data Structures	PC	3	0	0	3	30	70	100
4.	CA16114	Database Management Systems	PC	3	0	0	3	30	70	100
5.	CA16115	Problem Solving Using 'C'	PC	3	0	0	3	30	70	100
PRACTICAL										
6.	CA16121	Data Structures Lab	PC	0	0	3	2	50	50	100
7.	CA16122	Database Management Systems Lab	PC	0	0	3	2	50	50	100
8.	CA16123	C Programming Lab	PC	0	0	3	2	50	50	100
						Total Credits	**23**			**800**

SEMESTER - II

Sl. No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	CA16211	Operating Systems	PC	3	0	0	3	30	70	100
2.	CA16212	Design and Analysis of Algorithms	PC	3	0	0	3	30	70	100
3.	MA16233	Discrete Structures	FC	3	2	0	4	30	70	100
4.	EC16234	Microprocessor and its Applications	FC	3	2	0	4	30	70	100
5.	CA16215	Object Oriented Programming Using C++	PC	3	0	0	3	30	70	100
PRACTICAL										
6.	CA16221	Algorithms Lab	PC	0	0	3	2	50	50	100
7.	EC16252	Microprocessor and Microcontroller Laboratory	FC	0	0	3	2	50	50	100
8.	CA16223	Object Oriented Programming Lab	PC	0	0	3	2	50	50	100
						Total Credits	**23**			**800**

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SEMESTER - III

Sl. No.	Course Code	Course Name	Category	Hours/ Week		Credit		Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	CA16311	Data Communication and Networks	PC	3	0	0	3	30	70	100
2.	CA16312	Software Engineering	PC	3	2	0	4	30	70	100
3.	CA16313	Java Programming	PC	3	0	0	3	30	70	100
4.	CA16314	Computer Graphics and Multimedia	PC	3	2	0	4	30	70	100
5.	CA16315	Information Security	PC	3	0	0	3	30	70	100
PRACTICAL										
6.	CA16321	Networks Lab	PC	0	0	3	2	50	50	100
7.	CA16322	Java Programming Lab	PC	0	0	3	2	50	50	100
8.	CA16323	Computer Graphics and Multimedia Lab	PC	0	0	3	2	50	50	100
9.	HR16041	Career Building Skills – I	EEC	0	2	0	0	50	50	100
			Total Credits				**23**			**900**

SEMESTER - IV

Sl. No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	CA16411	C# and .NET	PC	3	2	0	4	30	70	100
2.	CA16412	Object Oriented Analysis and Design	PC	3	2	0	4	30	70	100
3.	CA16413	Web Technology	PC	3	0	0	3	30	70	100
4.		Elective I	PE	3	0	0	3	30	70	100
5.		Elective II	PE	3	0	0	3	30	70	100
PRACTICAL										
6.	CA16421	C# and .Net Lab	PC	0	0	3	2	50	50	100
7.	CA16422	Web Technology Lab	PC	0	0	3	2	50	50	100
8.	CA16423	Mini Project	PC	0	0	3	2	50	50	100
9.	HR16042	Career Building Skills II	EEC	0	2	0	0	50	50	100
			Total Credits				**23**			**900**

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SEMESTER - V

Sl. No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	CA16511	Cloud Computing	PC	3	2	0	4	30	70	100
2.	CA16512	Software Testing & Quality Assurance	PC	3	0	0	3	30	70	100
3.	CA16513	Mobile Application Development	PC	3	2	0	4	30	70	100
4.	CA16514	PHP and MySQL	PC	3	0	0	3	30	70	100
5.		Elective III	PE	3	0	0	3	30	70	100
PRACTICAL										
6.	CA16521	Software Testing Lab	PC	0	0	3	2	50	50	100
7.	CA16522	PHP and MySQL Lab	PC	0	0	3	2	50	50	100
8.	CA16523	Mobile Application Development Lab	PC	0	0	3	2	50	50	100
9.	CA16524	Project Phase – I	EEC	0	0	3	2	50	50	100
			Total Credits				**25**			**900**

SEMESTER - VI

Sl. No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
PRACTICAL										
1.	CA16621	Project Phase – II	EEC	0	0	24	12	50	50	100
			Total Credits				**12**			**100**

Chairman (BoS)

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Department	Master of Computer Applications
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LIST OF ELECTIVES

Sl. No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
01.	CA16461	Complier Design	3	0	0	3	30	70	100
02.	CA16462	TCP/IP	3	0	0	3	30	70	100
03.	CA16463	Unix and Network Programming	3	0	0	3	30	70	100
04.	CA16464	Component Based Technology	3	0	0	3	30	70	100
05.	CA16465	Database Technologies	3	0	0	3	30	70	100
06.	CA16466	Unix Internals	3	0	0	3	30	70	100
07.	CA16467	Enterprise Computing	3	0	0	3	30	70	100
08.	CA16468	Software Agent	3	0	0	3	30	70	100
09.	CA16469	Middleware Technology	3	0	0	3	30	70	100
10.	CA16471	Distributed Computing	3	0	0	3	30	70	100
11.	CA16472	Supply Chain Management	3	0	0	3	30	70	100
12.	CA16473	Web Graphics	3	0	0	3	30	70	100
13	CA16474	Agent Based Intelligent Systems	3	0	0	3	30	70	100
14.	CA16475	Network Administration	3	0	0	3	30	70	100
15.	CA16476	Software Project Management	3	0	0	3	30	70	100
16.	CA16477	Advanced Operating Systems	3	0	0	3	30	70	100
17.	CA16478	Artificial Intelligence	3	0	0	3	30	70	100
18.	CA16479	E-Learning Technology	3	0	0	3	30	70	100
19.	BA16486	Organizational Behavior	3	0	0	3	30	70	100
20.	BA16487	Health Care Information Systems	3	0	0	3	30	70	100
21.	MA16488	Operations Research	3	0	0	3	30	70	100
22.	CA16561	Soft Computing	3	0	0	3	30	70	100
23.	CA16562	Digital Image Processing	3	0	0	3	30	70	100
24.	CA16563	High Speed Networks	3	0	0	3	30	70	100
25.	CA16564	Artificial and Neural Networks	3	0	0	3	30	70	100
26.	CA16565	Mobile Computing	3	0	0	3	30	70	100
27.	CA16566	Natural Language Processing	3	0	0	3	30	70	100
28.	CA16567	Data Mining and Data Warehousing	3	0	0	3	30	70	100
29.	CA16568	Bio-Informatics	3	0	0	3	30	70	100
30.	CA16569	System Software	3	0	0	3	30	70	100
31.	CA16571	Cryptography and Network Security	3	0	0	3	30	70	100
32.	BA16586	Electronic Commerce	3	0	0	3	30	70	100

PC - PROFESSIONAL CORE

EEC - EMPLOYABILITY ENHANCEMENT COURSE

FC - FOUNDATION COURSES

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - I

		L	T	P	C
BA16131	**ACCOUNTING AND FINANCIAL MANAGEMENT**	3	2	0	4

Objectives:

- *To learn the accounting principles and preparation of final accounts.*
- *To understand costing and various cost methods.*
- *To analyze various financial statements.*
- *To study about budgets and budgetary control.*
- *To gain knowledge in financial management and investment decisions.*

UNIT - I FINANCIAL ACCOUNTING [12]

Financial Accounting - Definition - Accounting Principles - Concepts and Conventions - Journalizing Transactions and Ledger Posting - Trial Balance. Final Accounts: Trading Account - Profit and Loss Account - Balance Sheet. Depreciation: Straight Line Method - Written Down Value Method.

UNIT - II COST ACCOUNTING [12]

Meaning – Objectives - Elements of Cost – Components - Cost Sheet – Classification – Methods. Marginal Costing and Cost Volume Profit Analysis - Break Even Analysis. Methods of Valuing Material Issue: FIFO – LIFO – Weighted Average Cost Method – Standard Price Method.

UNIT - III FINANCIAL ANALYSIS [12]

Financial Statement Analysis - Types - Techniques - Ratios Analysis - Classification of Ratios - Funds Flow Analysis: Preparation of Fund Flow Statement - Cash Flow Analysis: Preparation of Cash Flow Statement - Difference Between Fund Flow Analysis and Cash Flow Analysis.

UNIT - IV BUDGETS AND BUDGETARY CONTROL [12]

Budgets and Budgetary Control – Meaning – Limitations – Classification - Sales Budget - Production Budget - Cost of Production Budget – Cash Budget – Master Budget – Flexible Budgeting - Zero Base Budgeting.

UNIT - V FINANCIAL MANAGEMENT [12]

Introduction – Objectives – Functions – Role of Financial Manager – Investment Decisions: Capital Budgeting – Accounting Rate of Return – Net Present Value - Pay Back Period – Profitability Index – Internal Rate of Return.

Total (L: 45 T:15) = 60 Hours

Course Outcomes

1. Describe the basic concept of accounting principles and balance sheet.
2. Identify the methods of valuing material issues and gain the knowledge of financial analysis.
3. Describe the various concepts of fund flow analysis and cash flow analysis.
4. Express the basic concept of budget and its disadvantages.
5. Identify the role of financial manager and gain the knowledge of investment decisions.

Text Books :

1. S.N.Maheswari, “Financial and Management Accounting”, Sultan Chand & Sons, 5th Edition, 2010.
2. M Y Khan, P K Jain, “Financial Management Text, Problems & Cases”, 6th edition, TMH, 2011.

Reference Books :

1. N. Ramachandran, Ramkumar Kakani, “Financial Accounting for Management”, Second Edition, TMH, 2008.
2. S.N.Maheshwari, “Financial Management Principles and Practice”, Sultan Chand & Sons, 2007.

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SEMESTER - I

		L	T	P	C
CA16112	**DIGITAL FUNDAMENTALS AND COMPUTER ORGANIZATION**	3	2	0	4

Prerequisite: **Digital Fundamentals**

Objective:

- *To provide the deep knowledge about digital technologies, computer and memory organization.*

UNIT - I INTRODUCTION TO DIGITAL DESIGN [12]

Data Types - Data Representation - r, r-1 Complements - Arithmetic Operations - Fixed Point Representations, Floating Point Representations , Binary Codes - Error Detection Codes – Logic Gates, Boolean Algebra, Boolean Expressions – Simplification: Karnaugh Map ,Tabular Simplification.

UNIT - II DIGITAL COMPONENTS [12]

Combinational Circuits: Half & Full Adder, Half and Full Subtracter - Sequential Circuits – Flip Flops - ICs - Decoders – Encoders – Multiplexers – DeMultiplexers - Registers - Shift Registers - Binary Counters.

UNIT - III FUNCTIONAL UNITS [12]

Basic Operational Concepts, Bus Structures, Machine Instructions, Memory Locations, Addressing Modes, Assembly Language Arithmetic: Number Representations, Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Signed Numbers, Fast Multiplication and Integer Division.

UNIT - IV PROCESSING UNIT [12]

Concepts, Execution of Complete Instruction, Multi Bus Organization, ALU; Control Unit: Hardwired Control, Micro Programmed Control; Micro Instructions, Micro Program Sequencing, Micro Instructions With Next Address Field and Pre-Fetching.

UNIT - V MEMORY AND I/O ORGANIZATION [12]

RAM, ROM, Cache Memory and Virtual Memory, Input and Output Organization: Accessing I/O Devices, Interrupts, DMA, and Interface Circuits.

Total (L: 45 T:15) = 60 Hours

Course Outcomes:

1. Gain the knowledge of arithmetic operation.
2. Identify the types of combinational circuits.
3. Review the concept of interrupts and types of buses.
4. Summarize the concept of basic operational concepts and addressing modes.
5. Outline types of RAM, ROM memories and secondary storage devices.

Text Books :

1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, Fifth Edition, “Computer Organization”,Tata McGraw Hill, 2002.
2. M. MorrisMano , “Digital Logic & Computer Design” PHI 2006.

Reference Books :

1. William Stallings, “Computer Organization and Architecture”, Sixth Edition, Pearson Education,2004.
2. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
3. David A. Patterson, John L. Hennessy, “Computer Organization and Design”, 3rd Edition. Morgan K Publishers, 2005.
4. David E. Culler, Jaswinder Paul Singh, Anoop Gupta: Parallel Computer Architecture: Hardware / Software Approach, Elsevier Science, 2008.

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SEMESTER - I

CA16113 **DATA STRUCTURES**

L	T	P	C
3	0	0	3

Objectives:

- *To master the design and data structure applications of linear data structures, tree, and graph Structures.*
- *To understand various algorithm design and analysis techniques.*

UNIT - I DATA STRUCTURES [12]

Introduction – Arrays – Structures – Stack: Definition and Examples, Representing Stacks - Queues and Lists: Queue and its Representation, Lists – Applications of Stack, Queue and Linked Lists.

UNIT - II TREES [12]

Binary Trees – Operations on Binary Trees - Binary Tree Representations – Node Representation, Internal and External Nodes, Implicit Array Representation – Binary Tree Traversals – Huffman Algorithm – Representing Lists as Binary Trees.

UNIT - III SORTING AND SEARCHING [12]

General Background – Exchange Sorts – Selection and Tree Sorting – Insertion Sorts – Merge and Radix Sorts – Basic Search Techniques – Tree Searching – General Search Trees – Hashing.

UNIT - IV GRAPHS AND THEIR APPLICATIONS [12]

Graphs – An Application of Graphs – Representation – Transitive Closure - Warshall's Algorithm – Shortest Path Algorithm – A Flow Problem – Dijkstra's Algorithm – An Application of Scheduling - Linked Representation of Graphs – Graph Traversals.

UNIT - V STORAGE MANAGEMENT [12]

General Lists: Operations, Linked List Representation, Using Lists, Freeing List Nodes - Automatic List Management: Reference Count Method, Garbage Collection, Algorithms, Collection and Compaction.

Total (L: 45 T: 15) = 60 Hours

Course Outcomes:

1. Express the concept of list data structure and its implementations.
2. Compare the concept of binary, binary search and binary tree traversals.
3. Know the concept of sorting and its types.
4. Apply the concept of graph and its representation.
5. Gain the knowledge about the list concepts.

Text Book :

1. Weiss "Data Structures and Algorithm Analysis in C", Addison Wesley, Second Edition, 2010.

Reference Books :

1. Robert Kruse & Clovis L. Tondo "Data Structures and Program Design in C",Prentice Hall 2nd edition.,1991.
2. Tanaenbaum A.S.,Langram Y. Augestein M.J "Data Structures using C" Pearson Education, 2004.

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SEMESTER - I

		L	T	P	C
CA16114	**DATABASE MANAGEMENT SYSTEMS**	3	0	0	3

Prerequisite: **MS-Access**

Objective:

- *To provide the knowledge about the introduction about the database systems, relational data base systems, database design, E-R model, storage management, indexing, transaction management and distributed database.*

UNIT - I **INTRODUCTION** **[9]**

Database Systems vs. File Systems- View of Data - Data Models-Database Languages - Transaction Management - Database Systems Structure - History of Database Systems - Database Systems Applications - Entity Relationship Model.

UNIT - II **RELATIONAL DATABASES** **[9]**

SQL - Basic Structure - Set Operations - Complex Queries - Joined Queries – DDL – Embedded SQL - Dynamic SQL - Other SQL Functions - Query by Example-Integrity and Security of Searching - Relational Database Design.

UNIT - III **DATA STORAGE AND INDEXING** **[9]**

Storage & File Structure – Disks – RAID - File Organization - Indexing & Hashing – B+TREE – B Tree - Static Hashing - Dynamic Hashing - Multiple Key Access.

UNIT - IV **QUERY EVALUATION & OPTIMIZATION** **[9]**

Query Processing - Selection Operation – Sorting - Join Operation - Evaluation of Expressions - Query Optimization.

UNIT - V **TRANSACTION MANAGEMENT** **[9]**

Transaction Concept - Static Implementation - Concurrency Control – Protocols – Deadlock Handling - Recovery Systems - Recovery with Concurrent Transactions - Shadow Paging - Buffer Management - Case Studies – Oracle - Microsoft SQL Server.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Express the knowledge of data base systems and analyze the various data models.
2. Employ the concept of data definition language and data manipulation language.
3. Express the knowledge of secondary storage device to store the data.
4. Describe the knowledge of query processing and its operations.
5. Apply the various concurrency control techniques in database transactions.

Text Books :

1. Henry F. Korth, Abraham Silberchatz, S.Sudarshan, Database System Concepts, McGraw - Hill – 2007.
2. Ramez E, Shamkant B. N – Fundamentals of Database Systems – 5th E – Addison Wesley H E -2007.

Reference Books :

1. Raghu Ramakrishnan & Johannesgerhrke"Data Base Management Systems",McGraw Hill International Ed, 2000.
2. C.J.Date, Longman, Dr.S.Swamynathan, Introduction to Database System, Pearson Education – 2007.
3. Hoffer, Prescott & McFadden – Modern Database Management – Eighth Edition – prentice Hall – 2007.
4. Kifer, B & Lewis Database System: An Application Oriented Approach, Complete Version – 2nd Ed – Addison Wesley HE – 2006.

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SEMESTER – I

		L	T	P	C
CA16115	**PROBLEM SOLVING USING ' C '**	3	0	0	3

Prerequisite: **Programming in C**

Objective:

- *The objective of learning is to develop problem-solving skills and couple them with top down design principles, it also the way to competent at algorithm design and program implementation. it provides useful guidance in separating the tasks of learning how to develop computer algorithms and implementing them in programming language like c.*

UNIT - I **INTRODUCTION TO COMPUTER PROBLEM SOLVING** **[9]**

Introduction – The Problem Solving Aspect – Top Down Design – Implementation of Algorithms – Program Verification – Efficiency of Algorithms – Analysis of Algorithms.

UNIT - II **FUNDAMENTAL ALGORITHMS** **[9]**

Introduction – Exchanging the Values – Counting – Factorial Computation – SINE Computation – Base Conversion – Factoring Methods – Array Techniques.

UNIT - III **INTRODUCTION TO C LANGUAGE** **[9]**

Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input/output Operations – Formatted I/O – Decision Making – Branching –- IF, Nested IF – Switch – Go to – Looping- while, Do, for Statements.

UNIT - IV **ARRAYS, FUNCTIONS, STRUCTURES AND UNIONS** **[9]**

Arrays – Dynamic and Multi-Dimensional Arrays – Character Arrays and Strings – String Handling Functions – User Defined Functions – Categories of Functions – Recursion – Structures and Unions – Array of Structures – Structures and Functions

UNIT - V **POINTERS AND FILE MANAGEMENT** **[9]**

Pointers – Declaration, Accessing a Variable, Character Strings, Pointers to Functions and Structures – File Management in C – Dynamic Memory Allocation – Linked Lists – Preprocessors.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the introduction about the problem solving methods.
2. Capture the fundamentals of c - constants, variables and data types, different operators and expressions in c language.
3. Describe different input and output operations with different formats and programs using different branching and looping statements.
4. Obtain knowledge about user defined functions and scope of variables in c.
5. Identify the concept of file, file operations and types of files.

Text Books :

1. R.G.Dromey “How to Solve it by Computer”, Pearson Education, India, 2007.
2. Herbert Schildt, C – The Complete Reference, McGraw Hill, New York, 2000.

Reference Books :

1. Deitel and Deitel "C How to Program", Addisson Wesley, 2001.
2. Brian W.Kernighan & Dennis Ritchie "C Programming Language", PHI, 1990.
3. Byron.S.Gottfried "Schaum's Outline of Programming with C", 2nd Edition, 1996.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - I

		L	T	P	C
CA16121	**DATA STRUCTURES LAB**	0	0	3	2

Prerequisite: **Data Structures**

Objective:

- To develop programming skills in design and implementation of data structures and their applications.

List of Experiments

1. Represent the given Sparse Matrix using One Dimensional Array and Linked List.
2. Create a Stack and do the following Operations Using Arrays and Linked Lists.
   (I) Push (II) Pop (III) Peep
3. Create a Program for Infix, Prefix and Postfix Notation Using Stack Operation.
4. Create a Queue and do the following Operations Using Arrays and Linked Lists.
   (I)Add (II) Remove
5. Implement the Operations on Singly Linked List, Doubly Linked List and Circular Linked List.
6. Create a Binary Search Tree and do the following Traversals.
   (I) In-Order (II) Pre Order (III) Post Order
7. Implement the following Operations on a Binary Search Tree.
   (I) Insert a Node (II) Delete a Node
8. Sorting the given List of Numbers using Heap and Quick Sort.
9. Perform the following Operations in a given Graph.
   (I) Depth First Search (II) Breadth First Search
10. Find the Shortest Path in a given Graph using Dijkstra's Algorithm.

Total : 45 **Hours**

Course Outcomes:

1. Demonstrate the array and linked list implementation of list ADT.
2. Demonstrate traversal of stack and queue using ADT.
3. Implement the operation of list and binary search tree ADT.
4 Implement the operation of binary search tree.
5. Perform depth first search and breadth first search.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - I

		L	T	P	C
CA16122	**DATABASE MANAGEMENT SYSTEMS LAB**	0	0	3	2

Prerequisite: **MS-Access**

Objective:

- To develop queries using SQL, programs in PL/SQL and to create application using front and back end tools.

