



Raffles University, Neemrana

School of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING SCHEME B.Tech. (COMPUTER SCIENCE & ENGINEERING) (2016-20)

Year: II

Semester: III

S. No.	Sub Code	Name of the Subject	Teaching Hours (Per Week)			Max. Marks				Credits
			L	T	P	TA	CA	ESE	Total	
1	CS-301	Applied Mathematics III	3	1		20	20	60	100	4
2	CS-302	Data Structure Using C	3	1		20	20	60	100	4
3	CS-303	Computer Architecture & Organization	3	1		20	20	60	100	4
4	CS-304	Principles of Management	3			20	20	60	100	3
5	CS-305	Object Oriented Programming Through C++	3	1		20	20	60	100	4
6	CS-306	UNIX & Shell Programming	4			20	20	60	100	4
Total			19	4		120	120	360	600	23
Practicals										
7	CS-P-302	Data Structures Using C Practical			2	20	20	60	100	1
8	CS-P-305	Object Oriented Programming Through C++ Practical			2	20	20	60	100	1
9	US-P-306	Shell Programming Practical			2	20	20	60	100	1
10	CS-P-307	Hardware Maintenance and Trouble Shooting Practical			2	20	20	60	100	1
11	CS-P-308	Seminar/GP							100	1
Total					8	80	80	240	500	5
Grand Total									1100	28

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Raffles University, Neemrana

School of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING SCHEME B.Tech. (COMPUTER SCIENCE & ENGINEERING) (2015-19)

Year: II

Semester: IV

S. No.	Sub Code	Name of the Subject	Teaching Hours (Per Week)			Max. Marks				Credits
			L	T	P	TA	CA	ESE	Total	
1	CS-401	Graph Theory & Combinatorics	3	1		20	20	60	100	4
2	CS-402	Microprocessor Based Systems	4			20	20	60	100	4
3	CS-403	System Programming	3	1		20	20	60	100	4
4	CS-404	Theory of Computation	3	1		20	20	60	100	4
5	CS-405	Embedded Systems	3			20	20	60	100	3
6	CS-406	Data Communication	3	1		20	20	60	100	4
Total			19	4		120	120	360	600	23
Practicals										
7	CS-P-402	Microprocessor Based Systems Practical			2	20	20	60	100	1
8	CS-P-403	System Programming Lab			2	20	20	60	100	1
9	CS-P-405	Embedded Systems Practical			2	20	20	60	100	1
10	CS-P-406	Data Communication Practical			2	20	20	60	100	1
11	CS-P-407	Seminar/GP							100	1
Total					8	80	80	240	500	5
Grand Total									1100	28

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SCHEME B.Tech. (COMPUTER SCIENCE & ENGINEERING) (2016-20)

Year: III

Semester: V

S. No.	Sub Code	Name of the Subject	Teaching Hours (Per Week)			Max. Marks				Credits
			L	T	P	TA	CA	ESE	Total	
1	CS-501	Operating Systems	3	1		20	20	60	100	4
2	CS-502	Computer Networks	3	1		20	20	60	100	4
3	CS-503	Database Management Systems	4			20	20	60	100	4
4	CS-504	Software Engineering	3	1		20	20	60	100	4
5	CS-505	Principles of Programming Languages	3			20	20	60	100	3
6	CS-506	Computer Graphics	3	1		20	20	60	100	4
Total			19	4		120	120	360	600	23
Practicals										
7	CS-P-502	Computer Networks Practical			2	20	20	60	100	1
8	CS-P-503	Database Management Systems Practical			2	20	20	60	100	1
9	CS-P-504	Software Tools Lab			2	20	20	60	100	1
10	CS-P-506	Computer Graphics Practical			2	20	20	60	100	1
11	CS-P-407	Seminar/GP							100	1
Total					8	80	80	240	500	5
Grand Total									1100	28

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING SCHEME B.Tech. (COMPUTER SCIENCE & ENGINEERING) (2016-20)