List of Experiments

1. Create an Employee database with related tables like Employee table, Department table and Project table. Construct the table relationship with relevant constraints. Perform All DDL, DML, and TCL Operations.
2. Create a Student Database with related tables like Student Personal table and Marks table. Perform the following Operation:
   (I) Create a view which contains top five students of a Class
   (Ii) Create two different views which contain the students details whose results are pass and fail respectively.
3. Create a Bank Database with customer table and account table.
   (I) Design a Trigger that does not allow user to do any DML operations during Sunday.
   (Ii) Design a Trigger that does not let the minimum balance to fall below Rs. 1000/-.
   (Iii) The Transaction amount is Not Zero and is Positive.
4. Design the database objects synonym, sequences, indexes for the Bank Database.
5. Creation of Partitions for a Student Mark table by using Range Partition Method.
6. Simulate a Payroll Processing System using PL/SQL.
7. Develop a Package Incorporating simple Functions and Procedures for an Inventory Management System.
8. Write a PL/SQL Block that will display the customer name, the fixed deposit number and the fixed deposit amount of the first five customers holding the highest amount in fixed deposits.
9. Write a PL/SQL block of code that depending upon a user supplied account number, the customer to which the account belongs, the introducer of the account and the nominee of the account are inserted into the ACCT_CUST_INTRO_NOM Table. If the user enters an account number that is not in the ACCT_MSTER table, Then the PL/SQL block must display appropriate error message back to the user.
10. Design and develop an application for bank using VB as a front end and Oracle as a back end tool.

Total : 45 **Hours**

Course Outcomes:

1. Implement the DDL, DML and TCL operations in RDBMS.
2. Demonstrate the High-level language extension with Triggers.
3. Creation of partition table and implement PL/SQL concept.
4. Develop the knowledge of package incorporating functions and procedures.
5. Implement the concept display appropriate error message.

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

SEMESTER - I

		L	T	P	C
CA16123	**C PROGRAMMING LAB**	0	0	3	2

Prerequisite: **Programming in C**

Objective:

- *The main objective of programming in C is to develop the problem solving techniques.*

List of Experiments

1. Display the following:
   (i) Floyds triangle (ii) Pascal Triangle.
2. Generate the following series of numbers:
   (i) Armstrong numbers between 1 to 100.
   (ii) Prime Numbers between 1 to 50.
   (iii) Fibonacci Series up to N numbers.
3. Manipulate the Strings with Following Operations
   i) Concatenating two strings.
   ii) Reversing the String.
   iii) To Count the Words and Characters in a Strings.
   iv) Replacing a String.
   v) Finding Length of the String.
   vi) Determine Palindrome String.
4. Find the Summation of the Following Series
   (i) Sine (ii) Cosine (iii) Exponential.
5. Create the Sales Report for M Sales Persons and N Products Using Two Dimensional Arrays.
6. Simulate Following Banking Operations Using Functions.
   (i) Deposit (ii) Withdrawal (iii) Balance Enquiry.
7. Implement Using Recursion
   (i) Find the Solution of Towers of Hanoi Problem Using Recursion.
   (Ii) Fibonacci Number Generation.
   (Iii) Factorial.
8. Implement the Array Using Following Concepts.
   I)To Find Both the Largest and Smallest Number in a List of Integers.
   Ii) To Perform the Addition, Multiplication of Two Matrix.
9. Write a Program that Implements the Following Concepts of Function.
   I) Function with No Arguments and No Return Value.
   Ii) Function with No Arguments but Return Value.
   Iii) Function with Arguments but No Return Value.
   Iv) Functions with Arguments and Return Value.
10. Generate Student Mark Sheets Using Structures.
11. Create a Collection of Books Using Arrays of Structures and Do the Following
    (i) Search a Book with Title and Author Name.
    (ii) Sorts the Books on Title.
12. Perform String Operations Using Pointers.
13. Write a Program to Sort the Array Using Pointers.
14. Program to Implement Dynamic Memory Allocation.
15. Create Reading and Displaying a Sequential and Random Access File.
16. Program to Simulate Banking operations Such as Deposit, Withdrawal & Balance Enquiry Using Switch Case.
17. Write a Program to Create a File Having the Fields Namely Roll No, Student Name, Sex (Male/Female), Result (Pass /Fail) and Display the Following Result
    (i) List of Male Students with Result.
    (ii) List of Girls with Result.

Total : 45 **Hours**

Course Outcomes:

1. Demonstrate the ability to use the editor, compiler, and linker to create source, object, and executable code and debugging of a simple ‘C’ program.
2. Gain the knowledge of the string and its operation.
3. Use various string handling arrays as part of the problem solution.
4. Reveal the concept of function and recursive function.
5. Implement the concept of structure data type as part of the solution and Utilize pointers to efficiently solve problems.

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SEMESTER – II

		L	T	P	C
CA16211	**OPERATING SYSTEMS**	3	0	0	3

Objective:

- *To get a comprehensive knowledge of the architecture of distributed systems, understand the deadlock and their solutions in distributed environments, to get the knowledge of failure recovery and fault tolerance to know the security issues and protection mechanisms for distributed environments, to get knowledge of multiprocessor operating system.*

UNIT - I INTRODUCTION [12]

Definition of OS - Mainframe System - Desktop Systems - Multi Processor System – Distributed - Clustered - Real Time Systems - Handheld Systems - Operating System Structure – System Components - Services - System Calls - System Programs - System Design and Implementation.

UNIT - II PROCESS MANAGEMENT [12]

Concepts - Process Scheduling - Operations on Processes - Co-Operating Processes – Inter Process Communication - CPU Scheduling - Scheduling Concepts - Criteria – Scheduling Algorithms - Multiprocessor Scheduling - Real Time Scheduling.

UNIT - III PROCESS SYNCHRONIZATION [12]

Critical Section - Synchronization Hardware – Semaphores - Problems of Synchronization - Critical Regions – Monitors – Deadlocks – Characterization - Handling Deadlocks – Deadlock Prevention – Avoidance – Detection - Deadlock Recovery.

UNIT - IV MEMORY MANAGEMENT [12]

Storage Hierarchy - Storage Management Strategies – Contiguous - Non Contiguous Storage Allocation - Single User - Fixed Partition - Variable Partition – Swapping - Virtual Memory – Basic Concepts - Multilevel Organization - Block Mapping – Paging – Segmentation – Page Replacement Methods – Locality - Working Sets.

UNIT - V I/O AND FILE SYSTEMS [12]

Disk Scheduling - File Concepts - File System Structure - Access Methods - Directory Structure – Protection - Directory Implementation - Allocation Methods - Free Space Management – Case Study: Linux System, Windows,.

Total (L: 45 T:15) = 60 Hours

Course Outcomes:

1. Understand the basics of operating systems and its components.
2. Examine the scheduling algorithms, know about the critical section problem.
3. Describe classical synchronization problem and semaphores.
4. Classify the storage management, paging and segmentation.
5. Understand disk structure and disk scheduling algorithms and analyze the concept of allocation methods, directory structure and free space management.

Text Book :

1. Silberschatz and Galvin, Operating System Concepts, 6th Edition, John Wiley & Sons, Inc., 2004.

Reference Books :

1. Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 1992.
2. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004.
3. H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002.

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SEMESTER – II

		L	T	P	C
CA16212	**DESIGN AND ANALYSIS OF ALGORITHMS**	3	0	0	3

Prerequisite: **Data Structures**

Objectives:

- *To master the design and data structure applications of linear data structures, tree, and graph structures*
- *To understand various algorithm design and analysis techniques.*

UNIT - I INTRODUCTION [9]

Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Frame Work – Asymptotic Notations – Mathematical Analysis for Recursive and Non-Recursive Algorithms.

UNIT - II DIVIDE AND CONQUER METHOD AND GREEDY METHOD [9]

Divide and Conquer Methodology – Merge Sort – Quick Sort – Binary Search – Binary Tree Traversal – Multiplication of Large Integers – Stassen's Matrix Multiplication – Greedy Method – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm.

UNIT - III DYNAMIC PROGRAMMING [9]

Computing a Binomial Coefficient – Marshall's and Floyd' Algorithm – Optimal Binary Search Tree – Knapsack Problem – Memory Functions.

UNIT - IV BACKTRACKING AND BRANCH AND BOUND [9]

Backtracking – N-Queens Problem – Hamiltonian Circuit Problem – Subset Sum Problem – Branch and Bound – Assignment Problem – Knapsack Problem – Traveling Salesman Problem.

UNIT - V NP-HARD AND NP-COMPLETE PROBLEMS [9]

P & NP Problems – NP - Complete Problems – Approximation Algorithms for NP- Hard Problems – Traveling Salesman Problem – Knapsack Problem.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Outline the basic problem types and summarizes the algorithm analysis framework.
2. Design algorithms using divide and conquer for different types of sorting and searching problems and analyze its complexity.
3. Choose transform and conquer, dynamic programming and greedy strategies to illustrate algorithms.
4. Apply upper bound and lower bound for the problems using branch and bound strategy.
5. Describe the concept of NP-Hard and complete problem..

Text Books :

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, Asia, 2002.
2. Anany Levitin**, "**Introduction to the Design and Analysis of Algorithms, 2/E"**,** Addison-Wesley, 2007.

Reference Books :

1. R. F. Gilberg, B. A. Forouzan, "Data Structures", Second Edition, Thomson India Edition, 2005.
2. A.V. Aho, J.E. Hopcroft, and J.D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
3. SaraBaase and Allen Van Gelder,"Computer Algorithms - Introduction to Design and Analysis" PE, 2003.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Introduction to algorithms" Prentice Hall 1990.

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SEMESTER – II

		L	T	P	C
MA16233	**DISCRETE STRUCTURES**	3	2	0	4

Objectives:

- *To study the mathematical logics and its applications.*
- *To familiarize with the basics of set theory.*
- *To study the concepts of graph theory.*
- *To understand the concepts of formal* languages & finite automata.

UNIT - I MATHEMATICAL LOGIC [12]

Propositions and Logical Operators - Truth Table - Propositions Generated by a Set, Equivalence and Implication - Basic Laws - Some more Connectives – Functionally Complete Set of Connectives - Normal Forms - Proofs in Propositional Calculus.

UNIT - II BASIC SET THEORY [12]

Basic Definitions - Venn Diagrams and Set Operations - Laws of Set Theory - Principle of Inclusion and Exclusion – Partitions - Permutation and Combination – Relations - Properties of Relations - Matrices of Relations - Closure Operations on Relations - Functions - Injective, Subjective and Bijective Functions.

UNIT - III GRAPH THEORY [12]

Basic Definitions – Degree – Graph Connectivity – Euler and Hamilton Graphs - Planar Graphs – Graph Coloring.

UNIT - IV FORMAL LANGUAGES [12]

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars- Pumping Lemma for Regular Languages-Context Free Languages.

UNIT - V FINITE STATE AUTOMATA [12]

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NDFA)-Equivalence of DFA and NDFA-Equivalence of NDFA and Regular Languages.

Total (L: 45 T:15) = 60 Hours

Course Outcomes:

1. Interpret the basics of mathematical logic.
2. Acquire knowledge in set theory.
3. Apply the concepts of graph theory.
4. Develop their skills in languages and grammars.
5. Interpret the concepts of finite state automata.

Text Book :

1. Kenneth H Rosen, “Discrete Mathematics”, 6th Edition, Tata McGraw Hill 2009.

Reference Books :

1. J.P.Tremblay, R.Manohar “Mathematical Structures with Applications to Computer Science” TataMcGrawHill Ed. 2002.
2. Hopcroft & Ullman, “Introduction to Automata Theory, Languages and Computation”, NPHouse, Delhi, 2002.
3. Swapan Kumar Chakra borty & Bikash Kanti Sarkar, “Discrete Mathematics” Oxford University Press, 2011.
4. Taha H. A. , “Operations Research: An Introduction “ 7th Edition, Pearson Education, 2007.

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SEMESTER – II

		L	T	P	C
EC16234	**MICROPROCESSOR AND ITS APPLICATIONS**	3	2	0	4

Prerequisite: **Digital Fundamentals and Computer Organization**

Objectives:

- *To study about the basic concepts of microprocessor (8085).*
- *To study about 8086 microprocessor and its programming.*
- *To study about applications of 8085/86 microprocessor.*
- *To learn about advanced microprocessor.*
- *To study about concepts of microcontrollers.*

UNIT - I INTRODUCTION [12]

Introduction to Microprocessor and Microcontroller-Architecture of 8085 Microprocessor- Instruction Set and Addressing Modes of 8085 –Assembly Language Programs of 8085.

UNIT - II 8086 MICROPROCESSOR [12]

Architecture of 8086-Instruction Set and Addressing Modes of 8086 Microprocessor- Assembly Language Programs and Commands of 8086.

UNIT - III APPLICATIONS OF 8085/8086 MICROPROCESSORS [12]

Seven Segment Display-Measurement of Electrical Quantity and Physical Quantities-Traffic Control-Stepper Motor.

UNIT - IV PENTIUM AND RISC PROCESSOR [12]

Pentium Intel Architecture-Operating Modes-Segmentation-Pin Description of Pentium Processor-Bus Interfacing-Pentium MMX-Pentium Pro, Pentium II and Pentium III:P6 Family Processor-Pentium IV Processor-RISC Processor.

UNIT - V MICROCONTROLLER [12]

Architecture of 8051 Microcontroller-Memory Organization-Serial Communication-Interrupts- Instruction Set and Addressing Modes.

Total (L: 45 T: 15) = 60 Hours

Course Outcomes:

1. Understanding how the processor stores and manipulates data, the basic arithmetic and logical operations performed by the 8085 microprocessor.
2. Learning the architecture and functioning of 8086.
3. Understanding the concept of applications of 8085 / 8086 micro processors.
4. Know the architecture of Pentium Intel and its description processors.
5. Design various types of serial communication function, addressing modes.

Text Book :

1. Soumitrakumarmandal,"Microprocessors and Microcontrollers", Architecture, Programming and Interfacing using 8085, 8086 and 8051, Tata McGraw Hill, 2012.

Reference Books :

1. Ramesh G,"Microprocessor Architecture Programming and Applications with 8085", Pen tram international Publishing (India) Pvt.Ltd,5th Edition,2009
2. R.Theagarajan,"Microprocessor and Microcontroller", Scitech Publishing (I) Pvt Ltd, 2nd Edition.
3. Barry B. Brey, "Intel Microprocessors, The 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumII, Pentium IV, Architecture, Programming & Interfacing", Seventh Edition, PHI Learning / Pearson Education, 2006

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SEMESTER – II

		L	T	P	C
CA16215	**OBJECT ORIENTED PROGRAMMING USING C++**	3	0	0	3

Prerequisite: **Problem Solving and Programming in C**

Objectives:

- *To provide the idea about the concept of objects and classes.*
- *To gain knowledge about overloading, inheritance and polymorphism.*

UNIT - I OBJECT ORIENTED PROGRAMMING [9]

Programming Paradigms - Object Oriented Programming - OOPS Concept - Advantages of OOPS - Difference Between C and C++ - Introduction to C++ - C++ Declarations - Control Structures - Arrays and Pointers.

UNIT - II CLASSES AND OBJECTS [9]

Classes and Objects - Functions in C++ - Inline Functions - Friend Function - Passing Objects to Functions - Array of Objects - Static Member Variable and Member Functions - Pointers to Objects – Dynamic Allocation Operators – Working with Strings – Manipulators – Typecasting – This Pointer - Default Arguments.

UNIT - III CONSTRUCTOR AND OPERATOR OVERLOADING [9]

Constructor and Destructor – Parameterized Constructor - Multiple Constructor in a Class - Constructor with Default Arguments - Copy Constructor - Dynamic Constructor– Overloading: Function Overloading – Overloading Unary Operators – Overloading Binary Operators – Operator Overloading Using Friend Function – Assertions.

UNIT - IV INHERITANCE AND TEMPLATES [9]

Inheritance – Types of Inheritance – Virtual Base Class - Virtual Functions - Pure Virtual Functions - Templates – Function Template and Class Template.

UNIT - V APPLICATIONS WITH FILES AND EXCEPTION HANDLING [9]

Introductions – File Stream Classes – Steps of File Operations - Checking for Errors- Finding End of File – File Opening Modes- File Pointers and Manipulators – Sequential Reads and Write Operations – Random Access Operations – Error Handling Functions- Command Line Arguments – Binary & ASCII Files-Exception Handling.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Implement the basic concept of C++, declaration, control structure, arrays and pointers.
2. Comprehend the concept of classes, objects, static data and member functions.
3. Understand the concept of constructer, destructor.
4. Understand reusability concept through different types of inheritance.
5. Illustrate the concept of error handling, command line arguments.

Text Books :

1. D.S.Malik, “C++ Programming from problem Analysis to Program Design”, 2007 Third Edition.
2. Ira Pohl, “Object-Oriented Programming Using C++”, Pearson Education, 2008, Second Edition.

Reference Books :

1. Kamthane, “Object Oriented Programming with ANSI and Turbo C++”, Pearson Education, 2009.
2. E. Balagurusamy, “Object Oriented Programming with C++”, PHI, 2008, Fourth Edition.
3. Stanley B.Lijjman Josee Lajoie, “C++ Primer”2004,Fifth Edition.

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SEMESTER - II

		L	T	P	C
CA16221	**ALGORITHMS LAB**	0	0	3	2

Prerequisite: **Data Structures Lab**

Objective:

- *To develop programming skills in design and implementation of data structures and their Applications.*

List of Experiments

1. Find a Recursive Solution to the Tower of Hanoi Puzzle.
2. Apply the Divide and Conquer Technique to arrange a Set of Numbers using Merge Sort and Quick Sort Method.
3. Perform Stassen's Matrix Multiplication using Divide and Conquer Method
4. Create a Program to find the Shortest Path using Dijkstra's Algorithm
5. Solve the Knapsack Problem using Greedy Method.
6. Construct a Minimum Spanning Tree Using Greedy Methods.
7. Construct Optimal Binary Search Trees using Dynamic Programming Method of Problem Solving.
8. Perform Graph Traversals.
9. Find the Solution for Traveling Salesperson Problem using Dynamic Programming Approach.
10. Implement the 8-Queens Problem using Backtracking.
11. Implement Knapsack Problem using Backtracking.
12. Find the Solution of Traveling Salesperson Problem using Branch and Bound Technique.

Total : 45 **Hours**

Course Outcomes:

1. Apply the divide and conquer technique.
2. Finding the shortest path using Dijkstra's algorithms.
3. Solving the knapsack problem using greedy methods.
4. Finding the solution for the dynamic programming method.
5. Implement the concept of backtracking method.

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SEMESTER - II

		L	T	P	C
EC16252	**MICROPROCESSOR AND MICROCONTROLLER LABORATORY**	0	0	3	2

Prerequisite: Digital Fundamentals and Computer Organization

Objectives:

- *Develop assembly language programs based on 8085, 8086 microprocessors and 8051microcontroller.*
- *Understand the peripheral interfacing with microprocessors and microcontroller.*

List of Experiments

1. 8085 Microprocessor
   (i) Arithmetic Operations
   (ii) Array Processing

2. 8086 Microprocessor
   (i) Arithmetic Operations
   (ii) Sorting and Searching
   (iii) String Manipulation

3. 8051Microcontroller
   (i) Arithmetic Operations
   (ii) Logical and Bit Manipulation

4. Peripheral Interfacing
   (i) Programmable peripheral interface (8255) using 8085.
   (ii) Keyboard and display controller (8279) using 8086.
   (iii) Stepper motor using 8085.

Total : 45 **Hours**

Course Outcomes:

1. Develop assembly language programming for 8085 microprocessor.
2. Understand assembly language programs for 8086 microprocessor.
3. Illustrate programming concepts of microcontroller.
4. Demonstrate programming with peripherals.
5. Design and develop the programming using simulation software.