Year: III

Semester: VI

S. No.	Sub Code	Name of the Subject	Teaching Hours (Per Week)			Max. Marks				Credits
			L	T	P	TA	CA	ESE	Total	
1	CS-601	Distributed Databases	4			20	20	60	100	4
2	CS-602	Design & Analysis of Algorithm	3	1		20	20	60	100	4
3	CS-603	Data Mining & Warehousing	3			20	20	60	100	3
4	CS-604	Parallel and Distributed Computing	3	1		20	20	60	100	4
5	CS-605	Java Programming	3	1		20	20	60	100	4
6	CS-606	Language Processor	3	1		20	20	60	100	4
Total			19	4		120	120	360	600	23
Practicals										
7	CS-P-602	Design & Analysis of Algorithm Practical			2	20	20	60	100	1
8	CS-P-605	Java Programming Practical			2	20	20	60	100	1
9	CS-P-606	Language Processor Practical			2	20	20	60	100	1
10	CS-P-607	Open Source Tool Lab			2	20	20	60	100	1
11	CS-P-407	Seminar/GP							100	1
Total					8	80	80	240	400	5
Grand Total									1100	28

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SCHEME B.Tech. (COMPUTER SCIENCE & ENGINEERING) (2016-20)

Year: IV

Semester: VII

S. No.	Sub Code	Name of the Subject	Teaching Hours (Per Week)			Max. Marks				Credits
			L	T	P	TA	CA	ESE	Total	
1	CS-701	Advanced Computer Architecture	3	1		20	20	60	100	4
2	CS-702	Network Security & Cryptography	3	1		20	20	60	100	4
3	CS-E-703	Elective-I	3			20	20	60	100	3
4	CS-E-704	Elective-II	3	1		20	20	60	100	4
5	CS-E-705	Elective-III	3	1		20	20	60	100	4
Total			15	4		100	100	300	500	19
Practicals										
6	CS-P-702	Network Security & Cryptography Practical			2	20	20	60	100	1
7	CS-I-706	Industrial Project Phase-I			10	50	50	400	500	8
Total					12	80	80	240	600	7
Grand Total									1100	28

Elective-I (CS-E-703):
Advanced Database Management System
Real Time System
Wireless Communication & Network

Elective-II (CS-E-704):
Digital Image Processing
Hardware Testing & Fault Tolerance
Information Theory & Coding

Elective-III (CS-E-705):
Software Project Management
Embedded System Design
Data Compression Technique

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SCHEME B.Tech. (COMPUTER SCIENCE & ENGINEERING) (2016-20)

Year: IV

Semester: VIII

S. No.	Sub Code	Name of the Subject	Teaching Hours (Per Week)			Max. Marks				Credits
			L	T	P	TA	CA	ESE	Total	
1	CS-801	Artificial Intelligence & Expert Systems	3	1		20	20	60	100	4
2	CS-802	Cloude Computing	4			20	20	60	100	4
3	CS-803	Cyber Laws	4			20	20	60	100	4
4	CS-804	Computer System Security	3	1		20	20	60	100	4
Total			16	2		80	80	240	400	16
Practicals										
7	CS-P-804	Computer System Security Practical			2	20	20	60	100	1
8	CS-II-805	Industrial Project Phase-II			14	50	150	400	600	11
Total					16	70	170	460	700	12
Grand Total									1100	28

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THIRD SEMESTER

CS-301 APPLIED MATHEMATICS – III

Total Hrs: 45

Unit I: Laplace Transforms (7 Hrs)

Laplace transform: definition and their simple properties, transform of derivatives and integrals, evaluation of integrals by L.T. ,inverse L.T. & its properties , convolution theorem, Laplace transforms of periodic function & Unit step function, applications of Laplace transforms to solve ordinary differential equations & partial differential equations.

Unit II: Z-Transforms (8 Hrs)

The Z transform- definition & properties, inverse & relation with Laplace Transform, Application to z transform to solve difference equations with constant coefficients.

Unit III: Fourier Series (7 Hrs)

Periodic function & their Fourier expansion, even & odd function, change of interval, half range expansion, Fourier Transforms: Fourier Integral theorem, Fourier transforms and their simple properties

Unit IV: Partial Differential Equations and its application (8 Hrs)

Partial differential equations of first order & first degree (i.e. Lagrange's form), linear homogeneous partial differential equation of nth order with constant coefficients, method of separation of variable. Simple applications.