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SEMESTER - II

		L	T	P	C
CA16223	**OBJECT ORIENTED PROGRAMMING LAB**	0	0	3	2

Prerequisite: **Problem Solving and Programming in C**

Objectives:

- *To understand object oriented programming concepts.*
- *To implement object oriented features in real time applications.*

List of Experiments

1. Write a C++ Program for Student Information System using Class and Object.
2. Operation on Enumerated Data Type
   A. Declare an Enum Type Days to Store Monday to Sunday.
   B. Store the Time Table for Monday to Friday. [2D Character Array is Sufficient]
   C. Get the Day as Input From the User.
   D. Map With the Enum Days Type. If There is No Such Day , Prompt the User to Enter a Correct Data
   E. If User Enters Saturday/Sunday, Display "Week End. No Classes "for Other Inputs, Display The Academic Time Table for the Day.
3. Write a C++ Program to Develop the Employee Salary Details using Array of Objects.
4. Create a Class Shape. Create the Circle, Rectangle, Triangle, Square Object of the Class Shape and Calculate the Area of each Type of Object using Overloaded Function.
5. Illustration of Static Members and Methods.
   a. Define Class Called "Faculty" and "Student" with Relevant Data Members. [No Public Data Member]
   b. In the Main Program " Get the Choice From the User for Entering the Faculty Details / Student Details " [Create Appropriate Objects]
   c. At the End of the Program, Just Display the Count of Number of Faculty and Number of Students Details Entered.
6. Write an Object Oriented Program in C++ to Read and Integer Number and Find the Sum of All Digits Until It Reduces to a Single Digit Using Constructor and Destructor.
7. Unary Operator Overloading [Both Member and Friend]
   a. Create a Class Called „Clock" that Contains Hour, Min and Seconds
   b. Write the Constructor for Initializing the Time
   c. Overload ++ as Member Function to Increment Seconds [Which In Turn Update Min And Hours]
   d. Overload – as Non Member Functions to Decrement Seconds.
   e. Do both Postfix and Prefix Format.
   f. Create an Instance of Clock.Get the Number of Ticks to be Incremented / Decremented from the User. Accordingly Update the Time and Display the New Time.
8. Write a C++ Program for Add Two Complex Numbers Using Binary Operator Overloading.
9. Develop an Object Oriented Program in C++ to Create a Data Base of the Following Items of the Derived Class.
   a. Name of the Patient, Sex, Age
   b. Ward Number 18
   c. Bed Number
   d. Nature of the Illness
   e. Date of Admission

   Design a Base Class Consisting of the Data Members Namely, Name of the Patient, Sex and Age. Another Base Class Consists of Ward Numbers, Bed Number and Nature of the Illness. The Derived Class Consists of the Data Member Date of Admission. Design a Virtual Class for the Data Member, Namely Name of the Patient, Sex and Age.
10. Write a C++ Program to Implement the Multi Level Inheritance.
11. Get the Choice Integer, Float and Characters and find the Maximum and Minimum Elements in each using Templates.
12. Exception Handling: Quadratic Equation. If the Roots are Imaginary Raise the Exception.
13. Write the C++ Program for Employee Details Using Files.
14. Simulate the MS-DOS Command/ Unix Command Copy/cp using Command Line Arguments.
15. Create a C++ Project for Menu Driven Inventory Management Systems using Object-Oriented Concepts.

Total : 45 **Hours**

Course Outcomes:

1. Implement classes and objects.
2. Acquire knowledge of implementing operator & function overloading.
3. Illustrate the concept of static members and methods.
4. Secure the knowledge of Implementation of the function Templates and class Templates.
5. Obtain the knowledge of Implementation of the File handling and Exception handling.

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SEMESTER - III

		L	T	P	C
CA16311	**DATA COMMUNICATION AND NETWORKS**	3	0	0	3

Prerequisite: **Computer Networks**

Objective:

- *To provide the deep knowledge about the communications based on transmission media, protocol models and finally about different layers of networks*.

UNIT - I DATA COMMUNICATIONS [9]

Components – Direction of Data Flow – Networks – Components and Categories – Types of Connections – Topologies – Protocols and Standards – ISO / OSI Model – Transmission Media – Coaxial Cable – Fiber Optics.

UNIT - II DATA LINK LAYER [9]

Error – Detection and Correction – Parity – LRC – CRC– Flow Control and Error Control - Stop and Wait – Go Back-N ARQ – Selective Repeat ARQ- Sliding Window – HDLC- LAN - Ethernet IEEE 802.3 - IEEE 802.4 – IEEE 802.5 - IEEE 802.11 – FDDI – Bridges.

UNIT - III NETWORK LAYER [9]

Internetworks – Packet Switching and Datagram Approach – IP Addressing Methods – Sub Netting – Routing – Distance Vector Routing – Link State Routing – Routers.

UNIT - IV TRANSPORT LAYER [9]

Duties of Transport Layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of Services (QOS) – Integrated Services.

UNIT - V APPLICATION LAYER [9]

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Know the concept of components, categories and ISO/OSI model of networks.
2. Describe the concept of various error detection techniques and flow, error control.
3. Compare the concept of circuit switching and packet switching.
4. Appraise user datagram and transmission control protocol.
5. Identify the purpose of domain name space, email and FTP.

Text Book :

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2007.

Reference Books :

1. James F.Kurose & KeithW.Ross,“Computer Networking: A Top-Down Approach Featuring TheInternet”,PE, 2005.
2. Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2010.
3. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2010.

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SEMESTER - III

		L	T	P	C
CA16312	**SOFTWARE ENGINEERING**	3	2	0	4

Prerequisite: **System Analysis and design**

Objectives:

- *To understand the deep knowledge about software and its basic concepts.*
- *Acquire knowledge about the models and the requirements of software.*
- *To be familiar with the designs of software and its principles.*
- *To learn the basic idea about the software testing and configuration.*
- *To gain the exposure on managing the project.*

UNIT - I SOFTWARE PROCESS [12]

Introduction –Process Models: A Generic Process Model-Process Assessment and Improvement- Prescriptive Process Models - Specialized Process Models- Unified Process-Personal and Team Process Models-Process Technology-Product and Process.

UNIT - II SOWARE REQUIREMENTS [12]

Requirement Analysis-Scenario Based Modeling-UML Models that Supplement the Use Case- Data Modeling Concepts-Class Based Modeling-Requirement Modeling Strategies – Flow Oriented Modeling.

UNIT - III DESIGN CONCEPTS AND PRINCIPLES [12]

The Design process- Design Concepts-The Design Model-Architectural Design – Software Architecture – Architectural Genres - Architectural Styles – Architectural Design.

UNIT - IV SOFTWARE TESTING [12]

Strategic Approach to Software Testing-Strategic Issues- Validation Testing- System Testing- The Art of Debugging-Testing Conventional Applications –Software Configuration Management- White Box Testing- Basis Path Testing – Control Structure Testing- Black Box Testing.

UNIT - V SOFTWARE PROJECT MANAGEMENT [12]

Project Management Concepts–Process and Project Metrics- Risk Management- Maintenance and Reengineering-Metrics in the Process and Project Domains, Metrics for Software Quality.

Total (L: 45 T: 15) = 45 Hours

Course Outcomes:

1. Know the basic concept of process model and process technology.
2. Describe the various models in software requirement technique strategies.
3. Describe the concept of design of software.
4. Apply the concept of software testing strategies.
5. Predict the software project.

Text Book :

1. Roger S.Pressman, Software Engineering- A practitioners Approach, McGraw Hill International Ed., 7th Ed., 2010.

Reference Books :

1. Ian Summerville, Software Engineering, Pearson education Asia, 6th edition, 2006
2. PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997
3. James F Peters and Witold P, “Software Engineering – An Engineering Approach”,John and Sons, Delhi, 2000

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SEMESTER - III

		L	T	P	C
CA16313	**JAVA PROGRAMMING**	3	0	0	3

Prerequisite: **Object Oriented Programming using C++**

Objectives:

- *To understand the basic programming concepts of java.*
- *To know how to import user defined package, to create thread program and string methods.*
- *To learn about the input/output and networking package classes and methods.*
- *To learn about the abstract windowing toolkit and applet package classes and methods.*
- *To understand the basic concept of swing, JDBC and servlet.*

UNIT - I **OOPS CONCEPT, OVERVIEW OF JAVA, INHERITANCE AND METHODS** **[9]**

Object Oriented Programming Concepts- Introduction- Lexical Issues- Data Types- Variables and Arrays Operators – Control Statements – Methods –Method Overriding.

UNIT - II **USER DEFINED PACKAGES, THREAD PROGRAMMING, STRING AND STREAM** **[9]**

Packages – Importing Packages- I/O Package – Interfaces – Exception Handling – Multithreaded Programming- String Operations. The Java I/O Classes– File – Byte Streams – The Character Streams – Serialization.

UNIT - III **JAVA PACKAGES: AWT, APPLET** **[9]**

AWT Package: AWT Classes – Window Fundamentals – Working with Graphics– Working with Color – Working with Fonts – Applet Package: Applet Basics – Applet Architecture – Reading and Writing in Console – Print Writer class.

UNIT - IV **JAVA SWING** **[9]**

Java Swing-Applet-Icons and Labels-Text Fields-Buttons-Combo Box-Tabbed Panes-Scroll Panes-Trees-Tables-Exploring Swing.

UNIT - V **SOFTWARE DEVELOPMENT USING JAVA AND SERVLET** **[9]**

JDBC – Servlets – Life Cycle of a Servlet – The Servlet API –Servlet and Http Package.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the basic object oriented programming concepts and know the origin of java programming.
2. Identify different operations through single packages and understanding the String concepts.
3. Learning the concept of java I/O packages.
4. Understanding the concept of AWT package.
5. Describe the concept of server side programming and perform database connectivity using JDBC.

Text Book :

1. Herbert Schildt" The Complete Reference JAVA", 7th Edition-, Tata McGraw Hill, 2007.

Reference Books :

1. Herbert Schildt,"The Complete Reference", 8th Edition-, Tata McGraw Hill, 2011.
2. Kogent,"Java 6 Programming Black Book" Edition 2011, Kogent Learning Solutions.
3. Steven Holzner, "Java2(JDK 5 Edition) Programming" 2007 edition

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SEMESTER – III

		L	T	P	C
CA16314	**COMPUTER GRAPHICS AND MULTIMEDIA**	**3**	**2**	**0**	**4**

Prerequisite: Data Structures & Photoshop

Objectives:

- *To learn the basics of computer graphics.*
- *To understand transformations in 2D and 3D graphics.*
- *Understanding multimedia techniques utilized in text, audio, video, graphics & animation.*

UNIT - I INTRODUCTION [12]

Introduction, Application area of Computer Graphics, Overview of Graphic System, Video-Display Devices, Raster-Scan Systems, Random Scan Systems, Graphics Monitors, Work Stations and Input Devices-Output Primitives: Points and Lines, DDA and Bresenham's Line Drawing Algorithms, Mid-Point Circle Algorithm.

UNIT - II 2D TRANSFORMATIONS AND VIEWING, CLIPPING CONCEPTS [12]

2-D Geometrical Transformations: Translation, Scaling, Rotation, Reflection and Shear Transformation Matrix Representations and Homogeneous Co-Ordinates, Composite Transformations, Transformations Between Coordinates- 2-D Viewing : The Viewing Pipe-Line, Viewing Coordinate Reference Frame, Window to View-Port Co-Ordinate Transformations, Viewing Function, Cohen-Sutherland Line Clipping Algorithms, Sutherland- Hodgeman Polygon Clipping Algorithm.

UNIT - III 3D TRANSFORMATIONS & VISIBLE SURFACE DETECTIONS TECHNIQUES [12]

3-D Geometric Transformations: Translation, Rotation, Scaling, Reflection and Shear Transformation and Composite Transformations-Visible Surface Detection Methods: Classification, Back-Face Detection, Depth-Buffer, Scan-Line, Depth Sorting.

UNIT - IV **OVERVIEW OF MUTIMEDIA [12]**

Introduction-Multimedia Presentation and Production-Characteristics of a Multimedia Presentation-Multiple Media –Hardware and Software Requirements –Use of Multimedia-Steps for Creating a Multimedia Presentation-Digital Representation-Introduction-Analog Representation-Waves-Digital Representation-Need for Digital Representation-Analog to Digital Conversion –Digital to Analog Conversion-Pulse Modulation-Video Display Systems-Video Adapter Card-Video Display Cable-LCD.

UNIT - V MULTIMEDIA SYSTEMS AND APPLICATIONS [12]

Introduction –Text-Types of Text – Font-Text Compression-File Formats- Image-Image Types-Seeing Color-Basic Steps for Image Processing –CMS- Image Processing Software-File Formats -Graphics – Advantage of Graphics –Use of Graphics-Components of Graphics System-Audio-Nature of Sound Waves –Fundamentals Characterics of Sound-Elements of Audio Systems-Amplifier-Loudspeaker -MIDI-MIDI Messages-MIDI Connections-Audio Processing Software-Video-Transmission of Video Signals – Video File Formats-PC Video-Video Editing-Video Editing Software-Animation-Historical Background-Uses of Animation-Key Frames & Tweening-Types of Animation-Animation Software-File Formats.

Total (L : 45 T : 15) = 60 Hours

Course Outcomes:

1. Recognize different types of output primitives in graphics system.
2. Implement the basics of transformations.
3. Understand the application of clipping algorithms.
4. Knowledge about the features of different types of multimedia.
5. Knowledge about various multimedia applications.

Text Books :

1. "Computer Graphics C version" Donald Hearn and M. Pauline Baker, Pearson/PHI, 7th Impression 2008.(I-III)
2. Ranjan Parekh, "Principles of Multimedia", reprint 2010, Tata McGraw-Hill Education. (IV Unit & V Unit)

Reference Books :

1. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc- Grew hill edition.
2. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Grew hill, 2nd edition.
3. Ralf Steinmetz, Klara steinmetz, "Multimedia Computing, Communications and Applications", 2004, Pearson edu.
4. Prabat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

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SEMESTER - III

		L	T	P	C
CA16315	**INFORMATION SECURITY**	3	0	0	3

Prerequisite: Networks

Objectives:

- To understand the role of access control in information systems.
- To explain the cryptanalysis for various ciphers.
- To exemplify the attacks on software and its solutions.
- To explore the operating system security mechanisms.
- To learn the methods to prevent the system and network intrusions.

UNIT - I ACCESS CONTROL [9]

Authentication - Passwords – Biometrics – Two Factor Authentication –Authorization - Access Control Matrix - Multilevel Security Model - Covert Channel - Authentication Protocols - Perfect Forward Secrecy-Confidentiality Policies - Integrity Policies - Hybrid Policies.

UNIT - II CRYPTANALYSIS OF CIPHERS [9]

Classical Ciphers-Symmetric Key Ciphers-Stream Ciphers-Block Ciphers-Public Key Ciphers-RSA-Diffie-Hellman-Linear and Differential Cryptanalysis-Tiny DES-Linear and Differential Cryptanalysis of Tiny DES- Side Channel Attack on RSA-Lattice Reduction and the Knapsack-Hellman's Time-Memory Tradeoff.

UNIT - III ATTACKS ON SOFTWARE [9]

Software Flaws-Buffer Overflow-Incomplete Mediation-Race Conditions-Malware-Software Based Attacks-Salami-Linearization-Time Bombs-Trusting Software-Insecurity in Software-Software Reverse Engineering-Software Tamper Resistance-Digital Rights Management-Software Development Issues.

UNIT - IV OPERATING SYSTEM SECURITY [9]

Operating System Security Functions-Separation-Memory Protection-Access Control-Trusted Operating System-MAC-DAC-Trusted Path-Trusted Computing Base-Next Generation Secure Computing Base-Feature Groups-Compelling Applications-Evaluating Systems: TCSEC, FIPS140, The Common Criteria, SSE- CMM.

UNIT - V SYSTEM AND NETWORK SECURITY [9]

Preventing System Intrusions-Guarding Against Network Intrusions-Identity Management-Identity Theft-Penetration Testing-Vulnerability Assessment.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Exercise the access control mechanism for better authentication and authorization.
2. Perform cryptanalysis for various ciphers.
3. Apply solutions to overcome the attacks on software.
4. Deploy the various techniques to secure the operating systems.
5. Develop solutions to guard against system and network intrusions.

Text Book :

1 Mark Stamp," Information Security: Principles and Practice", John Wiley & Sons, 2006.

Reference Books :

1. Matt Bishop, "Introduction to Computer Security", Pearson Education, First Edition, 2005.
2. John R.Vacca (Ed),"Computer and Information Security Handbook", Morgan Kaufman, Second Edition, 2013.
3. Charles P.Pfleeger and Shari Lawrence Pfleeger, "Security in Computing ", Prentice Hall, Fourth Edition, 2006
4. Michael Whitman, and Herbert Mattord "Principles of Information Security", 4th Edition, Cengage Learning, 2012.
5. William Stallings, "Cryptography and Network Security: Principles and Practices", Pearson Edu, 3rd Edition, 2011.

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SEMESTER - III

		L	T	P	C
CA16321	**NETWORKS LAB**	0	0	3	2

Prerequisite: **Computer Networks**

Objective:

- *To learn socket programming and to analyze the performance of protocols in different Layers in computer networks.*

List of Experiments

01. Applications using TCP Sockets Like
    A. Echo Client and Echo Server.
    B. File Transfer.
02. Applications using UDP Sockets Like
    A. DNS.
03. Applications using Raw Sockets Like
    A. Ping.
04. RPC
05. Experiments using Shortest Path Routing Protocols
06. Sliding Window Protocol
07. Implementation of ARP
08. Implementation of RARP
09. Development of Applications Such As Multiuser Chat
10. Development of Applications Such URL Web Page Downloading

Total : 45 **Hours**

Course Outcomes:

1. Demonstrate the applications using TCP sockets like echo client, echo server and file transfer.
2. Illustrate the applications using raw sockets like ping, trace route.
3. Experiments using shortest path routing protocols.
4. Develop an application such as HTTP and E-Mail.
5. Perform the concept of multiuser chat application.

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SEMESTER - III

		L	T	P	C
CA16322	**JAVA PROGRAMMING LAB**	0	0	3	2

Prerequisite: **C++ Lab**

Objective:

- *To know about the Assembler, Loader, Linker and Macro processor functions*

List of Experiments

1. Write a Java Program to Illustrate the use of Object Oriented Programming Concepts
2. Write a Java Program to Illustrate the use of Overriding.
3. Write a Java Program to Implement String Handling Functions.
4. Write a Java Program to Implement File Operations.
5. Create a Calculator Using AWT Controls and use Event Handling for Calculations.
6. To Illustrate a Java Program to Implement Java Database Connectivity
7. Create a Java Application for Payroll Calculation use Database Connectivity
8. To Develop an Applet Program for Conducting Online Exam using Swing.
9. To Develop a Java Program to Create an Application using Servlet for Conducting Online Reservation.

Total : 45 **Hours**

Course Outcomes:

1. Demonstrate the concepts of overriding.
2. Implement the exception handling concept.
3. Perform the concept of downloading web pages.
4. Perform the programs applet.
5. Develop a program using servlet.

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SEMESTER - III

		L	T	P	C
CA16323	**COMPUTER GRAPHICS AND MULTIMEDIA LAB**	0	0	3	2

Prerequisite: *C,C++,Photoshop, Flash*

Objectives:

- *To develop the graphics programming skills.*
- *To develop the multimedia skills.*

List of Experiments

1. To Implement the Graphics Concepts for Creating A Circle & Ellipse.
2. To Implement the Concepts of 2D Transformations
3. To Implement the Concepts of 2D Composite Transformations
4. To Implement the Concepts of 3D Transformations
5. To Implement the Concepts of 3D Composite Transformations
6. To Implement the Concepts of Clipping
7. Image Editing using Photoshop
   a. Color Model - RGB , CMY, YUV
   b. Cropping
   c. Converting Into Different File Formats
   d. Noise Reduction
8. Change A Circle Into A Square using Flash.
9. Create An Animation using Flash With Action Script (Add Required Sound And Video Files).
10. Create an Animation Showing the Animals in ZOO using Flash & Action Script. (Duration of Show Is 10 Minutes & use Sound Clips, Video Clips and Images)

Total : 45 **Hours**

Course Outcomes:

1. Ability to use the concepts of 2D and 3D transformations an composite transformations
2. Handling visible surface detection
3. Implement the concept of clipping
4. Develop the concept of image editing tools using Photoshop
5. Create a animation using flash

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SEMESTER - III

		L	T	P	C
HR16041	**CAREER BUILDING SKILLS – I**	0	2	0	1

Objective:

- *To expose the student to the concepts of communication and provide them problem solving skills.*

UNIT - I EFFECTIVE ENGLISH – WRITTEN AND SPOKEN ENGLISH [08]

Basic Rules of Grammar - Parts of Speech – Tenses – Verbs. Sentence Construction - Vocabulary – Idioms & Phrases – Synonyms – Antonyms. Dialogues and Conversations – Writing Exercises to Practice and Improve these Skills.

UNIT - II ART OF COMMUNICATION & THE HIDDEN DATA INVOLVED [04]

Verbal Communication - Effective Communication - Active listening –Paraphrasing – Feedback, Non Verbal Communication - Body Language of Self and Others, Importance of Feelings in Communication - Dealing with Feelings in Communication.

UNIT - III WORLD OF TEAMS [04]

Self Enhancement - Importance of Developing Assertive Skills- Developing Self Confidence – Developing Emotional Intelligence, Importance of Team work – Team vs. Group - Attributes of a Successful Team – Barriers Involved, Working with Groups – Dealing with People- Group Decision Making.

UNIT - IV QUANTITATIVE APTITUDE I [07]

Speed Math– HCF & LCM – Ratio & Proportions – Profit & Loss – Number System – Simple Interest & Compound Interest

UNIT - V REASONING I [07]

Odd Man Out – Coding and Decoding – Mathematical Operations – Arithmetic Reasoning – Seating Arrangement

Total (L: 0 T: 2) =30 Hours

Course Outcome:

1. Student able to compete the competitive exams and improve the communication skills.

Text Books :

1. Jeff Butterfield, Soft Skills for Everyone, Cengage Learning India Pvt Ltd, New Delhi, 2011 edition
2. E.Suresh,P.Srihari&J.Savithri –Communication Skills and Soft Skills: An Integrated Approach, 2011 ed.,Pearson, Delhi.
3. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, , 4th edition, TMH

Reference Books :

1. Bhatnagar Nitin Communicative English for Engineers and Professionals,2010 edition of Pearson Pub,New Delhi.
2. V.Sasikumar,P.KiranmaiDutt&GeethaRajeevan,Listening&Speaking,Reprint 2007 Pearson Education, New Delhi.
3. R.V.Praveen, Quantitative Aptitude and Reasoning, PHI
4. R.S.Agarwal, Quantitative Aptitude, 3rd edition,TMH

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SEMESTER - IV

		L	T	P	C
CA16411	**C# AND .NET**	3	2	0	4

Prerequisite: **Object Oriented Programming Using C++**

Objectives:

- *To properly plan and code increasingly more difficult object- oriented, event-driven programs using .NET.*
- *To create user-friendly window based and web based applications.*
- *To build simple applications using AJAX tools in .NET and also in XML.*

UNIT - I .NET FRAMEWORK [12]

.NET Architecture – Framework Base Classes and Libraries – Namespaces - Assemblies – C# .NET- Declaration – Decision – Iteration Statements, Inheritance – Operator Overloading –Errors and Exceptions – Arrays and Collections – Delegates and Events – Garbage Collection and Resource Management.

UNIT - II WINDOWS APPLICATION AND ADO.NET [12]

Introduction – Working with Menus and Dialog boxes - Architecture of ADO.NET – Connected and Disconnected Database – Working with Data Binding and Datasets.

UNIT - III BUILDING WEB APPLICATIONS [12]

Introduction – State Management – Data Access – Data Components and the Dataset – Building a Data Access Component–Adapter Class– Data View Class- Rich Data Controls-Formatting the Grid View –Sorting the Grid View-Data View & Form View.

UNIT - IV BUILDING WEB APPLICATIONS WITH AJAX EXTENSIONS [12]

User Controls-Adding Code to User Control – Themes and Master Pages – Themes-Master Page Design– Website Navigation-Sitemaps –Tree View- Control –Menu Control – Resources and Localization-What is AJAX? – ASP.NET and AJAX – ASP.NET Server –Side Support for AJAX – AJAX Client Support – Getting Familiar with AJAX – The Timer – Updating Progress .

UNIT - V XML AND WEB SERVICES [12]

Introduction – Writing and Reading XML Programmatically – Displaying XML Content with XSL – XML Data Binding –Overview of Web Services – Web Services Standards and Protocols – Creating a Web Service – Using a Web Service – Securing Web Service

Total (L: 45 T: 15) = 60 Hours

Course Outcomes:

1. Explore the .NET architecture and its classes.
2. Discuss about the windows application with ADO.NET.
3. Building of web applications with basic concepts.
4. Appraise building web applications with AJAX extensions.
5. Discuss the XML programming concepts and with ADO.NET.

Text Book :

1. John Sharp, “Visual C# 2005 Step by Step “, Microsoft, Prentice Hall of India (P) Ltd., 2007(Unit 1, 2).

Reference Books :

1. Matthew MacDonald and Mario Szpuszta, “Pro ASP.NET 2.0 in C# 2005”, A Press(Unit 3, 5[XML]).
2. Kathleen Kalata “Web Applications using ASP.NET 2.0”, Cenage Learning, 2007 (Unit 5 [web Service]).
3. Microsoft ASP.NET 4 Step by Step, George Shepherd, PHI Learning Private Limited, 2010 (Unit [AJAX]).

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SEMESTER - IV

		L	T	P	C
CA16412	**OBJECT ORIENTED ANALYSIS AND DESIGN**	3	2	0	4

Prerequisite: **System Analysis and Design**

Objectives:

- *To learn the basic principles of objects and object oriented system development life cycle.*
- *Learn to apply the unified modeling language (UML) to elementary object- oriented analysis and design concepts.*
- *Understanding the object oriented analysis process.*
- *Effectively use system requirements to drive the development of a robust design model.*
- *Showing how implementation & storage details of a system can be modeled.*

UNIT - I INTRODUCTION [9]

An Overview of Object Oriented Systems Development – Object basics: Object State and Properties – Object Behavior & Methods – Messages – Data Abstraction - Encapsulation– Class Hierarchy – Object Relationships & Associations – Aggregation – Identity – Dynamic Binding – Persistence – Object Oriented System Development Life Cycle

UNIT - II METHODOLOGIES AND UML [9]

Introduction –Modeling Technique: Rumbaing, Booch, Jacobson Methods – Patterns – Frameworks – Unified Approach – Unified Modeling Language: Static and Dynamic Models – UML Diagrams – Class Diagram – Use Case Diagrams – Case Study of Dynamic modeling.

UNIT - III OBJECT ORIENTED ANALYSIS PROCESS [9]

Identifying Use Case: Business Object Analysis – Use Case Driven Object Oriented Analysis – Use Case Model – Documentation – Classification – Identifying Object- Relationships- Attributes and Methods – Super– Sub Class – Case Study of Analysis Process

UNIT - IV OBJECT ORIENTED DESIGN PROCESS [9]

Design Process – Designing Classes: Class Visibility – Refining Attributes – Methods and Protocols – Packaging and Managing – Designing Interface Objects: Macro and Micro Level Processes – Case Study of Design Process.

UNIT - V OBJECT STORAGE AND OBJECT INTEROPERABILITY [9]

Object Store and Persistence – Database Management Systems – Distributed Databases and Client - Server Computing –Object Relational Systems - Object Oriented Databases Vs Traditional Databases.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognizing the object state and properties, object behavior & methods and messages.
2. Discuss about the modeling technique: rumbaing, booch, jacobson methods.
3. Appraise use case driven object oriented analysis and use case model.
4. Identify the class visibility, refining attributes, methods and protocols.
5. Compare objects oriented databases vs. traditional databases.

Text Book :

1. Ali Bahrami, “Object Oriented System Development”, McGraw Hill International Edition, 2008

Reference Books :

1. Craig L, “Applying UML and Patterns”, 3rd Edition, Pearson, 2009.
2. Grady B, James R, Ivar J, “The Unified Modeling Language User Guide”, Addison Wesley Long man,4thEd.2008.

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SEMESTER - IV

		L	T	P	C
CA16413	**WEB TECHNOLOGY**	3	0	0	3

Prerequisite: **JAVA Programming**

Objectives:

- To learn basics of web designing.
- To know about dynamic webpage creation.
- To under standard bean programming.
- To learn about server side programming.
- To study about web technology.

UNIT - I **HTML & XML** **[12]**

HTML- Forms, Frames, Tables, Simple Web Page Design, Introduction to XML-XML Versus HTML, Electronic Data Interchange(EDI),XML Terminology, Introduction to Document Type Declaration (DTD), Element Type Declaration Attribute Declaration, Limitation of DTDs, Introduction to Schema, Complex Types, Extensible Style Sheet Language Transformations.

UNIT - II **DYNAMIC HTML** **[12]**

Dynamic HTML – Cascading Style Sheet, Java Script –Introduction, Control Structure, Functions, Arrays, Standard Objects, Event Model, Simple Web Page Design.

UNIT - III **BEAN PROGRAMMING** **[12]**

Java Bean - Introduction, Advantages of Java Beans, Introspection, Bound and Constrained Properties, Persistence, Customizers, The Java Bean API, A Bean Example.

UNIT - IV **SERVER SIDE PROGRAMMING** **[12]**

Introduction to Java Servlet and JSP, Creating and Testing Servlets, Servlet Examples, Session Management.

UNIT - V **JAVA WEB TECHNOLOGIES** **[12]**

Introduction to JSP, JSP and JDBC, Apache Struts, Java Server Faces (JSF), Enterprise Java Bean (EJB), EJB Architecture-Overview, Types of EJB, Session Bean, JNDI Lookup.

Total (L: 45 T:15) = 60 Hours

Course Outcomes:

1. Understand the concept of HTML and design a web page using HTML.
2. Demonstrate the java script program using CSS Window and document objects and their properties.
3. Know the concept of java swing and java bean.
4. Demonstrate the servlets to invoke data from HTML forms using Java.
5. Understand the concept of hibernate frameworks and its database connectivity.

Text Books :

1. Achyut S G & Atul K,"WebTechnologies-TCP/IP,Web/JavaProgramming,&Cloud Computing"3rd ed,9th reprint 2013.
2. Herbert Schildt, "JavaTM: The Complete Reference", 9th Edition, Oracle Press, Tata McGraw Hill, 2014.

Reference Books :

1. Deital & Deital, Internet and World Wide Web – How to program, Pearson, 2011
2. Margaret Levine Young and Doug Muder,"Internet:The Complete Reference" 1st Ed,Tata Mcgrawhill, 2011.
3. Kogent, "Java 6 Programming Black Book" Edition 2011, Kogent Learning Solution.

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SEMESTER - IV

		L	T	P	C
CA16421	**C# AND .NET LAB**	0	0	3	2

Prerequisite: **Object Oriented Programming Using C++ Lab**

Objectives:

- *To properly plan and code increasingly more difficult object- oriented, event-driven programs using C#.*
- *To incorporate web programming concepts into the ASP.NET environment.*
- *To create user-friendly screens, forms, etc. using the windows controls available in C#.*
- *To manipulate database concept in ADO.NET.*
- *To create simple web service.*

List of Experiments

1. A Bank Collects an Interest on 10% on loans given up to Rs.5000, 12% for Loans between Rs.5001 and Rs.10000 and 15% for loans above Rs.10000. Write a Console Application to find One Year Interest for a given amount according to the above Lending Policy.
2. Define a Class Named amount. It should have the two variables, Namely Rupees and Paise. It should have One Method to Read in the Values of These Two Variables. Write an Operator Overloading Method for Adding two amounts. Write a Method to Display Amount1, Amount2 and Total Amount. Within the Main () Method Create the Objects Amount1, Amount2. Make Use of the Operator Overloading Method to Compute the Total Amount.
3. Create Student Personal Details using Windows Application.
4. Develop a Standard Calculator Widget using Windows Form.
5. Create a Library Book Details Form and using Menu Items Add Edit And Delete the Book Details using Dialog Boxes in Windows Forms.
6. Create a Student Details Database. Use Dataset with a Datagridview Control to Display the Student's Details in Windows Forms.
7. Create an ASP.NET Application to Get a User Name and Store It Session Information. Write an Application to Retrieve the User Name Stored in Session.
8. Create a Simple Database Component Using ASP.NET.
9. Develop a .NET Application to Read and Write XML Data.
10. Develop a Web Service.

Total : 45 **Hours**

Course Outcomes:

1. Implement overloading concept for calculating total amount.
2. Develop a standard calculate widget using windows form.
3. Perform student database in windows form and develop ASP .NET application.
4. Develop simple database components using ASP .NET.
5. Illustrate the concept of web services.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16422	**WEB TECHNOLOGY LAB**	0	0	3	2

Prerequisite: **JAVA Programming Lab**

Objectives:

- Understand the basics of webpage creation.
- To create dynamic WebPages.
- Create applications using advanced java tools.

List of Experiments

1. Create a Web Page Using HTML.
2. To Create an Html File to Link to Different Html Page which contains Images, Tables, and also link within a Page.
3. Design a XML Document to Store Information About a Student In a College. The Information Must Include Register Number. Name, Name of the College, Branch, Year of Joining and E-Mail Id. Make Up Simple Data for Three Students. Create a CSS Style Sheet and Use It To Display the Document.
4. Create an XML Document, which contains 10 user information. Implement a Program, which takes Userid as an Input and Returns The user details by taking the user Information from XML Document.
5. Create a Web Page with all types of Cascading Style Sheets using our College Information.
6. Client Side Scripts for Validating Web Form Controls Using DHTML.
7. Create a Java Bean to draw various Graphical Shapes and Display it using BDK.
8. Patient Information System: This Software can be used to keep track of the Patients' Information and Treatment Details in a Hospital or Clinic. using JSP, Servlet & JDBC.
9. Write a Program Java to Create Three-Tier Applications using JSP and Database for Conducting On-Line Examination for Displaying Student Mark List. Assume that Student Information is available in a Database which has been stored in a Database Server.
10. Write a Program to Implement Banking Operation using EJB.

Total : 45 **Hours**

Course Outcomes:

1. Demonstrate the Java program for socket using HTTP.
2. Design a XML document to store information about a student in a college.
3. Illustrate a web page with all types of cascading style sheets using our college information.
4 Perform a java bean to draw various graphical shapes and display it using BDK.
5. Design a program to implement banking operation using EJB.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
HR16042	**CAREER BUILDING SKILLS – II**	0	2	0	1

Objectives:

- *To inculcate people skills, time management and to enhance employability.*
- *To enhance arithmetical & analytical ability.*

UNIT - I **INTERVIEW & GD** **[04]**

Interview Handling Skills – Self Preparation Checklist – Grooming Tips: Do's & Don'ts – Mock Interview & Feedback, GD Skills – Understanding the Objective and Skills Tested in a GD – General types of Gds – Roles in a GD – Do's & Don'ts – Mock GD & Feedback.

UNIT - II **PRESENTATION SKILLS** **[05]**

Presentation Skills – Stages Involved in an Effective Presentation – Selection of Topic, Content, Aids – Engaging the Audience – Time Management – Mock Presentations & Feedback.

UNIT - III **BUSINESS ETIQUETTE & ETHICS** **[07]**

Grooming Etiquette – Telephone & E-Mail Etiquette – Dining Etiquette – Do's & Don'ts in a Formal Setting – How to Impress. Ethics – Importance of Ethics and Values – Choices and Dilemmas Faced – Discussions From News Headlines.

UNIT - IV **QUANTITATIVE APTITUDE II** **[07]**

Areas – Volumes – Heights & Distances – Partnerships & Shares – Chain Rule – Allegation & Mixtures – Time & Work – Pipes & Cisterns, Time and Distance, Problems on Trains.

UNIT - V **REASONING II** **[07]**

Blood Relations – Series Completion – Venn Diagrams – Direction Sense Test– Verbal Reasoning -1.

Total (L: 0 T:2) =30 Hours

Course Outcome:

1. Student compete quantitative aptitude and they can manage time and stress.

Text Book :

1. Jeff Butterfield, Soft Skills for Everyone, Cengage Learning India Pvt Ltd, New Delhi, 2011 edition.

Reference Books :

1. E.Suresh Kumar, P.Srihari & J.Savithri – Communication Skills and Soft Skills: An Integrated Approach, 2011 ed., Pearson New Delhi.
2. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, , 4th edition, TMH
3. Bhatnagar Nitin Communicative English for Engineers and Professionals,2010 ed of Pearson Publication,Delhi.
4. V.Sasikumar, P.Kiranmai Dutt & Geetha Rajeevan,Listening&Speaking,Reprint 2007 Pearson Education, Delhi.
5. R.V.Praveen, Quantitative Aptitude and Reasoning, PHI.
6. R.S.Agarwal, Quantitative Aptitude, 3rd edition,TMH.

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SEMESTER - V

		L	T	P	C
CA16511	**CLOUD COMPUTING**	3	2	0	4

Prerequisite **:Distributed Computing**

Objectives:

- *To understand the cloud computing and its services available today.*
- *To understand all platforms, cloud infrastructure and technologies.*
- *To understanding the mobile cloud, wap and other protocols.*
- *To use google and amazon web services.*

UNIT - I UNDERSTANDING CLOUD COMPUTING [12]

Defining Cloud Computing - Cloud Types - Examining the Characteristics of Cloud Computing - Assessing the Value Proposition – Measuring the Cloud's Value - Avoiding Capital Expenditures - Understanding Cloud Architecture - Exploring the Cloud Computing Stack - Connecting to the Cloud Understanding Services-Defining Infrastructure as a Service.

UNIT - II USING PLATFORMS [12]

Understanding Abstraction and Virtualization – Capacity Planning – Defining Baseline and Metrics- Network Capacity – Exploring Platform as a Service – Using Google Web Services – Surveying the Google Application Portfolio – Using Amazon Web Services

UNIT - III EXPLORING CLOUD INFRASTRUCTURE [12]

Managing the Cloud – Administrating the Clouds – Cloud Management Products – Emerging Cloud Management Standards – Understanding Cloud Security – Securing the Cloud – Securing Data – Establishing Identity and Presence.

UNIT - IV UNDERSTANDING SERVIES AND APPLICATIONS [12]

Understanding Service Oriented Architecture –Defining SOA Communications-Managing and Monitoring SOA - Moving Applications to the Cloud - Working with Cloud-Based Storage-Exploring Cloud Backup Solutions – Working With Productivity Software.

UNIT - V USING THE MOBILE CLOUD [12]

Working with Mobile Devices - Defining the Mobile Market – Using Smart Phones with the Cloud – Working with Mobile Web Services – Understanding Services Types – Performing Services Discovery – Using SMS – Defining WAP and Other Protocols – Performing Synchronization.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Know the characteristics of cloud computing and its types.
2. Illustrate the cloud service models and cloud deployment models.
3. Develop an application using paas application frameworks.
4. Explore the microsoft cloud services- windows azure platform.
5. Understand the purpose of service oriented architecture (SOA).

Text Book :

1. Barrie Sosinsky, Cloud Computing Bible, Wiley Publishing, Reprint 2011.

Reference Books :

1. Michael Miller, Cloud Computing: Web-Based Applications , 1st Ed., Que Publishing, and August 2008.
2. Anthony T V, Toby J V, Robert E, Cloud Computing: A Practical Approach,3rd Ed., Tata McGraw-Hill 2010.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER – V

		L	T	P	C
CA16512	**SOFTWARE TESTING AND QUALITY ASSURANCE**	3	0	0	3

Prerequisite: **Software Engineering**

Objective:

- *To learn detail about testing fundamentals, testing management, software quality metrics, details of software quality assurance and testing projects.*

UNIT - I TESTING FUNDAMENTALS [9]

Principles of Testing- Testing, Verification and Validation – Process Model to represent Different Phases – Software Development Life Cycle Models.

UNIT - II TESTING TYPES [9]

Types of Testing – White Box Testing – Black Box Testing – Integration Testing – System and Acceptance Testing – Performance Testing – Regression Testing - Internalization Testing – Ad Hoc Testing

UNIT - III SPECIALIZED TESTING [9]

Testing of Objects Oriented Systems – Difference In OO Testing – Tools for Testing of OO Systems – Usability and Accessibility Testing – Testing for Usability.

UNIT - IV ORGANIZATIONAL ISSUES IN TESTING [9]

Common People Issues – Comparison between Testing and Development Functions – Organization Structures for Testing Team – Testing Services Organizations.

UNIT - V TESTING MANAGEMENT AND AUTOMATION [9]

Introduction – Test Planning – Test Management – Test Execution – Software Test Automation – Scope of Automation – Test Automation Tools – Generic Requirement for Test Tool/Framework – Selecting a Test Tool – Challenges in Automation.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Know to basic concepts of software testing and life cycle model.
2. Realize he concept software testing planning and management.
3. Understand the concept of software measurement.
4. Determine the software quality assurance.
5. Express the concept of managing testing projects and groups and its role.

Text Book :

1. Gopalswamy R and Srinivasan D, “Software Testing: Principles and Practices”, P E, New Delhi, 2013.

Reference Books :

1. Glenford J M, Corey S, Tom Badgett and Todd M Thomas, “The Art of Software Testing”, Wiley, USA, 2004.
2. Ilene B, “Practical Software Testing”, Springer – Verlag, New Delhi, 2003.
3. John D Mr and David A S, “A Practical Guide to Testing Object-Oriented Software”, Addison-Wesley, 2001.
4. Stephen H Kan, “Metrics and Models in Software Quality Engineering”, Pearson Education, New Delhi, 2002.
5. William E Perry, “Effective Methods for Software Testing”, Wiley, New York, 2000.

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SEMESTER - V

		L	T	P	C
CA16513	**MOBILE APPLICATION DEVELOPMENT**	3	2	0	4

Prerequisite: **Software Project Management**

Objective:

- To expose students in open source computing environment and introduce them to use open source packages explore implementations of some of the underlying technologies of open source applications.

UNIT - I INTRODUCTION TO ANDROID [12]

A Little Background – What Android Isn't – An Open Platform for Mobile Development – Native Android Applications – Android SDK Features – Introducing the Open Handset Alliance – What Does Android Run On? – Why Develop for Mobile? – Why Develop for Android? – Introducing the Development Framework: What Comes In the Box? – Understanding the Android Software Stack – The Dalvik Virtual Machine – Android Application Architecture.

UNIT - II DEVELOPING FOR ANDROID [12]

What You Need to Begin –Downloading and Installing the Android SDK – Developing with Eclipse – Using the Android Developer Tools Plug-In for Eclipse – Using the Support Package –Creating your first Android Application: Creating a New Android Project – Creating an Android Virtual Device – Creating Launch Configurations – Running and Debugging your Android Application – Types of Android Applications – Android Development Tools.

UNIT - III CREATING APPLICATIONS AND ACTIVITIES [12]

What Makes an Android Application?– Introducing the Application Manifest File – Using the Manifest Editor the Android Application Lifecycle – Understanding and Application's Priority and its Process States – Introducing the Android Application Class – A Closer Look at Android Activities.

UNIT - IV AUDIO, VIDEO AND USING THE CAMERA [12]

Playing Audio and Video – Manipulating Raw Audio – Creating a Sound Pool – Using Audio Effects – Using the Camera for Taking Pictures – Recording Video – Using Media Effects – Adding Media to the Media Store.

UNIT - V BLUETOOTH, NFC, NETWORKS AND WI-FI [12]

Using Bluetooth – Managing Network and Internet Connectivity – Managing Wi-Fi – Transferring Data using Wi-Fi Direct – Near Field Communication. Telephony and SMS: Using Telephony – Introducing SMS and MMS.