Unit V : Random Variables (7 Hrs)

Random Variables, Distribution functions of continuous & discrete random variables, Joint distributions, mathematical expectations, moment, Moment generating function & characteristic function.

Unit VI: Special probability distribution (8Hrs)

Geometric, Binomial, Poisson's, normal, Exponential, Uniform, Weibul probability distribution. Random processes resemble average & temporal average, Auto correlation & cross correlation, stationary random process, power spectrum stationary processes & ergodic Random process.

Text books: 1. Grewal B.S, 'Higher Engineering Mathematics', Khanna Publishers, 38th edition 2004.

2. Spiegel M. R, 'Advanced Mathematics for Engnrns and Scientist', McGraw-Hill Book, 2000.

References 1. Chandrika Prasad, 'Mathematics for Engineer', S Chand Publication

2. Chandrika Prasad, 'Advanced Mathematics for Engineer', S Chand Publication

3. Kreyszig E, 'Advanced Engineering Mathematics', John Wiley & Sons, 8th edition, 2000.

4. Jain R.K. and Iyengar, S.R.K., 'Advanced Engineering Mathematics', Narosa Publishers, 2003.

5. H. K. Dass, 'Engineering Mathematics', S. Chand Publication, New Delhi

CS-302 DATA STRUCTURES USING C

Total Hrs: 45

Unit I: Arrays, Records and Pointers (7 Hrs)

Introduction, Linear Arrays, Arrays as ADT, Representation of Linear in Memory, Traversing Linear Arrays, Inserting and deleting, Sorting; Bubble Sort, Searching; Linear Search, Binary Search, Multidimensional Arrays, Representation of Polynomials Using Arrays, Pointers; Pointer Arrays, Dynamic Memory Management, Records; Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Sparse Matrices.

Unit II: Linked List (9 Hrs)

Introduction Linked Lists ,Representation of Linked Lists in Memory Traversing a Linked List Searching a Linked List ,Memory Allocation; Garbage Collection ,Insertion into a Linked List ,Deletion from a Linked List , Header Linked List, Circularly Linked Lists ,Two-Way Lists (or Doubly Linked Lists), Josephus Problem and its Solution, Buddy Systems.

Unit III: Stacks, Queue and Recursion (9 Hrs)

Introduction Stacks, Array Representation of Stacks ,Linked Representation of Stacks, Stack as ADT ,Arithmetic Expression; Polish Notation ,Application of Stacks ,Recursion, Towers of Hanoi , Implementation of Recursive Procedures by Stacks ,Queue, Linked Representation of Queues ,Queues as ADT , Circular of Queues, Deques, Priority Queues ,Applications of Queues.

Unit IV: Trees (10 Hrs)

Introduction Binary Trees ,Representing Binary Tree in Memory ,Traversing Binary Trees, Traversal Algorithms Using Stacks, Header Nodes; Threads ,Threaded Binary Trees ,Binary Search Trees ,Searching and Inserting in Binary Search Trees ,Deleting in a Binary Search Tree, Balanced Binary Trees, AVL Search Trees ,Insertion in an AVL Search Tree ,Deletion in an AVL Search Tree, mway Search Trees ,Searching, Insertion and Deletion in an m-way Search tree, B-Trees ,Searching, Insertion and Deletion in a B-tree, B+-Trees.

Unit V: Graphs and their Applications (6 Hrs)

Introduction ,Graph Theory Terminology ,Sequential Representation of Graphs; Adjacency Matrix; Path Matrix ,Warshall's Algorithm; Shortest Paths ,Linked Representation of a Graph ,Operations on Graphs ,Traversing a Graph ,Posets; Topological Sorting ,Spanning Trees

Unit VI: Sorting and Searching (4 Hrs)

Introduction, Sorting, Insertion Sort, Selection Sort, Merging, Merge-Sort, Shell Sort, Radix Sort, Searching and Data Modification, Hashing.