Total (L: 45 T:15) =60 Hours

Course Outcomes:

1. Understand the basic technologies used by the Android platform.
2. Become familiar with creating graphical elements, handling different screen resolutions.
3. Create graphical user interfaces along with functionality for Android apps.
4. Create various graphical assets for Android apps and create animations and transitions.
5. Learn how the Android platform uses Intents.

Text Book :

1. Reto Meier. Professional Android 4 Application Development. Reprint 2014, Wiley India Pvt Ltd.

Reference Book :

1 Paul D, Harvey D, Abbey D and Michael Morgano. Android for Programmers An App-Driven Approach.

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SEMESTER - V

		L	T	P	C
CA16514	**PHP AND MYSQL**	3	0	0	3

Prerequisite: **Database Management System**

Objectives:

- *Introducing PHP and MySQL.*
- *Understanding the benefits of using PHP.*
- *Integrating PHP and MySQL Database.*
- *Learning about the use of Web forms and JavaScript in PHP.*
- *Understanding Sessions and Cookies in PHP.*

UNIT - I **INTRODUCING PHP** **[9]**

What is PHP? - What is MySQL? – Deciding on a Web Application Platform – Server-Side Scripting Overview Static HTML – Client-Side Technologies – Server Side Scripting – What is Server Side Scripting Good For?.

UNIT - II **PHP BASICS** **[9]**

Learning PHP Syntax and Variables – Control Structures and Functions – Passing Information – String Handling – Arrays.

UNIT - III **INTEGRATING PHP AND MYSQL** **[9]**

Connecting to MySQL - Making MySQL Queries – Fetching Data Sets – Getting Data about Data – Multiple Connections – Building in Error checking – Creating MySQL database With PHP – MySQL Functions – Performing Database Queries : HTML Tables and Database Tables – Complex Mapping – Creating the Sample Tables.

UNIT - IV **INTEGRATING WEB FORMS AND JAVASCRIPT** **[9]**

HTML Forms – Basic Form Submission to a Database – Self-Submission – Editing Data with an HTML Form - Integrating PHP and JavaScript

UNIT - V **WORKING WITH COOKIES AND SESSIONS, PHP TYPES** **[9]**

Session : Session in PHP - Sample Session Code – Session Functions – Configuration Issues – Cookies: Set cookie() function – Deleting Cookies - Reading Cookies - Pitfalls – Sending HTTP Headers - PHP Types : Type Round Up – Type Testing – Assignment and Conversions

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognizing the object state and properties, object behavior & methods and messages.
2. Discuss about the modeling technique: rumbaing, booch, jacobson methods.
3. Appraise use case driven object oriented analysis and use case model.
4. Identify the class visibility, refining attributes, methods and protocols.
5. Discuss the database management systems and compare different databases.

Text Book :

1. Steve Suchring, “PHP6 and MySQL Bible”, John Wiley sons, 2010.

Reference Books :

1. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O‟ Reilly, 2002
2. GNU Developers B.Mahendran, ”Understanding OSTC”, Sai Care Publications, 2009.
3. Dr.N.B.Venkateswarlu,“Introduction to Linux : Installation and Programming”,*BS Publications,*2006,

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SEMESTER - V

		L	T	P	C
CA16521	**SOFTWARE TESTING LAB**	0	0	3	2

Prerequisite: *Basic knowledge in Java with software engineering methods.*

Objectives:

- *To learn software testing techniques for online systems.*
- *Be familiar with GUI object testing.*
- *To learn exception concept in software testing.*

List of Experiments

1. Understand the Automation Testing Approach (Theory Concept).
2. Manual Testing for
   a. Login Page
   b. University Result
3. Using IDE, Write a Test Suite Containing Minimum 4 Test Cases.
4. Conduct a Test Suite for any Two Web Sites.
5. Write Java Script to Develop a Web Page Which Calculates the GCD of 2 Numbers.
6. Write and Test a Program to Login a Specific Web Page.
7. Write the Test Case for any Known Application (Eg - Banking Application).
8. Write and Test a Program to Provide Total Number of Objects Present / Available on the Page.
9. Write and Test a Program to Get the Number of List Items In a List / Combo Box.
10. Write and Test a Program to Count Number of Items on a Desktop.

Course Outcomes:

1. Execute open test tool selenium.
2. Apply software testing techniques for various applications.
3. Implement test cases for GUI objects.
4. Develop exception testing.

Total : **45 Hours**

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - V

		L	T	P	C
CA16522	**PHP AND MYSQL LAB**	0	0	3	2

Prerequisite: **DBMS Lab**

Objectives:

- *Understand the basics of PHP and MYSQL.*
- *Creating a simple programs using PHP.*
- *Knowing the logical of sessions and cookies.*
- *Connecting MYSQL with PHP applications.*

List of Experiments

1. Creating Simple Webpage Using PHP.
2. Create a PHP Program to Find Largest of Three Numbers using Conditional Statements In PHP.
3. Create a PHP Program to Find Factorial of Given Number using Loop Statements.
4. Create a PHP Program to Perform Matrix Multiplication using Arrays.
5. Create a PHP Program to Perform Arithmetic Operation using Functions.
6. Develop a PHP Program to use String Handling Functions.
7. Construct a PHP Program to Pass Value From One From Into Another Form.
8. Develop a PHP Program to use Session and Cookies.
9. Create Database Connectivity in PHP with Mysql.
10. Construct a Dynamic Website for KSR College Of Engineering.

Course Outcomes:

1. Creating simple webpage using PHP.
2. Simple PHP program using conditional statements, array, strings and loops.
3. Factorial program using PHP.
4. PHP program using session and cookies.
5. Web application development with MYSQL.

Total : **45 Hours**

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - V

		L	T	P	C
CA16523	**MOBILE APPLICATION DEVELOPMENT LAB**	0	0	3	2

Prerequisite: **Mini Project**

Objectives:

- *Introducing the basic technologies used by Android.*
- *Understanding the benefits of Android.*
- *Learning about the use of Web forms and link.*
- *Understanding SMS application using Android.*

List of Experiments

1. Create an App to Display Hello World.
2. Create an Application with two edit Text and a Button. When the Button is Clicked, the Text Inputted in Edit Text1 Should be Retrieved and Displayed in EditText2.
3. Creating a Simple Login Application using Android.
4. Creating Calculator Application Using Android.
5. Creating Simple Home Screen Widget in Android.
6. Creating Android Chat App.
7. Create a Camera Application, where You can click a Picture and then Save it as the Wallpaper using Android.
8. Create an Audio Recorder which Will Record the Sound using Android.
9. Create an App using Web Link Application. (E.g. Face Book, Gmail Link In Same Page)
10. Create an SMS Application Using Android.

Course Outcomes:

1. Understand the basic technologies used by the android platform.
2. Become familiar with creating graphical elements, handling different screen resolutions, and how graphical elements in an android app are displayed.
3. Create GUI along with functionality for android apps.
4. Learn how the android platform uses Intents.
5. Understand what is necessary to publish and distribute Android apps.

Total : **45 Hours**

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16461	**COMPILER DESIGN [ELECTIVE]**	3	0	0	3

Prerequisite: **System Software**

Objectives:

- *To provide the idea about the concepts of Compilers.*
- *To gain knowledge about Compiler design, code generation and optimization*

UNIT - I **INTRODUCTION-LEXICAL ANALYSIS** **[9]**

Introduction to Compiling- Compilers-Analysis of the Source Program-The Phases- Cousins-The Grouping of Phases-Compiler Construction Tools. The Role of the Lexical Analyzer- Input Buffering- Specification of Tokens-Recognition of Tokens-A Language for Specifying Lexical Analyzer.

UNIT - II **SYNTAX ANALYSIS** **[9]**

Syntax Analysis- The Role of the Parser-Context-Free Grammars-Writing a Grammar-Top Down Parsing-Bottom-Up Parsing-LR Parsers-Constructing an SLR (1) Parsing Table. Type Checking- Type Systems-Specification of a Simple Type Checker

UNIT - III **INTERMEDIATE CODE GENERATION** **[9]**

Intermediate Languages-Declarations-Assignment Statements - Boolean Expressions- Case Statements- Back Patching-Procedure Calls.

UNIT - IV **CODE GENERATION** **[9]**

Issues in the Design of a Code Generator- The Target Machine-Run-Time Storage Management-Basic Blocks and Flow Graphs- Next-Use Information-A Simple Code Generator-Register Allocation and Assignment-The Dag Representation of Basic Blocks - Generating Code From Tags.

UNIT - V **CODE OPTIMIZATION** **[9]**

Introduction-The Principle Sources of Optimization-Peephole Optimization- Optimization of Basic Blocks-Loops In Flow Graphs- Introduction to Global Data-Flow Analysis-Code Improving Transformations.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Examine the grammar for the generated tokens and solving finite automata for a input string.
2. Solve the left and right most derivation and studying the top down parsing & Bottom up techniques.
3. Examine about the intermediate code representation, statement and expressions.
4. Analyze the function preserving and structure preserving transformation.
5. Summarize about various storage strategies, basic blocks and flow graphs.

Text Book :

1. Alfred V.Aho, Ravi Sethi Jeffrey D.Ullman, “Compilers- Principles, Techniques, and Tools”, Pearson Edu

Reference Books :

1. Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Polishers, 2000.
2. David Galles, “Modern Compiler Design”, Pearson Education Asia, 2007.
3. C. N. Fisher and R. J. LeBlanc “Crafting a Compiler with C”, Pearson Education,2000.

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SEMESTER - IV

		L	T	P	C
CA16462	**TCP/IP [ELECTIVE]**	3	0	0	3

Prerequisite: **Computer Network**

Objective:

- *In-depth study of TCP/IP 5 layers. Topics include internet protocols (IPv4, IPv6, ICMP), addressing (ARP), auto-configuration (DHCP), transport control protocols (TCP), User Datagram Protocol (UDP), Domain Name Services (DNS), end-to-end services.*

UNIT - I **INTRODUCTION** **[9]**

History –Standards – Internet –- OSI model – Protocol suite – Addressing – Transmission Media – Local Area and Wide Area Networks – Switching – Connecting devices – IP Addressing

UNIT - II **INTERNET PROTOCOL** **[9]**

Subnetting – Super netting – IP Packets – Delivery and Forwarding of IP Packets –Datagram – Fragmentation – Options-Checksum – ARP –RARP-Internet Control Message Protocol – Internet Group Management Protocol.

UNIT - III **TCP & UDP** **[9]**

TCP Services –Features-Segmentation-TCP Connection-State Transition Diagram-Windows in TCP-Flow control – Error Control – Congestion Control –Timers-Package-User Datagram protocol – Services-Applications-Package

UNIT - IV **APPLICATION LAYER AND CLIENT SERVER MODEL** **[9]**

Concurrency – BOOTP – DHCP – Domain Name System – Name Space – Distribution – Resolution – Messages – Telnet – Rlogin –Network Virtual Terminal – Character Set – Controlling the Server – Remote Login.

UNIT - V **APPLICATION PROTOCOLS** **[9]**

File Transfer Protocol – Connections – Communication – Simple Mail Transfer Protocol – Simple Network Management Protocol – Hyper Text Transfer Protocol – Transaction – Request and Response messages.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognizing the network components, categories, topology and IP address and compare the ISO/OSI model with TCP/IP protocol suite.
2. Discuss about the functionality of various internet protocols and gain the knowledge of the different routing protocols and algorithms.
3. Appraise User datagram and transmission control protocols.
4. Gain the knowledge of congestion control and QOS techniques and purpose of DNS and client - server model.
5. Compare HTTP, HTTPs and FTP in world wide web.

Text Book :

1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata McGraw Hill Edition, 2010.

Reference Book :

1. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP – Volume I,II III", PHI Pvt. Ltd., 2nd Ed. 2005.

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SEMESTER - IV

		L	T	P	C
CA16463	**UNIX AND NETWORK PROGRAMMING [ELECTIVE]**	3	0	0	3

Prerequisite: **Operating System**

Objectives:

- *To study about concept of processes in UNIX operating systems*
- *To learn different forms of synchronization between processes*
- *To perform TCP and UDP communication in UNIX operating system*
- *To learn the applications of client server communications*

UNIT - I INTRODUCTION & FILE SYSTEM [9]

Overview of UNIX OS - File I/O – File Descriptors – File Sharing - Files and Directories – File Types - File Access Permissions – File Systems – Symbolic Links - Standard I/O library – Streams and File Objects – Buffering - System Data Files and Information - Password File – Group File – Login Accounting – System Identification.

UNIT - II PROCESSES [9]

Environment of a UNIX Process – Process Termination – Command Line Arguments – Process Control – Process Identifiers - Process Relationships Terminal Logins – Signals –Threads

UNIT - III INTERPROCESS COMMUNICATION [9]

Introduction - Message Passing (SVR4)- Pipes – FIFO – Message Queues - Synchronization(SVR4) – Mutexes – Condition Variables – Read – Write Locks – File Locking – Record Locking –Semaphores –Shared Memory(SVR4).

UNIT - IV SOCKETS [9]

Introduction – Transport Layer – Socket Introduction - TCP Sockets – UDP Sockets - Raw Sockets – Socket Options - I/O Multiplexing - Name and Address Conversions

UNIT - V APPLICATIONS [9]

Debugging Techniques - TCP Echo Client Server - UDP Echo Client Server - Ping - Trace Route - Client Server Applications Like File Transfer and Chat.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Compare the system calls and library functions, different types of files and access permissions.
2. Creation of parent and child process and gain the knowledge of the signals and threads.
3. Identify the purpose of interprocess communication system and locking procedure.
4. Recognizing the different multiplexing techniques.
5. Appraise the TCP, UDP sockets and raw sockets.

Text Book :

1. W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 2008.(Unit 1,2 &3).

Reference Books :

1 W.Stevens, Bill F,A R,“Unix Network Programming”,V1,TheSockets Networking API,3rdEd.,PE,Nov 2007(4&5).
2 Meeta G, Tilak S and Rajiv S The ‘C’ Odyssey Unix –The open Boundless C ,1st Ed ,BPB Publications1992.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER – IV

		L	T	P	C
CA16464	**COMPONENT BASED TECHNOLOGY [ELECTIVE]**	3	0	0	3

Prerequisite: **Middleware Technology**

Objectives:

- *Introduce in depth of JAVA, CORBA and .NET components.*
- *To have a clear understanding of software components, component architecture and middleware.*
- *To study the component frameworks and development.*

UNIT - I **INTRODUCTION** **[9]**

Software Components – Objects – Fundamental Properties of Component Technology – Modules – Interfaces – Callbacks – Directory Services – Component Architecture – Components and Middleware

UNIT - II **JAVA COMPONENT TECHNOLOGIES** **[9]**

Java Beans – Events and Connections – Properties – Introspection – JAR Files – Reflection – Object Serialization – Enterprise Java Beans – Distributed Object Models – RMI and RMI – IIOP

UNIT - III **CORBA TECHNOLOGIES** **[9]**

Java and CORBA – Interface Definition Language – Object Request Broker – System Object Model – Portable Object Adapter – CORBA Services – CORBA Component Model – Containers – Application Server – Model Driven Architecture.

UNIT - IV **COMAND .NET TECHNOLOGIES** **[9]**

COM – Distributed COM – Object Reuse – Interfaces And Versioning – Dispatch Interfaces – Connectable Objects – OLE Containers and Servers – Active X Controls – .NET Components - Assemblies – Appdomains – Contexts – Reflection – Remoting.

UNIT - V **COMPONENT FRAMEWORKS AND DEVELOPMENT** **[9]**

Connectors – Contexts – EJB Containers – CLR Contexts and Channels – Black Box Component Framework – Directory Objects – Cross-Development Environment – Component-Oriented Programming – Component Design and Implementation Tools – Testing Tools - Assembly Tools.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understanding the fundamentals of component technology and know about the component architecture and Middleware.
2. Implement the concept of java bean and RMI.
3. Examine the concept of CORBA and perform COM objects.
4. Implements .NET components and understanding the EJB concepts.
5. Implement the concept of component oriented programming.

Text Book :

1. Clemens Szyperski, “Component Software Beyond Object Oriented Programming”,Addison Wesley, 2nd 2007.

Reference Books :

1. Ed Roman, “Enterprise Java Beans”, Third Edition, Wiley, 2005.
2. Gerald B, Andreas Vogel, Keith Duddy, “Java Programming with CORBA”, 3rd Ed., John Wiley & Sons 2001.

SEMESTER - IV

		L	T	P	C
CA16465	**DATABASE TECHNOLOGIES [ELECTIVE]**	3	0	0	3

Prerequisite: **DBMS**

Objective:

- *To get a comprehensive knowledge of the advance database systems, to understand the distributed, object oriented & relational database design, to learn data models & their use in high end applications, and to know the current issues in databases.*

UNIT - I DATABASE SYSTEM DESIGN [9]

File and Storage Structures – Physical Database Design and Tuning – Transaction Processing Concepts – Concurrency Control Techniques – Database Recovery Techniques – Security and Integrity.

UNIT - II DISTRIBUTED DATABASES [9]

Centralized vs Distributed Databases – Distributed Database Concepts – Advantages of Distributed Databases – Additional Functions of Distributed Databases – Fragmentation and Replication Techniques – Types of Distributed Databases – Distributed Database Architecture – Concurrency Control and Recovery Techniques in Distributed Databases – Client/Server Architecture.

UNIT - III OBJECT ORIENTED AND RELATIONAL DATABASES [9]

Introduction to Object Oriented Concepts – Overview of the Object Model of Object Data Management Group – Object Definition Language – Object Query Language – Object Database Conceptual Design – Nested Relational Model – Functional Dependencies and Normalization for Relational Databases – Relational Database Design Algorithms.

UNIT - IV ENHANCED DATA MODLES FOR ADVANCED APPLICATIONS [9]

Enhanced Data Models – Web Databases – Design of Temporal Databases – Incorporating Time in Relational Databases – Incorporating Time in Object Oriented Databases – Temporal Querying Constructs – Time Series Data – Spatial Databases

UNIT - V CURRENT ISSUES [9]

Active Database Concepts – Introduction to Deductive Databases – Clausal Form and Horn Clauses – Interpretations of Rules – Use of Relational Operations – Multimedia Databases – The Nature of Multimedia Data and Applications.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the need of database design concepts and compare the centralized vs. distributed database
2. Analysis the concept of object oriented concepts and relational database
3. Know the concept of enhanced data models
4. Implement the concept of enhanced data models for various applications
5. Understand the concept database according to new treads and Apply the concept of database for current issues

Text Book :

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan,"Database System Concepts"8th Edi,McGraw Hill, 2011.

Reference Books :

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Pearson Education, 5th Edition, 2011
2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, 3rd Edition 2004.
3. C.S.R Prabhu, "Object-Oriented Database Systems", Prentice Hall Of India, 2011.

R 2016

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SEMESTER - IV

		L	T	P	C
CA16466	**UNIX INTERNALS [ELECTIVE]**	3	0	0	3

Prerequisite: **Operating System**

Objective:

- *To get a comprehensive knowledge of the architecture of UNIX operating systems, to understand the IPC, kernels, process and memory management mechanisms for UNIX environments*

UNIT - I **INTRODUCTION TO UNIX** **[9]**

UNIX Operating System – History – Commands – System Structures – Shell, Shell Programming – System/Calls – UNIX Communications.

UNIT - II **UNIX KERNALS** **[9]**

Architectures – Kernel Data Structures – File Sub – System and Process – Sub- System – User – Kernel Modes – Process States and Transitions – Sleep and Wakeup.

UNIT - III **FILE SYSTEMS** **[9]**

Buffers – Structures and Representater – Implementation of System Calls.

UNIT - IV **PROCESSES AND MEMORY MANAGEMENT** **[9]**

Structure – Context – Address Space – Creation – Termination – Scheduling – Threads – Implementation of System Calls, Swapping – Segmentation – Demand Paging.

UNIT - V **I/O SUBSYSTEM AND IPC** **[9]**

Drivers – Streams – Implementations of IPC Mechanism.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the concept of UNIX basic concept.
2. Understand the concept of shell programming and UNIX communications.
3. Analysis the concept of kernel and interpret the concept of process states and transitions.
4. Interpret the concept of process states and transitions.
5. Construct the concept of file systems and UNIX system calls with process, memory and I/o subsystem.

Text Book :

1. Bach M.J., The Design of Unix Operating System, Prentice Hall India, 1986.

Reference Books :

1. Sumitabha Das, Unix Concepts and Applications, TMH 2002.
2. B.W.Kernigham, Rob Pike, Unix Programming Environment, PHI, 1999.
3. Goodheart B., Cox.J., The Magic Garden Explained, Prentice Hall India, 1994.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16467	**ENTERPRISE COMPUTING [ELECTIVE]**	3	0	0	3

Prerequisite: **Distributed Computing**

Objectives:

- *To understand the complexity of enterprise applications.*
- *To learn the architecture with the J2EE, RMI, CORBA, DCOM communication.*
- *To understand the services for distributed enterprise systems components.*
- *To learn about web enabling and application enabling.*

UNIT - I **ENTERPRISE FOUNDATIONS** **[9]**

Enterprise Architectural Overview - Object Oriented Software Development Process for the Enterprise- Component Based Software Development for Enterprise- Java Enterprise System Architecture with the J2EE- Enterprise Data – Basic JDBC

UNIT - II **DISTRIBUTED ENTERPRISE COMMUNICATIONS ENABLING** **[9]**

Distributed Enterprise Communications - Network Communications - Web Communications – Components with COBRA - DCOM Communications.