Text Books: 1. Seymour Lipschutz, Schaums Outlines, 'Data Structures with C', Tata Mc Graw Hill

Reference Books:

1. S. Sahani, 'Data Structures in C'
2. D.Samantha, 'Classic Data Structure', PHI Publications

CS-P-302 DATA STRUCTURES USING C (Practical)

Total Hrs: 20

1. Write and execute a program in C to implement stack using arrays
2. Write and execute a program in C to implement queue using arrays
3. Write and execute a program in C to implement simple linked list
4. Write and execute a program in C to implement stack using linked list
5. Write and execute a program in C to implement queue using linked list
6. Write and execute a program in C to implement doubly linked list
7. Write and execute a program in C to implement circular linked list.
8. Write and execute a program in C to reverse a singly and doubly linked list
9. Write and execute a program in C to insert a node in a linked list in a sorted fashion 154
10. Write and execute a program in C to implement binary tree, finding the depth of a tree
11. Write and execute a program in C to implement in order, preorder and post order traversals
12. Write and execute a program in C to find if two trees are identical
13. Write and execute a program in C to implement graph using linked list
14. Write and execute a program in C to implement bubble sort and selection sort using menu driven program
15. Write and execute a program in C to implement merge sort

Unit I: Basic Structure of Computers (7 Hrs)

Functional Units, Basic operational concepts, Bus structures Addressing modes, subroutines: parameter passing, Instruction formats, expanding op codes method.

Unit II: Basic Processing Unit (8 Hrs)

Bus architecture, Execution of a Complete Instruction, sequencing of control signals, Hardwired control, Micro programmed Control, microinstruction format, Bit slice concept.

Unit III: Arithmetic Unit (7 Hrs)

Number representations and their operations, Design of Fast Adders, Signed multiplication, Booth's Algorithm, bit pair recoding, Integer Division, Floating point numbers and operations, guard bits and rounding.

Unit IV: The Memory System (8 Hrs)

Various technologies used in memory design, higher order memory design, multimodal memories and interleaving, Associative Memory, Cache memory, Virtual Memory.

Unit V: Input /Output Organization (7Hrs)

I/O mapped I/O and memory mapped I/O, interrupts and interrupts handling mechanisms, vectored interrupts, synchronous vs. asynchronous data transfer, Direct Memory Access COMPUTER PERIPHERALS: I/O devices such as magnetic disk, magnetic tape, CDROM systems.

Unit VI: RISC (8 Hrs)

Pipelining, basic concepts in pipelining, delayed branch, branch prediction, data dependency, influence of pipelining on instruction set design, multiple execution Units, performance considerations, Basic concepts in parallel processing & classification of parallel architectures. Vector Processing, Array Processors. Recent trends in Computer Architecture & Organization.

Text Books: 1. V.C.Hamacher,Z.G.Vranesic and S.G.Zaky, 'Computer Organization', McGraw Hill,5th edition ,2002.

References Books: 1. A.S.Tanenbaum, "Structured Computer Organization" 4th Edition, Pearson Education.

2. M Mano, "Computer System and Architecture", Pearson Education 3. W. Stallings, "Computer Organization & Architecture", Pearson Education.

CS-304 PRINCIPLES OF MANAGEMENT

Total Hrs: 45

Unit I: Introduction (7 Hrs)
Nature and Functions of Management, Management yesterday and today, Planning and Decision making.

Unit II: Management Information System (8 Hrs)
Management Information System: Introduction, Conceptual Foundations, and Information System Requirement

Unit III: Marketing Management and Planning (7 Hrs)
Marketing Management: Marketing concept, Indian Marketing Environment, Market segmentation, Market Planning, International Marketing.

Unit IV: Financial Management (8 Hrs)
Various Aspects of Financial Management, Benefits of Financial Management.

Unit V: Human Resource Management (7 Hrs)
Human Resource Management: Human Resource Planning, Recruitment, Selection, Training and development, Security, Safety and Health.

Unit VI: Organization Structure and Behavior (8 Hrs)
Organization Behavior: Organization Structure and design. Designing Effective Organization, Managing Job Stress, Organization Development.

Text Books: 1. P C Tripathi and P N Reddy , 'Principles of management'

2. Davis and H. Olson, 'Management Information System,Gordan', McGraw Hill Pub.

3. William Werther and Keith Davis, ' Human Resources and Personal Management'

4. V S Ramaswamy and S Namakumari, 'Marketing Management' 5. High Arnold and Daniel Feldman, 'Organization Behavior', McGraw Hill.

- Unit I: Principles of Object Oriented Programming (8 Hrs)
Differences between C and C++. A look at procedure Oriented programming, object oriented programming paradigm, basic concepts of OOP, Benefits of OOP, OO languages, A sample program, structure of C++ program. Introduction to OOPS :The origins of C++, What is Object Oriented Programming?, Some C++ fundamentals, Headers & Name Spaces, Introducing C++ Classes, Function overloading, Operator overloading, Inheritance, Constructors & Destructors, Function & Operator Overloading:
- Unit II: Overloading (10Hrs)
constructor functions, Localizing variables, Function overloading & Ambiguity, Finding the address of an overloaded function, this Pointer, Operator overloading, References, Using reference to overload a unary operator, Overloading, overriding, Applying operator overloading.
- Unit III: Inheritance, Virtual Functions and polymorphism (6 Hrs)
Inheritance and the access specifier, Constructors and Destructors in derived classes, Multiple Inheritance, Passing parameters to a basic class, Pointers and references to derived types, Virtual Functions, Why virtual functions?, Pure virtual functions and abstract types, Early Vs Late binding. Unit
- IV: Static & Dynamic memory allocation (8 Hrs)
Static & Dynamic allocation using new and delete, static class members, Virtual base classes, const member functions and mutable, volatile member functions, Using the as keyword, linkage specification, The .* and ->* operators, Creating conversion functions, Copy constructors, Granting access, namespaces, Explicit constructors, type name and export
- Unit V: Templates (5 Hrs)
Class templates, class templates with multiple parameters, function templates, function templates with multiple parameters.
- Unit-VI: Exceptions Handling (8 Hrs)
Exception Handling, fundamentals, options the uncaught exception (), Applying exception Handling, and RTTI, casting operators, Recent trends in Object Oriented Programming in C++ , Advanced topics & its Application.
- Text Books: 1. Object Oriented Programming in C++ -Robert Lafore, edition, Galgotia publications
2. The Complete Reference C++, Herbert Schildt, 4th Edition, TMH
- Reference Books: 1. Y. Kanetkar, 'Let's C++', BPB publications
2. E Balagurusamy, 'Object oriented programming with C++', 4th edition, TMH
3. Sourav Sahay , 'Object-Oriented Programming with C++' , Oxford University Press, 2006.

1. Write a Program to perform various operations on complex numbers
2. Prepare salary chart of an employee using Structures.
3. Write code to demonstrate the creation of class & object.
4. Programs to define Class using constructor & destructor.(Default constructor ,Multiple constructor, Copy constructor, Overloaded constructor)
5. Write a Program to maintain employee record using Classes.
6. Write a Program to illustrate Multiple Inheritance.
7. Demonstrate the concept of overloading unary & binary operators.
8. Write a program to show the concept of function overloading.
9. Write A Program to illustrate Dynamic Memory Allocation using Pointers.
10. Write code to show compile time polymorphism (static binding)
11. Write code to show run time polymorphism (dynamic binding)
12. Create a class code & illustrate the use of THIS pointer.
13. Demonstrate the formatting of output using manipulators.
14. Create templates & demonstrate their use.
15. Write code to demonstrate exception handling.

UNIT-1 INTRODUCTION

(8Hrs)

UNIX Operating System Introduction, UNIX Architecture, Features of UNIX, Internal and External Commands, Command Structure cal, date, echo, printf, bc, script, passwd, PATH, who, uname, tty, stty, pwd, cd, mkdir, rmdir, od. The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff, gzip, tar, zip, df, du, mount, umount, chmod, The vi editor, security by file Permissions. NETWORKING COMMANDS: ping, telnet, ftp, finger, arp, rlogin.

UNIT-2 INTRODUCTION TO SHELLS:

(8 hrs)

Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization. FILTERS: Filters, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Ordering a File, uniq.