UNIT - III **SERVICES FOR DISTRIBUTED ENTERPRISE SYSTEMS** **[9]**

Naming Services - Directory and Trading Services - Activation Services - Transaction Services, High Assurance Enterprise Applications.

UNIT - IV **ENTERPRISE WEB ENABLING** **[9]**

Web Browsers and Web Servers in Enterprise- Traditional Web Programming and Java- Java Server Pages.

UNIT - V **ENTERPRISE APPLICATIONS ENABLING** **[9]**

Enterprise Application Platforms - Application Servers and Enterprise JavaBeans –Advanced Enterprise JavaBeans Serving- Enterprise Application Integration.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the basic concept of enterprise foundation,J2EE and JDBC.
2. Ability to know about the distributed enterprise communication and CORBA, DCOM.
3. Describe the concept of various services for distributed enterprise system.
4. Recognize the concept of traditional web programming.
5. Learn about the concept of enterprise application enabling.

Text Book :

1. Paul J P,Venkata S.R.Krishna R&Chayanti,“Building Java Enterprise Systems With J2EE", echmedia , Delhi, 2005.

Reference Books :

1. Dustin R. Callaway - "Inside Servlets " - Addison Wesley Longman Inc, New Delhi, 2001.
2. Tom Valesky - "Enterprise Java Beans" - Addison Wesley Longman Inc. New Delhi, 2000.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16468	**SOFTWARE AGENT [ELECTIVE]**	3	0	0	3

Prerequisite: **Software Engineering**

Objective:

- *The aim of this course is to introduce the concepts, techniques and applications of software agents. The students are expected to be able to understand the nature, concepts and techniques of the agent technology and its standards and to evaluate current software agent systems.*

UNIT - I **AGENTS–OVERVIEW** **[9]**

Agent Definition–Agent Programming Paradigms–Agent vs Object–Aglet –Mobile Agents –Agent Frameworks–Agent Reasoning.

UNIT - II **JAVA AGENTS** **[9]**

Processes –Threads –Daemons–Components –Java Beans– ActiveX– Sockets – RPCs–Distributed Computing –Aglets Programming–Jini Architecture –Actors and Agents–Typed and Proactive Messages.

UNIT - III **MULTIAGENTSYSTEMS** **[9]**

Interaction between Agents–Reactive Agents–Cognitive Agents–Interaction Protocols–Agent Coordination–Agent Negotiation–Agent Cooperation–Agent Organization–Self- Interested Agent Sin Electronic Commerce Applications.

UNIT - IV **INTELLIGENTSOFTWAREAGENTS** **[9]**

Interface Agents –Agent Communication Languages –Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT - V **AGENTSAND SECURITY** **[9]**

Agent Security Issues–Mobile Agents Security – Protecting Agents Against Malicious Hosts–Untrusted Agent–Black Box Security–Authentication for Agents–Security issues for Aglets.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Study the concept of agent.
2. Describe the techniques of software agent.
3. Know about the concept of multi agent systems.
4. Understand the nature, concept and techniques of the agent technology and its standards.
5. Analysis the concept of agent security issues.

Text Book :

1. Russell, Norvig, "Artificial Intelligence: A Modern Approach", 2nd Edition, Pearson Education, 2003.

Reference Books :

1. Bradshaw," Software Agents", MITPress, 2000.
2. RichardMurch,TonyJohnson,"IntelligentSoftwareAgents", PrenticeHall,2000.
3. GerhardWeiss,“MultiAgentSystems–AmodernApproachtoDistributed Artificial Intelligence”, MITPress, 2000. Bigus&Bigus," ConstructingIntelligentagentswithJava ", Wiley,1997.

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SEMESTER - IV

		L	T	P	C
CA16469	**MIDDLEWARE TECHNOLOGY [ELECTIVE]**	3	0	0	3

Prerequisite: **Client-Server Technology**

Objectives:

- *To introduce the concepts, techniques and applications of middleware technology.*
- *To understand middleware components like COM, CORBA and EJB.*

UNIT - I **INTRODUCTION CLIENT / SERVER & MIDDLEWARE TECHNOLOGY** **[9]**

Client / Server- Server Types- Middleware – Client, Server and Operating System-Introduction to Distributed Object Technology-Middleware – Client/Server Building Blocks – Peer-to Peer Communications–RPC-Messaging-Java RMI-Overview of CORBA and DCOM.

UNIT - II **EJB ARCHITECTURE** **[9]**

EJB – EJB Architecture – Overview of EJB Software Architecture – View of EJB –Conversation – Building and Deploying EJBs – Roles in EJB.

UNIT - III **EJB APPLICATIONS** **[9]**

Types of Enterprise beans –Lifecycle of Beans-Steps in Developing an application using EJB Framework, EJB Deployment-EJB Session Beans – EJB Entity Beans – EJB Clients – Building an Application with EJB.

UNIT - IV **CORBA** **[9]**

Introduction and Concepts-CORBA Components-Architectural Features-Method Invocations-Static and Dynamic CORBA-Structure of CORBA IDL-Self Describing Data types-Building an application using CORBA-Advanced CORBA- CORBA Object Service-Object Location Service-Message Service-CORBA Component Model.

UNIT - V **COM** **[9]**

Evolution of DCOM, COM Client and Server, COM IDL, COM Interface-COM threading Model, Marshalling, Comparision of RMI, CORBA and DCOM.Programming Examples of RMI, CORBA and DCOM.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the client / server concepts.
2. Obtain the knowledge of EJB.
3. Built EJB application for any one concept.
4. Describe the concept of CORBA services and models.
5. Understand the concept of COM and DCOM.

Text Books :

1. Robert O, Dan H & Jeri E, “The Essential Client / Server Survival Guide”, Golgotha Publications Pvt. Ltd., 2009.
2. G.Sudha Sadasivam, Radha Shankarmani,”Middleware &Enterprise Integration Technologies.” 2010.

Reference Books :

1. Chris Britton and Peter Eye, “IT Architecture and Middleware”, Pearson Education, 2nd Edition, 2004.
2. Wolfgang Emmerich, “Engineering Distributed Objects”, John Wiley, 2000.
3. Michah L, “Middleware Networks: Concept, Design and Deployment of Internet Infrastructure”, Kluwer, 2000.

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SEMESTER - IV

		L	T	P	C
CA16471	**DISTRIBUTED COMPUTING [ELECTIVE]**	3	0	0	3

Prerequisite: **Database Management Systems**

Objectives:

- *To understand the architecture and models of distributed computing.*
- *To learn the interprocess and remote communication.*
- *To understand synchronization.*
- *To know the distributed system management.*
- *To learn the file system concepts in distributed computing.*

UNIT - I INTRODUCTION [12]

Introduction - Architectures for Distributed Systems - Distributed Computing Models – Software Concepts - Issues in Designing Distributed Systems - Client/Server Models. Network Communication: LAN and WAN Technologies - Protocols for Network Systems –Asynchronous Transfer Mode - Protocols for Distributed Systems.

UNIT - II INTERPROCESS AND REMOTE COMMUNICATION [12]

Message Passing - Group Communication - API for Internet Protocol. Remote Communication: Introduction - Remote Procedure Call Basics - RPC Implementation - RPC Communication – RPC Issues - RMI Basics - RMI Implementation.

UNIT - III SYNCHRONIZATION [12]

Introduction – Clock Synchronization – Logical Clocks – Global State – Mutual Exclusion – Election Algorithms – Deadlocks in Distributed Systems

UNIT - IV DISTRIBUTED SYSTEM MANAGEMENT [12]

Introduction – Resource Management – Task Assignment Approach – Load Balancing Approach – Load Sharing Approach – Process Management in a Distributed Environment –Process Migration – Threads – Fault Tolerance.

UNIT - V DISTRIBUTED FILE SYSTEMS [12]

Introduction - File Models - DFS Design - File Sharing Semantics – DFS Implementation – File Caching in DFS – Replication in DFS. Naming: Introduction – Desirable Features of a Good Naming System – Basic Concepts – System Oriented Names – Name Caches - Naming and Security.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Observe the characterization and challenges in distributed systems. analyze various models of distributed systems and compare the types of networks.
2. Identify the purpose of marshalling and un-marshalling. recognize the purpose of inter process communication with the help of RMI.
3. Acquire the knowledge about the synchronization. obtain the knowledge about the mutual exclusion, election algorithm and deadlock in distributed systems.
4. Know about the concept of distributed system management. Learn about process management of distributed system.
5. Discuss about the distributed file systems. Describe the concept of DNS and security.

Text Book :

1. Sunita Mahajan, Seema Shah, Distributed Computing, Oxford University Press, 2nd Edition, 2013.

Reference Book :

1. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education, 2007.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16472	**SUPPLY CHAIN MANAGEMENT [ELECTIVE]**	3	0	0	3

Prerequisite: **Accounting and Financial Management**

Objective:

- *Understand how supply chain strategy can provide a competitive advantage for organizations analyze the balance between customer satisfaction level and inventory management policies leverage supplier and distributor capabilities within value generating business processes apply information systems to support collaboration and visibility of supply chains.*

UNIT - I INTRODUCTION [9]

Supply Chain – Fundamentals, Importance, Decision Phases, Process View- Supplier-Manufacturer-Cluster Chain-Drivers of Supply Chain Performance-Structuring Supply Chain Drivers-Overview of Supply Chain Models and Modeling Systems.

UNIT - II STRATEGIC SOURCING [9]

In-Sourcing and Out-sourcing – Types of Purchasing Strategies-Supplier Evaluation, Selection and Measurement-Supplier Quality Management-Creating a Word Class Supply Base-World Wide Sourcing.

UNIT - III SUPPLY CHAIN NETWORK [9]

Distribution Network Design – Role, Factors Influencing, Options, Value Addition-Models for Facility Location and Capacity Location-Impact of Uncertainty on Network Design-Network Design Decision Trees-Distribution Center Location Models-Supply Chain Network Optimization Models.

UNIT - IV PLANNING DEMAND,INVENTORY AND SUPPLY [9]

Overview of Demand Forecasting in the Supply Chain-Aggregate Planning in the Supply Chain-Managing Predictable Variability-Managing Supply Chain Cycle Inventory-Uncertainty in the Supply Chain – Safety Inventory-Determination of Optimal Level of Product Availability-Coordination in the Supply Chain.

UNIT - V CURRENT TRENDS [9]

E-Business – Framework and Role of Supply Chain in E-Business and b2b Practices-Supply Chain IT Framework-Internal Supply Chain management-Fundamentals of Transaction Management-Supply Chain in IT practice-Supplier Relationship Management-Information Systems development-Packages in Supply Chain –eSRM, eLRM, eSCM.Supply Base Management.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the basic concept of supply chain management.
2. Obtain the knowledge about the supply chain strategy.
3. Discuss the knowledge about the supply chain network.
4. Analysis the balance between customer satisfaction levels.
5. Obtain the knowledge about the current trends of supply chain management.

Text Books :

1. Sunil C and Peter M, Supply Chain Management-Strategy Planning and Operation,PE,3rd Indian Reprint 2004.
2. Monczka et al., Purchasing and Supply Chain Management,Thonson Learning,2nd edition, 2nd Reprint,2002.

Reference Books :

1. Altekar Rahul V,Supply Chain Management-Concept and Cases,Prentice Hall India, 2005.
2. Shapiro Jeremy F,Modeling the Supply Chain,Thomson Learning,2nd Reprint,2002 .
3. Ballou R H, Business Logistics and Supply Chain Management, Pearson Education, 2nd Indian Reprint, 2004.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16473	**WEB GRAPHICS [ELECTIVE]**	3	0	0	3

Prerequisite: **Computer Graphics**

Objective:

- *To study the concepts of HTML, photoshop, photoshop pro, the concepts of handling audio, video and animation on web page and the creation of interactive web sites.*

UNIT - I INTRODUCTION [9]

HTML Coding - Basic Web Graphics - Web Page Design and Site Building - Adding Multimedia to the Web- Vector and Raster Graphics.

UNIT - II RASTER IMAGE EDITING SOFTWARE [9]

Introduction - Image Basics - File Formats - GIF - JPEG - Color Palette –Layers – Working with Layers - Creating New Images - Brushes – Grids and Guides- Scaling Images - Moving and Merging Layers - Tool Palette - Adding Text to Images – Designing Icons and Background Images.

UNIT - III VECTOR IMAGE HANDLING [9]

Introduction – Creating Simple Vector Graphics – Creating banners - Frame by Frame Animation –Creating Special Effects -Text Effects and Animation- Color Models, Color Depths, Color Calibration, Creating Gradients, Oil Paint Effect.

UNIT - IV MULTIMEDIA [9]

Creating Clippings - Animations with Sound Effects - Adding Audio or Video - Windows Media Player ActiveX Control - Embedding VRML in a Web Page - Real Player ActiveX control.

UNIT - V APPLICATIONS [9]

Creating Web Site With a Particular Theme Using all the Utilities - Graphics - Animations and Interaction.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the concept of HTML for web page design and building.
2. Gain the knowledge of raster image editing software.
3. Observe the concept of vector image handling.
4. Understand the concept of adding multimedia elements.
5. Creation of web site for particular theme.

Text Book :

1. Adobe creative team, Adobe Photoshop elements 7 and Adobe premiere elements 7 classroom in a book collection, Adobe Press, 2009.

Reference Books :

1. Lisa Danae Dayley, Brad Dayley, Adobe Photoshop CS5 Bible, 2012.
2. Steve Romaniello, Photoshop 7, BPB Publications, 2007.
3. Todd Perkins**,** Adobe Flash Professional CS5, Wiley India Edition, 2012.
4. Adobe creative team, Adobe Flash CS4 professional classroom in a book, Adobe Press, 2009.

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SEMESTER - IV

		L	T	P	C
CA16474	**AGENT BASED INTELLIGENT SYSTEMS [ELECTIVE]**	3	0	0	3

Prerequisite: **Professional Ethics**

Objectives:

- *To explain the basic knowledge representation, problem solving and learning methods of AI.*
- *To explore the knowledge representation and reasoning.*
- *To plan the agents in various state and domain scenarios.*
- *To develop intelligent systems by assembling solutions to concrete computational problems.*

UNIT - I INTRODUCTION [9]

Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics -Constraint Satisfaction Problems - Game Playing.

UNIT - II KNOWLEDGE REPRESENTATION AND REASONING [9]

Logical Agents-First order Logic-First order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events.

UNIT - III PLANNING AGENTS [9]

Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-Multi Agent Planning.

UNIT - IV AGENTS AND UNCERTAINITY [9]

Acting Under Uncertainty – Probability Notation-Bayes Rule and Use - Bayesian Networks- Other Approaches - Time and Uncertainty-Temporal Models - Utility Theory - Decision Network - Complex Decisions.

UNIT - V HIGHER LEVEL AGENTS [9]

Knowledge in Learning-Relevance Information-Statistical Learning Methods- Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars- Future of AI.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the basic concept of intelligent systems.
2. Explore the concept of knowledge representation describe the concept of reasoning.
3. Plan the agents in various states.
4. Illustrate the concept of agent and uncertainty.
5. Develop the concept of intelligent systems by assembly solutions to concrete computational problems.

Text Book :

1. Stuart Russell and Peter Norvig, “Artificial Intelligence - A Modern Approach”, 2nd Edition, Pearson, 2011.

Reference Books :

1. Michael Wooldridge, “An Introduction to Multi Agent System”, John Wiley, 2002.
2. Patrick H W, Artificial Intelligence, 3rd Ed., AW, 1999. Nils.J.Nilsson Principles of Artificial Intelligence Narosa Publishing House, 1992.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) R 2016

SEMESTER - IV

		L	T	P	C
CA16475	**NETWORK ADMINISTRATION [ELECTIVE]**	3	0	0	3

Prerequisite: **Computer Network**

Objectives:

- *To learn about the concepts of OSI reference model and protocol architecture.*
- *Focuses on network design and the proper way to design an internetwork.*
- *To understand SONET and ISDN.*
- *To learn about the fiber optics and voice technology.*
- *To provide the deep knowledge about IP technology and wireless WAN students will gain.*
- *A solid background on networking protocols, architecture design.*

UNIT - I ISO REFERENCE MODEL AND FRAME RELAY WAN PROTOCOLS [9]

OSI Reference Model-Standard Organizations-Layer 3 Switching: Approaches to Layer 3 Switching-Aspects of Layering- Relieving Network Congestion-WAN Architecture-Protocol Architecture-Frame Relay WAN Protocol: Introduction to Frame Relay-Frame Relay Virtual Circuits- Data Flow in Frame Relay FECN and BECN-Frame Relay Network Implementation.

UNIT - II ETHERNET TECHNIQUES [9]

GIGABIT Ethernet and Fast Ethernet: Introduction to Gigabit Ethernet-An Alternate to High Speed Transmission-Quality of Service on Ethernet-Introduction to Fast Ethernet-Network Design Criteria for Fast Ethernet-Troubleshooting Techniques for Fast Ethernet-Encoding

UNIT - III SONET AND ISDN [9]

SONET: SONET Architecture and Protocols-SONET Overhead- Super Rate Payloads in SONETISDN and B-ISDN: Introduction to ISDN: How does ISDN Work-ISDN Standards-ISDN Evaluation-ATM: ATM Network Operation-Multicasting in ATM-ATM Signaling and Addressing- TCP/IP: Introduction to TCP/IP-How does TCP/IP Work-IP Addressing-RSVP.

UNIT - IV FIBER OPTICS AND VOICE TECHNOLOGY [9]

Fiber Optics and Testing: Fiber Optics Cables-Types of Fiber Optics-Understanding OTDR Testing- Voice Technologies: Introduction-Voice Over IP-Current and Future Telephony Trends-LAN Protocol Architecture: Protocols and Communication Architecture-Understanding Token Passing-Dense Wave Division Multiplexing: Today's Telecommunication Network Challenge-Resolving the Capacity Crisis-Capacity Expansion Potential –DWDM Technology

UNIT - V IP TECHNOLOGY AND WIRELESS WAN [9]

Future Trends in IP Technology: IP-Over –SONET-Backbone Architecture-Tunneling with Virtual Private Networks-Wireless LAN: What is a Wireless LAN-Wireless LAN Technology-Line-of Sight / Fresnel Zone-Considerations for Selecting a Wireless LAN Solution.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understanding the concept of ISO reference model and WAN protocol.
2. Analyze the concept of gigabit ethernet and fast ethernet.
3. Express the concept of SONET architecture and its protocols.
4. Implement the fiber optical an testing.
5. Discuss about the ISDN, ATM, and TCP/IP and perform the voice technologies and IP Technologies.

Text Book :

1. Steve Wisniewski, "Network Administration ", Pearson Education, 2007.

Reference Books :

1. Steven Graham, Steve Shah, "LINUX Administration A beginner's Guide", 3rdEdition,McGraw Hill, 2002.
2. Nicholas wells, "Guide to Linux Installation and administration", Vikas Publishing house, 2000.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER – IV

		L	T	P	C
CA16476	**SOFTWARE PROJECT MANAGEMENT [ELECTIVE]**	3	0	0	3

Objectives:

- *To learn the basic idea about the software project management and it's planning activities.*
- *To know about the project evaluation concepts and software estimation.*
- *To get the role of software developers in getting exposure on software quality and risk management.*
- *To be familiar with the project management process and its activities.*

UNIT - I INTRODUCTION TO S O F T W A R E PROJECT MANAGEMENT [9]

Product Life Cycle: Introduction-Idea Generation-Prototype Development Phase-Alpha Phase- Beta Phase-Production Phase-Maintenance and Obsolescence Phase. Product Life Cycle Models: The Waterfall Model-The Prototyping Model-The Rapid Application Development (RAD) Model- Spiral Model and Its Variants. Process Models: The ISO-9001 Model-The Capability Maturity Model.

UNIT - II SOFTWARE METRICS & SOFTWARE CONFIGURATION MANAGEMENT [9]

Software Metrics: Introduction-The Metrics Roadmap-A Typical Metrics Strategy-What To Measure- Set Targets and Track Them-Understanding and Trying to Minimize Variability-Act on Data-People and Organizational Issues in Metrics Programs-Common Pitfalls to watch out for in Metrics Programs –Metrics Implementation Checklists and Tools. Software Configuration Management: Introduction-Definitions and Terminology-The Process and Activities of SCM- Configuration Status Accounting-Configuration Audit-Metrics in SCM-SCM Tools and Automation.

UNIT - III SOFTWARE QUALITY ASSURANCE & RISK MANAGEMENT [9]

Software Quality Assurance: Software Quality-Quality Important in Software-Quality Control and Quality Assurance-Cost and Benefits of Quality-Software Quality Analyst's Functions-Misconceptions about the SQA Role-Software Quality Assurance Tools- Organizational Structures-Profile of a Successful SQA-Measure of SQA Success-Pitfalls of SQA. Risk Management: Introduction- Risk Management and its important. Risk Management Cycle-Risk Identification-Risk Quantification-Risk Monitoring-Risk Mitigation-Practical Techniques and Metrics in Risk Management.

UNIT - IV PROJECT MANAGEMENT PROCESS AND ACTIVITIES [9]

Project Life Cycle: In-Stream Activities-Project Initiation: Activities During Project Initiation-Outputs, Quality Record and Project Initiation Phase-Interface to the Process Database. Project Planning and Tracking: Components of Project Planning and Tracking-Project Closure: Issues and Metrics for Project Closure.

UNIT - V ENGINEERING ACITIVITIES IN PROJECTS [9]

Estimation: Phases of Estimation-Estimation Methodology-Size Estimation Effort and Schedule Estimates. Project Management In Testing Phase- What Is Testing? – What are the Activities That Make Up Testing- Test Scheduling & Types of Tests- Project Management In the Maintenance Phase-Activities During the Maintenance Phase-Management Issues in the Maintenance Phase.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Recognize the process models, production phase and software Matrices.
2. Understand the concept of software configuration management.
3. Describe the concept of software quality assurance and risk management.
4. Analysis the concept of project management process.
5. Express the concept of software requirement activity in a project.

Text Book :

1. Gopalaswamy Ramesh, "Managing Global Software Projects", Tata McGraw Hill, 2005

Reference Books :

1. Bob Hughes, Mikecotterell, Rajib Mall, "Software Project Management", Fifth Edition,Tata McGraw Hill, 2011.
2. Walker Royce, "Software Project Management", Pearson Education, 2005.
3. Pankoj Jalote, "Software Project Management in Practice", Pearson Education, 2002.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16477	**ADVANCED OPERATING SYSTEMS [ELECTIVE]**	3	0	0	3

Prerequisite: **Operating System**

Objective:

- *To get a comprehensive knowledge of the architecture of distributed systems.*
- *To understand the deadlock and their solutions in distributed environments,*
- *To get the knowledge of failure recovery and fault tolerance, to know the security issues and protection mechanisms for distributed environments,*
- *To learn multiprocessor operating systems.*

UNIT - I DISTRIBUTED OPERATING SYSTEMS [9]

Architectures of Distributed Systems - System Architecture Types - Issues in Distributed Operating Systems - Communication Networks - Communication Primitives. Distributed Dead Lock Detection - Introduction - Deadlock Handling Strategies in Distributed Systems - Issues in Deadlock Detection and Resolution - Control Organizations for Distributed Deadlock Detection.

UNIT - II DISTRIBUTED RESOURCE MANAGEMENT [9]

Distributed File Systems – Mechanisms for Building Distributed File Systems – Design Issues – Distributed Shared Memory – Design Issues : Distributed Scheduling – Issues in Load Distributing – Components of a Load Distributing Algorithm – Load Distributing Algorithms – Selecting a Suitable Load Sharing Algorithm – Requirements for Load Distributing.

UNIT - III FAILURE RECOVERY AND FAULT TOLERANCE [9]

Recovery – Basic Concepts – Classification of Failures – Backward and Forward Error Recovery – Backward-Error Recovery : Basic Approaches – Recovery in Concurrent Systems – Fault Tolerance – Issues – Atomic Actions and Committing – Commit Protocols – Non blocking Commit Protocols – Voting Protocol

UNIT - IV PROTECTION AND SECURITY [9]

Protection and Security -Preliminaries, The Access Matrix Model and its implementations.-Safety in Matrix Model-Advanced Models of Protection. Data Security - Cryptography: Model of Cryptography, Conventional Cryptography-Modern Cryptography, Private Key Cryptography, Data Encryption Standard- Public Key Cryptography - Multiple Encryptions.

UNIT - V MULTIPROCESSOR OPERATING SYSTEMS [9]

Multiprocessor Operating Systems - Basic Multiprocessor System Architectures - Inter Connection Networks for Multiprocessor Systems - Caching - Hypercube Architecture - Structures of Multiprocessor Operating System-Operating System Design Issues.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the concept distributed concept of distributed operating systems.
2. Know the concept of distributed file systems.
3. Analysis the concept of failure recovery.
4. Gain the knowledge about the protection.
5. Know the concept of multiprocessor operating systems.

Text Book :

1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", Tata McGraw-Hill Edition 2007.

Reference Books :

1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2003
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16478	**ARTIFICIAL INTELLIGENCE [ELECTIVE]**	3	0	0	3

Prerequisite: **Soft Computing**

Objective:

- *This subject deals with various AI concepts and methodologies.*
- *To acquire knowledge on various AI techniques and expert systems.*
- *To have enriched knowledge regarding heuristic search, knowledge representation and expert systems*.

UNIT - I INTRODUCTION [9]

Intelligent Agents – Agents and Environments – Good Behavior – The Nature of Environments – Structure of Agents – Problem Solving – Problem Solving Agents – Example Problems – Searching for Solutions – Uniformed Search Strategies – Avoiding Repeated States – Searching with Partial Information.

UNIT - II SEARCHING TECHNIQUES [9]

Informed Search Strategies – Heuristic Function – Local Search Algorithms and Optimistic Problems – Local Search in Continuous Spaces – Online Search Agents and Unknown Environments – Constraint Satisfaction Problems (CSP) – Backtracking Search and Local Search – Structure of Problems – Adversarial Search – Games – Optimal Decisions in Games – Alpha – Beta Pruning – Imperfect Real-Time Decision – Games that include an Element of Chance.

UNIT - III KNOWLEDGE REPRESENTATION [9]

First Order Logic - Syntax and Semantics – Using First Order Logic – Knowledge Engineering – Inference – Prepositional vs First Order Logic – Unification and Lifting – Forward Chaining – Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering – Categories and Objects – Actions – Simulation and Events – Mental Events and Mental Objects.

UNIT - IV LEARNING [9]

Learning from Observations – Forms of Learning – Inductive Learning - Learning Decision Trees – Ensemble Learning – Knowledge in Learning – Logical Formulation of Learning – Explanation Based Learning – Learning using Relevant Information – Inductive Logic Programming – Statistical Learning Methods – Learning with Complete Data – Learning with Hidden Variable – EM Algorithm – Instance Based Learning – Neural Networks – Reinforcement Learning – Passive Reinforcement Learning – Active Reinforcement Learning – Generalization in Reinforcement Learning.

UNIT - V APPLICATIONS [9]

Communication – Communication as Action – Formal Grammar for a Fragment of English – Syntactic Analysis – Augmented Grammars – Semantic Interpretation – Ambiguity and Disambiguation – Discourse Understanding – Grammar Induction – Probabilistic Language Processing – Probabilistic Language Models – Information Retrieval – Information Extraction – Machine Translation.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the concepts of intelligence agent.
2. Know the performance of problem solving agents.
3. Analyze the issues of knowledge representation.
4. Understand the concept of leaning technique.
5. Understand use the leaning agents for applications

Text Book :

1. Artificial Intelligence a modern Approach "– Stuart Russell & Peter Norvig, 2nd Edi Perason Edu, 2011.

Reference Books :

1. Elaine rich and Kelvin Knight, "Artificial Intelligence ", Tata McGrawhill Publication, 3rd Edition, 2008.
2. "Artificial Intelligence ", George F Luger, 5th Edition, Pearsons Education Publ, 2008.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
CA16479	**E – LEARNING TECHNOLOGY [ELECTIVE]**	3	0	0	3

Prerequisite: **E-Commerce**

Objective:

- *To provides the deep knowledge about E-learning concepts and tools available which helps to improve the learning technology.*

UNIT - I **INTRODUCTION** **[9]**

What is E-Learning – E-Learning Evolution – Advantages and Disadvantages of E-Learning – Instructional Design Models for E-Learning – Applying User – Centered Design to E-Learning – Rapid E-Learning.

UNIT - II **KEEPING THE E-LEARNING STRATEGY FORWARD** **[9]**

Learning Strategy – Process for Developing the E- Learning Strategy- Doomed to Failure – Keeping Focused on the Strategy – Instructional Strategies for E-Learning.

UNIT - III **DELIVERING E-LEARNING & E-LEARNING EVALUATIO** **[9]**

Delivering E-Learning – Instructional Game Characteristics – Educational Podcasting- Gaming at Work – Delivering E-Learning Synchronously – E-Learning Education – Four Levels of Evaluating Learning – Learning Analytics – Evaluation Models.

UNIT - IV **WEB STANDARDS** **[9]**

What are Web Standards? – Who is involved in Web Standards? Resources for Guidance on Web Standards – How are Web Standards used in Education – Web Standards for Designers – Validators - W3C Keeping it Simple.

UNIT - V **E-LEARNING TOOLS** **[9]**

E-learning Tools – What is E-Learning Tool? – E-learning Authoring Tools – Wikis and E-Learning.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the concept of e-leaning.
2. Know the concept of various learning strategies.
3. Express the concept of delivering e-learning.
4. Understand the concept of web standards for designing, valuators.
5. Obtain the knowledge about the e-leaning tools.

Text Books :

1. The e-Learning Guild's Handbook of e-Learning Strategy Foreword by Marc Rosenberg Chapters by Kevin Moore, Frank Hanfland, Patti Shank, Lisa Young, Lance Dublin, Ryan Watkins, Michael Corry Bill Brandon, Editor sponsored by Compilation Copyright 2007 by The e-Learning .
2. E-Learning Concepts and Techniques by Bloomsburg University of Pennsylvania's Department of Instructional Technology students and guest authors.

Reference Book :

1. The Insider's Guide to Becoming a Rapid E-Learning Pro – Tom Kuhlmann.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - IV

		L	T	P	C
BA16486	**ORGANIZATIONAL BEHAVIOUR [ELECTIVE]**	3	0	0	3

Objectives:

- *The objective of this course is to introduce theories and concepts related to understanding people's behavior in organizations. students will study the behavior of individuals and groups within organizations in order to gain both a theoretical understanding as well as practical knowledge that can be applied in a work setting. Understand the concept of leadership, leadership styles and their power.*
- *Explore the relationships among the various components of organizational behavior and their effectiveness.*

UNIT - I INTRODUCTION [9]

Organizational behavior: Definition – Meaning – Scope & Importance of OB – OB Model. Management and Managers: Functions – Skills – Roles – Types of Managers.

UNIT - II INDIVIDUAL BEHAVIOUR [9]

Personality: Theories – Types. Learning: Meaning and Definition – Theories of Learning. Attitudes: Nature – Components – Formation – Functions – Measurement. Perception: Factors Influencing Perception. Motivation: Importance – Theories (Maslow's Hierarchy Theory & Herzberg Theory) – Types – Effects on Work Behavior

UNIT - III GROUP BEHAVIOUR [9]

Nature – Types – Group Development – Group behavior – Structuring. Group Decision Making Techniques. Team Dynamics: Nature of Teams – Teams Vs Groups – Benefits From Teams – Types of Teams – Team Issues – Effective Team Work.

UNIT - IV LEADERSHIP AND POWER [9]

Leadership: Meaning – Importance – Leadership Styles – Theories. Power: Power Dynamics – Sources of Power – Effective Use of Power.

UNIT - V DYNAMICS OF ORGANIZATIONAL BEHAVIOUR [9]

Organization Culture and Climate: Factors Affecting Organizational Culture & Climate. Organizational Change: Importance – The Change Process – Resistance of Change – Managing Change. Job Satisfaction: Determinants – Measurements. Stress: Prevention and Management of Stress – Balancing Work and Life. .

Total (L: 45 T : 0) = 45 Hours

Course Outcomes:

1. Know the concepts of organizational behavior, managements and managers.
2. Analysis the concept of individual behavior like personality, attitudes.
3. Implement the concept of perception, motivation and Analysis the concept team work, leadership and power.
4. Implement the concept of perception and motivation and Gain the knowledge of group behavior.
5. Organize the concept of culture and climate and its change with job satisfaction and stress.

Text Book :

1. Aswathappa.K, Organizational Behaviour, Himalaya Publishing House, 10th Revised Edition, 2012.

Reference Books :

1. Stephen P Robbins "Organizational Behaviour", PHI, 13th Edition, 2010.
2. Mohini Sukhapure & Uday N.Limaye "Organizational Behaviour", HJimalaya Publishing Private Limited, 2010.
3. P.Subba Rao "Organizational Behaviour (Text,Cases and Games)"K, Himalaya Publishing (P) Ltd, 2010.

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SEMESTER - IV

		L	T	P	C
BA16487	**HEALTH CARE INFORMATION SYSTEMS [ELECTIVE]**	3	0	0	3

Objectives:

- *To be able to describe the major types of health care information (internal and external) that are captured or used or both in health care organizations.*
- *To be able to cite specific examples of the major types of health care information.*
- *To be able to identify the major advances in information technology and significant* Federal *initiatives that influenced the adoption of health care information systems.*
- *To be able to discuss why information technology (IT) adoption rates are lower in health care compared with other industries.*

UNIT - I INTRODUCTION [9]

Introduction to Healthcare Information –Health Care Data Quality-Healthcare Information Regulations, Laws and Standards

UNIT - II HEALTHCARE INFORMATION SYSTEMS [9]

History and Evolution of Healthcare Information Systems-Current and Emerging use of Clinical Information Systems-System Acquisition-System Implementation and Support.

UNIT - III INFORMATION TECHNOLOGY [9]

Information Architecture and Technologies that Support Health Care Information Systems-Health Care Information Systems Standards-Security of Healthcare Information Systems.

UNIT - IV MANAGEMENT OF IT CHALLENGES [9]

Organizing Information Technology Services-IT Alignment and Strategic Planning-IT Governance and Management.

UNIT - V IT INITIATIVES [9]

Management's Role in Major IT Initiatives-Assessing and Archiving Value in Healthcare Information Systems.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Ability to describe the concept of major types of health care information.
2. Obtain the knowledge about the healthcare information systems.
3. Know the knowledge about the concept of information technology.
4. Discuss about the Information Technology (IT) adaptation rates are lower in health care systems.
5. Obtain the concept IT initiatives.

Text Book :

1. Karen A.W, France W.Lee, John P.G," Managing Healthcare Information Systems: A Practical Approach for Health CARE Exe.", Jossey B/Willey, 2005.

Reference Book :

1. Rudi Van De Velde & Patrice D,"Clinical Information Systems:A Component Based Approach ",Springer 2005.

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SEMESTER - IV

		L	T	P	C
MA16488	**OPERATIONS RESEARCH [ELECTIVE]**	3	2	0	4

Objectives:

- *To learn about the optimization techniques for decision making problem in engineering fields.*
- *To understand the concepts of transportation and assignment problems.*
- *To study the concepts of project scheduling by network analysis.*
- *To enumerate the concepts in stock control models.*
- *To understand the concepts of scheduling and replacement problems in mechanical engineering.*

UNIT - I LINEAR PROGRAMMING PROBLEMS [12]

Introduction – Scope and role of OR – Phases of OR – Limitations of OR – Linear Programming Problem – Formulation of Linear Programming Problem – Optimum Solution by Graphical Method – Simplex Method (Using Slack Variables).

UNIT - II TRANSPORTATION AND ASSIGNMENT PROBLEMS [12]

Transportation Models (Minimizing and Maximizing Cases) - Balanced and Unbalanced Cases – Initial Basic Feasible Solution by North West Corner Rule, Least Cost and Vogel's Approximation Methods. Check for Optimality by Modified Method Assignment Models (Minimizing and Maximizing Cases) – Balanced and Unbalanced Cases – Solution by Hungarian Method. Travelling Salesman Problem.

UNIT - III NETWORK MODELS [12]

Network – Fulkerson's Rule – Construction of a Network – Critical Path Method (CPM) – Optimistic, Pessimistic and Most Likely Time Estimates – Project Scheduling by PERT Analysis.

UNIT - IV INVENTORY MODEL [12]

Types of Inventory – Deterministic Inventory Models – EOQ and EBQ Models with and without Shortages – Quantity Discount Models - Price Breaks – Probabilistic Inventory Model.

UNIT - V REPLACEMENT MODELS AND SEQUENCING [12]

Replacement of items that Deteriorate with Time – Value of Money Changing with Time – Not Changing with Time – Optimum Replacement Policy – Individual and Group Replacement. Sequencing Problem – Assumptions – Processing of 'n' Jobs in 2 Machines 'n' Jobs with 'm' Machines

Total (L:45 T: 15) = 60 Hours

Course Outcomes:

1. Enable to develop the decision making during the uncertain situations by linear programming approach.
2. Identify to minimize the transportation and assignment cost and maximizes the profit in industries.
3. Developing the network techniques in project scheduling.
4. Study the importance of stock controlling to maximize the profit.
5. Understand and apply the *replacement and sequencing methods in manufacturing engineering.*

Text Book :

1. P.K.Gupta and Man Mohan "Problems in Operations Research:, S.Chand and Co,12th edition,2014

Reference Books :

1. Hira and Gupta "Problems in Operations Research", S. Chand and Co,2002.
2. Wayne.L.Winston, Operations research applications and algorithms",Thomson learning,4th edition 2007.
3. Taha H.A," Operation Research", Pearson Education sixth edition,2003

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SEMESTER - V

		L	T	P	C
CA16561	**SOFT COMPUTING [ELECTIVE]**	3	0	0	3

Prerequisite: **Distributed Computing**

Objectives:

- *To learn the key aspects of soft computing and neural networks.*
- *To learn the fuzzy logic components.*
- *To gain insight onto neuro fuzzy modeling and control.*
- *To gain knowledge in machine learning through support vector machine.*

UNIT - I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS [12]

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT - II GENETIC ALGORITHMS [12]

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT - III NEURAL NETWORKS [12]

Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks Supervised Learning Neural Networks – Radial Basis Function Networks -Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural networks.

UNIT - IV FUZZY LOGIC [12]

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT - V NEURO-FUZZY MODELING [12]

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule Base Structure Identification – Neuro-Fuzzy Control.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Understand the concept of soft computing.
2. Discuss the concept of genetic algorithm.
3. State the concept of neural networks basic.
4. Know the concept of fuzzy modeling.
5. Gain the knowledge about the neuro-fuzzy modeling.

Text Books :

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2012.
2. George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”,Prentice Hall,1995.
3. James A. Freeman & David M. Skapura, “Neural Networks Algorithms, Applications & Prg. Tech.”, PE., 2003

Reference Books :

1. Mitchell Melanie, “An Introduction to Genetic Algorithm”, Prentice Hall, 1998.
2. David E. Goldberg, “Genetic Algorithms in Search, Optimization and MachineLearning”,AddisonWesley,1997.
3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to FuzzyLogic using MATLAB”, Springer, 2007.
4. S.N.Sivanandam · S.N.Deepa, “Introduction to Genetic Algorithms”,Springer, 2007.
5. Jacek M. Zurada, “Introduction to Artificial Neural Systems”, PWSPublishers, 1992.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - V

		L	T	P	C
CA16562	**DIGITAL IMAGE PROCESSING [ELECTIVE]**	3	0	0	3

Prerequisite: **Digital Fundamentals and Computer Organization**

Objectives:

- *To give the knowledge of effectively storing images.*
- *To extract interesting patterns from an image.*
- *To discriminate between different classes of images.*
- *To give mathematical fundamentals for image processing.*
- *To lead the confidence in developing image-processing applications.*

UNIT - I **FUNDAMENTALS OF IMAGE PROCESSING AND IMAGE TRANSFORMS** **[12]**

Introduction – Steps in Digital Image Processing – Image Sampling and Quantization – Basic Relationships Between Pixels – Color Fundamentals – File Formats – Image Transforms: DFT, DCT, Haar, SVD and KL- Introduction to Mat Lab Toolbox.

UNIT - II **IMAGE ENHANCEMENT AND IMAGE RESTORATION** **[12]**

Image Enhancement in the Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Spatial Filtering – Image Enhancement in the Frequency Domain: Frequency Domain Filters - Image Restoration: Model of Image Degradation/Restoration Process, Noise Models, Restoration by Spatial and Frequency Domain Filtering.

UNIT - III **MULTI RESOLUTION ANALYSIS AND IMAGE COMPRESSION** **[12]**

Multi Resolution Analysis: Image Pyramids – Multi Resolution Expansion – Wavelet Transforms. Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT - IV **IMAGE SEGMENTATION AND DESCRIPTION** **[12]**

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Based Segmentation, Basic Morphological Algorithms, Morphological Water Sheds - Description: Boundary Descriptors, Regional Descriptors.

UNIT - V **CURRENT TRENDS AND APPLICATIONS OF IMAGE PROCESSING** **[12]**

Applications: Image Classification, Object Recognition, Image Fusion, Steganography – Current Trends: Color Image Processing, Wavelets in Image Processing.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Understand the concept of fundamentals of image processing.
2. Know the concept of image enhancement in spatial domain.
3. Spot out the multi resolution and analysis the various techniques for image compression.
4. Study the concept of image segmentation.
5. Investigate the concept of current trends in image processing.

Text Books :

1. S.Jayaraman, S.Esakkirajan and T.Veerakumar,"Digital Image Processing", McGraw Hill Edition, 2011.
2. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Pearson Education,3rd Edition, 2008.
3. S. Sridhar, "Digital Image Processing", Oxford University Press, 2011.

Reference Books :

1. Milan S,Vaclav H&Roger B,"Image Processing,Analysis & Machine Vision",2nd Ed.Thomson Learning,2001.
2. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, "Non Linear Image Processing", Elsevier, 2007.