UNIT-3 REGULAR EXPRESSIONS:

(8 hrs)

Atoms, operators GREP: Operation, grep Family, Searching for File Content. SED: Scripts, Operation, Addresses, commands, Applications, grep and sed. AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

UNIT-4 KORN SHELL:

(8 hrs)

Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process. KORN SHELL PROGRAMMING: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT-5 INTERACTIVE C SHELL:

(8 hrs)

C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts. C SHELL PROGRAMMING: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT-6 FILE MANAGEMENT:

(6 hrs)

File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

1. Write a shell script to write your user name as a banner to the front of the file being sent to the printer
2. Write a shell script to print the first five arguments in reverse order
3. Write a shell script to append a line to the file. Both the file name and line have to be specified to the script at the command line. Ensure that it runs the sh shell script. Print the number of lines in the file after you done.
4. Write a shell script that tests and print outs the name of all the files in a directory that are executable. Do not print any other file or directory names. If there are subdirectories, go down recursively. How would you change this script to not go down recursively?
5. Write a shell script that given a person's UID, tells you how many times that person is logged on
6. Write a shell script called lsdirs which lists just the directories in the current directory
7. Write a shell script called see taking a filename name as argument which uses ls if the file is a directory and more if file is otherwise
8. Write a shell script that asks a user to type w word in, then tells the user how long that word is.
9. In many versions of unix there us a -i argument for cp so that you will be prompted for confirmation if you are about to overwrite a file. Write a script called cpi which will prompt if necessary without using the -i argument.
10. Write a shell script that takes a uid as an argument and prints out that persons name, home directory, shell and group number, and other groups that person may belong to.
11. Sort /etc/passwd using the uid as the key.
12. a) Write a program to generate Machine OpCode Table , Symbol Table and Pseudo OpCode table during First Pass Assembler. b) Write a program to generate Machine Opcode table using Two pass Assembler.
13. a) Write a program to Generate Macro Name Table , Macro definition Table and Argument List Array during Pass One of Two Pass Macro. b) Write a program to generate Expanded Source in Pass Two of Two Pass Macro.
14. Design a shell script where there are three hard links of a file named calendar.sh date.sh and list.sh. the script should behave differently depending on the name of the script through which it is run a)To find which number is greater amongst the three entered number b)Design a shell script by which only the word "DDU" is displayed from the lines in any file 162
15. Design a shell script for user-interactive calculator using function.

CS-P-307 HARDWARE MAINTENANCE AND TROUBLESHOOTING (PRACTICAL)

Total Hrs: 20

1. Study of Motherboard of Pentium-4.
2. Study of Storage devices.
3. To demonstrate Assembling of Personal Computer.
4. Study and Configuration of BIOS.
5. To demonstrate Partitioning of Hard disk
6. To demonstrate Installation of Operating System.
7. To Study Networking Basics
8. To demonstrate File and Printer Sharing in Network.
9. To study Structured Cabling.
10. To Build Small Home Network.
11. To study WI-FI Basics.
12. To demonstrate Protecting PC from Virus, Spyware and Malware.
13. To demonstrate installation of Linux.
14. To demonstrate Windows 2007.
15. To demonstrate mounting xp files in Linux using NFS server.

FOURTH SEMESTER

CS-401 GRAPH THEORY AND COMBINATORICS

Total Hrs: 45

Unit I: Set Theory

(7 Hrs)

Operations on sets, Laws of algebra of sets, Representation of sets on computer in terms of 0's & 1's. Partition & covering of a set, ordered pair, Product set, Relation—Different types of relations, Graph of relation, Matrix of relation, Transitive closure of relation, Properties of relations, Compatible relation. Functions, Partial ordering & partially ordered set, Hasse diagram of Poset, Totally ordered set, Peano axioms & Mathematical Induction.

Unit II: Group

(8 Hrs)

Algebra or Algebraic systems like semi group, monoid, and examples. Homomorphism, Isomorphism of semi group & monoid. Groups, properties of algebraic groups. Permutations groups, Subgroups, Co sets, Lagranges theorem, properties of cyclic groups, generator of group, kernel of Homorphism, quotient group, fundamental theorems & Homomorphism of groups, Residue classes & Fermats theorem.

Unit III: Rings

(7 Hrs)

Rings, types of rings, Fields, subring, Integral domain. Simple properties of rings. Lattice as Poset & as algebraic system, Types of lattices, Hasse diagrams, Sublattice, direct product of Lattices, Lattice Homomorphism, complement of elements of lattices, Various lattices, composition tables, Lattice Bn . Boolean algebra; Boolean Expressions, Equivalence of Boolean ression by tables, Simplification of circuit & equivalent circuit by truth tables.