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SEMESTER - V

		L	T	P	C
CA16563	**HIGH SPEED NETWORKS [ELECTIVE]**	3	0	0	3

Prerequisite: **Computer Networks**

Objectives:

- *Understand the concept of ATM and frame relay.*
- *Analyze the up-to-date survey of developments in high speed networks.*
- *Observe the techniques involved to support real-time traffic and congestion control.*
- *Distinguish the different levels of quality of service (QoS) to different applications.*

UNIT - I INTRODUCTION [12]

Frame Relay Networks–Asynchronous Transfer Mode–ATM Protocol Architecture - ATM Logical Connection-ATM Cell–ATM Service Categories–AAL. High Speed LAN's: Fast Ethernet-Gigabit – Ethernet-Fiber Channel–Wireless LAN's.

UNIT - II CONGESTIONANDTRAFFICMANAGEMENT [12]

Queuing Analysis- Queuing Models–Single Server Queues–Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks– Frame Relay Congestion Control.

UNIT - III TCPAND ATM CONGESTIONCONTROL [12]

TCP Flow Control–TCP Congestion Control–Retransmission–Timer Management–Exponential RTO Back Off–KARN's Algorithm–Window Management–Performance of TCP over ATM. Traffic and Congestion Control in ATM–Requirements–Attributes–Traffic Management Framework, Traffic Control– ABR Traffic Management–ABR ratecontrol, RM Cell Formats, ABR Capacity Allocations – GFR Traffic Management.

UNIT - IV INTEGRATEDANDDIFFERENTIATEDSERVICES [12]

Integrated Services Architecture–Approach, Components, Services Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ Random Early Detection and Differentiated Services.

UNIT - V PROTOCOLS FOR QOS SUPPORT [12]

RSVP–Goals & Characteristics, Data Flow and RSV Pope rations, Protocol Mechanisms– Multiprotocol Label, Switching Operations, Label Stacking, Protocol details–RTP–Protocol Architecture, Data Transfer Protocol, RTCP.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Recognize the concept of ATM networks.
2. Identify the concept of congestion management system.
3. Observe the technique involved to support real time traffic.
4. Discuss the concept of integrated services.
5. Expand the concept of QOS for different applications.

Text Book :

1. William Stallings, "High Speed Networks and Internet", Pearson Education, 2nd Edition, 2002.

Reference Books :

1. Warland&PravinVaraiya,"HighPerformanceCommunicationNetworks",Jean Harcourt siaPvt.Ltd.,IIEdition,2001.
2. Irvan Pepelnjk,JimGuichardand Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume1 and 2, 2003

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - V

		L	T	P	C
CA16564	**ARTIFICIAL AND NEURAL NETWORKS [ELECTIVE]**	3	0	0	3

Prerequisite: **Soft Computing**

Objectives:

- *To search and describe the basic behavior of neurons.*
- *To aware of the basis of the artificial neural networks.*
- *To understand the learning process.*
- *To describe the perception functioning.*
- *To understand the radial-basis function networks and describe the self-organizing maps.*

UNIT - I **INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS** **[12]**

Introduction-General Characteristics of Human Brain-Artificial Neural Network-Benefits of the Artificial Neural Networks-Applications of the ANN-Computational Model of the Neuron-Structure of a Neural Net (Topology).

UNIT - II **LEARNING PROCESS** **[12]**

Introduction-Supervised Learning-Error Correction Learning-Reinforcement of Learning-Stochastic Learning-Unsupervised Learning-Hebbian Learning-Competitive Learning.

UNIT - III **NEURAL NETWORKS** **[12]**

Introduction-Convergence Theorem of the Perception-Virtues and Limitations-Adaline and Madaline- Multilayer Perception- Algorithm of Back Propagation-Learning Rate and Momentum-Algorithms of Second Order-Pruning.

UNIT - IV **RADIAL-BASIS FUNCTION NETWORKS** **[12]**

Cover's Theorem – Interpolation Problem-Regularization Theory-XOR Problem-Comparison of RBF Networks and Multilayer Perceptions – Kernel Regression-Learning Strategies-Computer Experiment.

UNIT - V **SELF-ORGANIZING MAP** **[12]**

Introduction-Topology-Learning Rule-Operation Stage of SOM Network-Geometrical Interpretation- Hierarchical Vector Quantization-Contextual Maps.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Understand the basic concept of artificial neural networks (ANN).
2. Study the concept of learning.
3. Describe the concept of perception functioning.
4. Know the algorithms of cover's theorem, interpolation problem, regulation theory and XOR problem.
5. Describe the basic concept of self organizing map.

Text Book :

1. Haykin, S., "Neural Networks: A Comprehensive foundation", Pearson Education, 2nd Edition, 2006.

Reference Books :

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 3rd Edition,2009.
2. James A. Anderson, "An Introduction to Neural Networks", Prentice Hall, 2002..

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SEMESTER - V

		L	T	P	C
CA16565	**MOBILE COMPUTING [ELECTIVE]**	3	0	0	3

Prerequisite: **Distributed Computing**

Objectives:

- *To learn the basics of wireless voice and data communications technologies.*
- *To build working knowledge on various telephone and satellite networks.*
- *To study the working principles of wireless LAN and its standards.*
- *To build knowledge on various mobile computing algorithms.*
- *To build skills in working with wireless application protocols to develop mobile content applications.*

UNIT - I **WIRELESS COMMUNICATION FUNDAMENTALS** **[12]**

Introduction – Wireless Transmission – Frequencies for Radio Transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread Spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT - II **TELECOMMUNICATION SYSTEMS** **[12]**

GSM – System Architecture – Protocols – Connection Establishment – Handover – Security – GPRS, DECT.

UNIT - III **WIRELESS NETWORKS** **[12]**

Wireless LAN – IEEE 802.11 Standards – Architecture – Services – HIPERLAN – AdHoc Network – Blue Tooth.

UNIT - IV **NETWORK LAYER** **[12]**

Mobile IP – Dynamic Host Configuration Protocol – Routing – DSDV – DSR – AODV – ZRP – ODMR.

UNIT - V **TRANSPORT AND APPLICATION LAYERS** **[12]**

TCP Over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing – Selective Retransmission – Transaction Oriented TCP – WAP.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Gain Knowledge in basics of radio transmission.
2. Describe second generation digital cellular network and its architecture.
3. Observe various WLAN products, its system and protocol architecture.
4. Identify the requirements of mobile IP for IPV4 and IPV6.
5. Acquire the knowledge of TCP for mobility

Text Books :

1. Jochen Schiller, “Mobile Communications”, 2nd , Prentice Hall of India / Pearson Education, 2nd Edition, 2011.
2. C.Sivaram murthy & B.S.Manoj, “Adhoc wireless Networks”, Pearson Education, 2012.

Reference Books :

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, Pearson Education, 2003.
2. Uwe H, Lothar M, Martin S. Nicklons & Thomas S, “Principles of Mobile Computing”, Springer, New York, 2003.
3. C.K.Toh, “AdHoc Mobile Wireless Networks”, Prentice Hall Inc., 2002.
4. William Stallings, “Wireless Communications and Networks”, 2nd Ed., PHl of India / Pearson Education, 2004.

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SEMESTER - V

		L	T	P	C
CA16566	**NATURAL LANGUAGE PROCESSING [ELECTIVE]**	3	0	0	3

Prerequisite: **Problem Solving Techniques**

Objectives:

- *To tag a given text with basic language processing features, design an innovative application using NLP components,*
- *To implement a rule based system to tackle morphology/syntax of a language, design a tag set to be used for statistical processing keeping an application in mind, design a statistical technique for a new application,*
- *To compare and contrast use of different statistical approaches for different types of applications.*

UNIT - I INTRODUCTION [12]

Natural Language Processing tasks in Syntax, Semantics and Pragmatics Issues - Applications - The Role of Machine Learning - Probability Basics –Information Theory – Collocations -N-gram Language Models - Estimating Parameters and Smoothing - Evaluating Language Models.

UNIT - II MORPHOLOGY AND PART OF SPEECH TAGGING [12]

Linguistic Essentials - Lexical Syntax- Morphology and Finite State Transducers - Part of Speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation Based Models - Maximum Entropy Models-Conditional Random Fields.

UNIT - III SYNTAX PARSING [12]

Syntax Parsing - Grammar Formalisms and Tree Banks - Parsing with Context Free Grammars - Features and Unification -Statistical Parsing and Probabilistic CFGs (PCFGs)-Lexicalized CFGs.

UNIT - IV SEMANTIC ANALYSIS [12]

Representing Meaning – Semantic Analysis - Lexical Semantics –Word-Sense Disambiguation - Supervised – Dictionary Based and Unsupervised Approaches - Compositional Semantics-Semantic Role Labeling and Semantic Parsing – Discourse Analysis.

UNIT - V APPLICATIONS [12]

Named Entity Recognition and Relation Extraction- IE Using Sequence Labeling- Machine Translation (MT) - Basic issues in MT-Statistical Translation-Word Alignment- Phrase-Based Translation – Question Answering.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Understanding the basic concept of natural language.
2. Describe the concept of morphology and speech tagging.
3. Study the basic concept of syntax analysis.
4. Express the concept of semantic analysis and lexical analysis.
5. Compare the concept of different statistical approaches.

Text Books :

1. Daniel Jurafsky and James H. Martin “Speech and Language Processing” 2nd Edition, Prentice Hall, 2008.
2. Foundations of Statistical Natural Language Processing by Christopher D. Manning and Hinrich S,MIT,1999.

Reference Books :

1. Pierre M.N, An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation and Application with Special Consideration of English, French, and German (Cognitive Technologies) Soft cover reprint, 2010.
2. James Allen, Natural Language Understanding, Addison Wesley; 2nd edition 1994.
3. NLTK – Natural Language Tool Kit - http://www.nltk.org/.
4. Steven Bird, Ewan Klein and Edward Loper Natural Language Processing with Python, O'Reilly;1st ed. 2009.

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SEMESTER - V

		L	T	P	C
CA16567	**DATA MINING AND DATA WAREHOUSING [ELECTIVE]**	3	0	0	3

Prerequisite: **Database Management Systems**

Objectives:

- *To learn the basic fundamentals of data warehousing and data mining.*
- *Students are exposed to data preprocessing techniques and data mining functionalities and query language.*
- *To build knowledge with association rules for transactional databases.*
- *An understanding various classification and prediction methods.*
- *To know about mining object, spatial, multimedia, text and web data.*

UNIT - I **DATA WAREHOUSING AND BUSINESS ANALYSIS** **[12]**

Data Warehousing Components –Building a Data Warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup and Transformation Tools –Metadata – Reporting – Query Tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT - II **DATA MINING** **[12]**

Data Mining Functionalities – Data Preprocessing: – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. Association Rule Mining: - Efficient and Scalable Frequent Item Set Mining Methods - Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT - III **ISSUES REGARDING CLASSIFICATION AND PREDICTION** **[12]**

Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Ensemble Methods – Model Section.

UNIT - IV **CLUSTER ANALYSIS** **[12]**

Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT - V **MINING OBJECT, SPATIAL, MULTIMEDIA, TEXT AND WEB DATA** **[12]**

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Elucidate the basic concept of data Mining.
2. Explore about multidimensional model.
3. Narrate the steps of data preprocessing.
4. Discuss different classification techniques.
5. Outline different clustering techniques.

Text Books :

1. Alex B and Stephen J.Smith “Data Warehousing,DataMining&OLAP”,TataMcGrawHillEdi,25thReprint 2012.
2. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” 2nd Ed, Elsevier, Reprinted 2008.

Reference Books :

1. K.P. Soman,Shyam D and V. Ajay “Insight into Data mining Theory and Practice”, EE Edition, PHI 2006.
2. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, PHI India, 2006.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER - V

		L	T	P	C
CA16568	**BIO INFORMATICS [ELECTIVE]**	3	0	0	3

Prerequisite: **Hospital management**

Objectives:

- *To learn the key aspects of bio informatics and search engines.*
- *To gain insight contents 0f mining the patterns.*
- *To gain knowledge in modeling structures.*

UNIT - I **INTRODUCTORY CONCEPTS** **[12]**

The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition –Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation –Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.

UNIT - II **SEARCH ENGINES AND DATA VISUALIZATION** **[12]**

Search Engines- The Search Process – Search Engine Technology – Searching and Information Theory – Computational Methods – Search Engines and Knowledge Management – Data Visualization – Sequence Visualization – Structure Visualization – User Interface –Animation vs Simulation – General Purpose Technologies.

UNIT - III **STATISTICS AND DATA MINING** **[12]**

Statistical Concepts – Microarrays – Imperfect Data –Basics-– Quantifying Randomness – Data Analysis – Tool Selection- Statistics of Alignment – Clustering and Classification – Data Mining – Methods – Infrastructure-Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.

UNIT - IV **PATTERN MATCHING** **[12]**

Fundamentals – Dot Matrix Analysis – Substitution Matrices –Dynamic Programming – Word Methods – Bayesian Methods – Multiple Sequence Alignment –Tools.

UNIT - V **MODELING AND SIMULATION** **[12]**

Drug Discovery – Fundamentals – Protein Structure – Systems Biology – Tools – Collaboration and Communications – Standards –Issues.

Total (L:45 T:15) = 60 Hours

Course Outcomes:

1. Learn about the basic concept of database management.
2. Discuss the concept of search engines and data visualization.
3. Study the concept of statistics and data mining.
4. Evaluate the fundamental concept of pattern matching.
5. Analysis the concept of modeling structures and simulation.

Text Book :

1. Bryan Bergeron, "Bio Informatics Computing", 2nd Edition, Pearson Education, 2004.

Reference Book :

1. T.K.Attwood and D.J. Perry Smith, "Introduction to Bio Informatics, Longman Essen, 1999.

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2016**

SEMESTER – V

		L	T	P	C
CA16569	**SYSTEM SOFTWARE [ELECTIVE]**	3	0	0	3

Prerequisite: **Operating System**

Objectives:

- *To understand the relationship between system software and machine architecture.*
- *To know the design and implementation of assemblers.*
- *To know the design and implementation of linkers and loaders.*
- *To have an understanding of macro processors.*
- *To have an understanding of system software tool.*

UNIT - I INTRODUCTION [9]

Introduction – System Software and Machine Architecture – Machine Architectures (SIC and SIC/XE) – Data and Instruction Formats – Addressing Modes – Instruction Sets – I/O Programming - RISC – CISC.

UNIT - II ASSEMBLERS [9]

Basic Assembler Functions – A Simple SIC Assembler – Assembler Algorithms and Data Structures – Machine Dependent Assembler Features, Instruction Formats and Addressing Modes – Program Relocation – Machine Independent Assembler Features – Literals – Symbol-Defining Statements – Expressions – Program Blocks – Control Sections and Program Linking – Implementation Examples MASM Assembler.

UNIT - III LOADERS AND LINKERS [9]

Basic Loader Functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine Dependent Loader Features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent Loader Features – Automatic Library Search – Loader Options Loader Design Options – Linkage Editors – Dynamic Linking –Bootstrap Loaders. Implementation Examples: MSDOS Linker.

UNIT - IV MACRO PROCESSORS [9]

Basic Macro Processor Functions – Macro Definition and Expansion – Macro Processor Algorithm and Data Structures – Machine – Independent Macro Processor Features – Concatenation of Macro Parameters – Generation of unique Labels – Conditional Macro Expansion – Keyword Macro Parameters – Macro Processor Design Options – Recursive Macro Expansion – Algorithm – General Purpose Macro Processors – Macro Processing within Language Translators – Implementation Examples: MASM Macro Processor – ANSI C Macro Language.

UNIT - V OTHER SYSTEM SOFTWARE [9]

Text Editors – Overview of Editing Process - User Interface – Editor Structure – Interactive Debugging Systems – Debugging Functions and Capabilities – Relationships with other Parts of the System – User Interface Criteria.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Understand the system software and the machine architectures of SIC and SIC/XE.
2. Understand the basic assembler functions and machine dependent and independent assembler features.
3. Understand the basic loader functions and machine dependent and independent loader features.
4. Know the basic macro processor functions and machine independent macro processor features.
5. Understand the interactive text editors and editor structure.

Text Book :

1. Leland Beck - “System Software – An Introduction to Systems Programming”, 3rd Ed., Pearson Edu.2011.

Reference Books :

1. D. M. Dhamdhere,"Systems Programming and Operating Systems", 2nd ,TataMcGraw Hill Co, 2009.
2. John J. Donovan, “Systems Programming”, Tata McGraw Hill Company, 2009.

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SEMESTER - V

		L	T	P	C
CA16571	**CRYPTOGRAPHY AND NETWORK SECURITY[ELECTIVE]**	3	0	0	3

Prerequisite: **Computer Network**

Objectives:

- *To know the methods of conventional encryption.*
- *To understand the concepts of public key encryption and number theory.*
- *To understand authentication and hash functions.*
- *To know the network security tools and applications.*
- *To understand the system level security used.*

UNIT - I INTRODUCTION [7]

The Need for Security-Security Approaches-Principles of Security-Plain Text and Cipher Text Substitution and Transposition Techniques-Encryption and Decryption-Symmetric and Asymmetric Cryptography-Stenography-Key Range and Key Size-Types of Attacks.

UNIT - II INFORMATION SECURITY & SYMMETRIC KEY CRYPTOGRAPHIC ALGORITHMS [9]

Information Security: An Introduction, Why Information Security is needed? Algorithm Types and Modes-Overview of Symmetric Key Cryptography- DES(Description) – IDEA - RC5 –BLOWFISH.

UNIT - III ASYMMETRIC KEY CRYPTOGRAPHIC ALGORITHMS [10]

Overview of Asymmetric Key Cryptography- RSA Algorithm-Digital Signatures- Public Key Infrastructure: Introduction-Digital Certificates- Private Key Management-PKIX Model.

UNIT - IV INTERNET SECURITY PROTOCOLS [12]

Basic Concepts-SSL-SHTTP-TLS-SET-SSL vs SET- 3D Secure Protocol -Kerberos--Email Security-WAP Security-Security in GSM .USER AUTHENTICATION MECHANISMS: Introduction-Authentication Basics-Passwords - Authentication Tokens-Certificate Based Authentication-Biometrics Authentication.

UNIT - V NETWORK SECURITY [7]

Brief Introduction to TCP/IP- Firewalls-IP Security-Virtual Private Networks Case Studies on Cryptography and Security.

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. Introduction about the security concept.
2. Recognize the concept of Information security.
3. Understanding of the asymmetric key cryptography.
4. Know the concept of internet security protocols
5. Describe the basic concept of TCP/IP.

Text Book :

1. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 3rd Edition 2013.

Reference Books :

1. William Stallings, "Cryptography and Network Security - Principles and Practices", PHI India, 3rd Edition, 2011.
2. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2011.
3. Michael E.Whitman,Herbert J.Mattord, “Principles of Information Security”, Cengage Learning India P.Ltd, 4th Ed,12.

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SEMESTER - V

		L	T	P	C
BA16586	**ELECTRONIC COMMERCE [ELECTIVE]**	3	0	0	3

Objectives:

- *To learn about the fundamentals of electronic Transactions*
- *To understand the security technologies for electronic commerce.*
- *To understand the e-commerce payment systems.*
- *To know how businesses sell products and services on the Web.*
- *To understand web marketing approaches and elements of branding.*

UNIT - I INTRODUCTION [9]

Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

UNIT - II SECURITY TECHNOLOGIES [9]

Types of Security Technologies - Internet Security Holes - Inside Attacks – Outside Attacks - Cryptography: Objective - Codes and Ciphers - Breaking Encryption Schemes - Data Encryption Standard - Trusted Key Distribution and Verification - Cryptographic Applications.

UNIT - III ELECTRONIC PAYMENT METHODS [9]

Electronic Payment Methods – Updating Traditional Transaction – Secure Online Transaction Models - Digital Currencies – Digital Payment Systems - Payment Service Providers – Security Protocols – S-HTTP - SET.

UNIT - IV ELECTRONIC COMMERCE PROVIDERS [9]

Types of E-Commerce Providers and Vendors - Online Sales Channels - Virtual Transaction Process - Security Considerations – Cyber Cash - Customer Protection - Client Application - Selling Through Cyber Cash – Mobile Electronic Commerce.

UNIT - V ONLINE COMMERCE ENVIRONMENTS [9]

Servers and Commercial Environments - Server Market Orientation - Netscape Commerce Server - Microsoft Internet Servers - Ecash Client Software and Implementation - Electronic Data Interchange – Implementing E-Commerce Databases..

Total (L : 45 T : 0) = 45 Hours

Course Outcomes:

1. To understand the concepts of electronic Transactions
2. Analysis the concept of security.
3. Discuss the concept of digital payment system.
4. Gain the knowledge of service on the web.
5. Understand the concept of web marketing.

Text Book:

1. Pete Loshin,John Vacca “Electronic Commerce” 4th ED., Firewall media Laxmi Publications Delhi 2013

Reference Books:

1. Jeffrey F.Rayport and Bernard J. Jaworski, “Introduction to E-Commerce”, 2nd Edition, TataMc-GrawHill 2009.
2. Greenstein, “Electronic Commerce”, Tata Mc-Graw Hill Pvt., Ltd., 2003.