Unit IV: Graph Theory

(8 Hrs)

Graphs and its types, subgraph, Quotient graph, Euler path, Complete path, in degree out degree, reach ability, cyde, matrix representation of graph. Transitive closure of graph, Adjacency matrix, Trees, Venn diagram, Representation of trees, binary trees, spanning trees, Prims algorithm.

Unit V: Combinatorics:

(7Hrs)

Definition of generating functions and examples, proof of simple combinatorial identities, Probab. G.F. $p(t) p t$, $E(x) p (t) n$, $n \sum =$, examples. Recursive relations: definitions & examples, explicitly formula for sequence, back tracking to find explicit formula of sequence, solving recurrence relations. Counting Thjeorem and application, Equivalent sets, cardinal numbers, denumerable sets. Multiplication principle of counting. Permutation & Combination with examples. The pigeon hole principle & extended pigeon hole principle and application of pigeon hole principle in solving simple problems.

Unit VI: Number Theory:

(8 Hrs)

Examples of continued fractions. The study of continued fractions. alpha has Infinite continued fraction if alpha is irrational. Alpha has periodic continued fractions if alpha is quadratic irrational. Application to approximation of irrationals by rationals. Hurwitz's theorem.

Text Books: 1. Discrete Mathematical structure with application to computer science by Trembley & Manohar (Mc. Graw Hill)

2. Discrete Mathematical Structure by Kolmann , Busby & Ross (PHI)

References: 1. Liu, 'Discrete Mathematics'

2. John Truss , 'Discrete Mathematics' Addison Wesley, 2000

3. K. D. Joshi, 'Foundations of Discrete Mathematical' Willey Eastern.

4. M. L. Khanna , 'Modern Algebra' , Jai Prakash Nath & Company Meeru.

CS-402 MICROPROCESSOR BASED SYSTEMS

Total Hrs: 45 hours

Unit I: Introduction to 8086 Microprocessor (7 Hrs)

Building Concepts of Microprocessor, Introduction to 16, 32, 64 bit Microprocessor, Comparison of 8086 / 8088 CPU Architecture, Microprocessor Evolution - INTEL 8086 to Pentium with focus on- Clock Speed, Concurrent operation of EU and BIU, Memory Organization & Interfacing.

Unit II: 8086 Programming (8 Hrs)

Addressing modes, Instruction set, Programming examples, Pseudo Op codes, Assembler Directives. Introduction to Software and Hardware tools. [Cross assemblers, Logic analyzers, Emulators, Simulators], Architecture.

Unit III: Co-processor interfacing (7 Hrs)

8086 / 88 Maximum Mode, Architecture and Programming of 8087 and its Interfacing with 8086/8088.

Unit IV: 8255 Interfacing (8 Hrs)

Interfacing and programming of Peripheral 8255, Interfacing of ADC, DAC & applications. Interfacing and programming of Peripheral 8253.

Unit V: Special Peripheral Interfacing (7 Hrs)

Architecture, Interfacing and programming of Peripherals, 8251 & DMA Controllers 8237.

Unit VI: Advanced Microprocessor study (8 Hrs) 80386 Architecture, Real and Protected Mode, Register Model, Memory Management Unit.

Text Books: 1. Advanced Microprocessors & Peripherals by A.K. Ray & K.M. Bhurchandi, TMH

2. Programming & Interfacing of 8086 / 8088, D.V. Hall, TMH.

Reference books: 1. Intel Reference Manuals, Microprocessor & Microcontrollers: Intel

2. A. K Ray, 'Advanced Microprocessor & peripherals' [TMH]

3. Microprocessors 8086 / 88 Family Prog. Interfacing: Liu, Gibson.

CS-P-402 MICROPROCESSOR BASED SYSTEM (PRACTICAL)

Total Hrs: 20

1. Study of 8086 microprocessor, Assembler/Cross Assembler/Simulator and basic programs like addition of two 16 bit, 32 bit numbers and series addition (complete architecture, segmentation and pin diagram).
2. Write an ALP to compare a string by using string related instructions of 8086.
3. Write an assembly language program for 8086 to generate Fibonacci series and store it from memory location 0050H.
4. Write an ALP to find the Number in Memory Array.
5. Write an ALP to arrange a string in Ascending/Descending order.
6. Interface 8255 with 8086 microprocessor and write a program to glow the alternate LED's.
7. Interface 8253 with 8086 microprocessor
8. Interface 8251 with 8086 microprocessor
9. Interface of ADC using 8255 155
10. Open Ended experiments on Microprocessor Interfacing.

CS-403 SYSTEM PROGRAMMING

Total Hrs: 45

Unit I: Introduction

(7 Hrs)

Assembler Concept of assembler, design of single pass and two pass assembler.

Unit II: Microprocessor

(8 Hrs)

Microprocessor- Concept of macro, macro call within macro, macro definition within macro, recursive macro calls, design of macro processor.

Unit III: Linker and Loader-

(7 Hrs)

Linker and Loader- Concept of static and dynamic relocation, external symbols, design of linker, design of object file for different loading schemes.

Unit IV: Common Object file format & System Utilities

(8 Hrs)

Common Object file format & System Utilities- Structure of object file and executable file, section or segment headers, symbol table, concept of storage class, string various, data types line insert, character, arrays structures. Source code control system, make, link editor, symbolic debugger.

Unit V: Unix Device Drivers

(7 Hrs)

Unix Device Drivers- Definition , Anatomy and Types, Device programming, Installation , Incorporation of driver routines, Basic device driver operation, Implementation with Line Printer & Disk ,Comparative study between device drivers for UNIX & Windows.

Unit VI: Linux System programming

(8 Hrs)

Basics, Concepts, Writing, implementation of virtual machines

Text Books: 1. Lila & Beg , 'System Programming'.

2. George Pajari , 'Unix Device Drivers', Pearson Education.

Reference Books: 1. System Programming and Operating systems- D. M. Dhamdhare

2. Unix system Utilities manual.

3. Unix programming Environment- Keringham and Pike, Pearson Education.

CS-404 THEORY OF COMPUTATION

Total Hrs: 45

Unit I: Mathematical preliminaries (7 Hrs)

Sets, operations, relations, strings, transitive closure, count ability and diagonalisation, induction and proof methods- pigeon-hole principle and simple applications – concept of language – grammars and production rules –Chomsky hierarchy.

Unit II: Finite automata & regular expressions (8 Hrs)

Finite State machine, regular languages, deterministic finite automata, conversion to deterministic automata, E-closures – regular expressions, finite automata, and minimization of automata, Moore and Mealy machine and their equivalence.

Unit III: Regular grammar & context free grammar (7 Hrs)

Pumping lemma for regular sets- closure properties of regular sets- decision properties for regular sets, equivalence between regular language and regular grammar. Context – free languages – parse trees and ambiguity , reduction of CFGS ,Chomsky and Griebach normal forms.

Unit IV: Push – down Automata (PDA) (7 Hrs)

non Determinism – acceptance by two methods and their equivalence, conversion of PDA to CFG CFLs and PDAs- closure and decision properties of CFLs.

Unit V: Turing machines (12 Hrs)

variants – recursively enumerable (r.e.) set – recursive sets ,TM as computer of function – decidability and solvability – Halting Problem – reductions – Post correspondence Problem (PCP) and un solvability of ambiguity problem of CFGs, Church’s hypothesis, Introduction to recursive function theory – primitive recursive and partial recursive functions.

Unit VI: Trends and Applications of Automata (4 Hrs)

Recent trends in Theory of computation.

Text Books 1. Introduction Of Automata Theory, Languages and computation- J.E. Hopcroft , J.D.Ulman, Pearson education.

Reference Books 1. John Martin, ‘Introduction Of Automata Theory, Languages and computation’

2. Peter Linz , ‘Introduction to formal languages and automata’,Norasa,2000.

3. Mishra and Chandrashekharan, ‘ Theory Of Computer Science’ .

CS-405 EMBEDDED SYSTEMS

Total Hrs: 60

Unit-I: Microcontrollers (10Hrs)

Microprocessors and Micro-controllers, Types of Microcontrollers, External memory, Processor Architecture – Harvard v/s Van Neumann; CISC v/s RISC, Microcontroller, Memory types, Software development tools like assembler, cross- compiler, emulator, and 173 simulator, 8051 controller, Block Diagram &Architecture.

Unit-II: 8051 (10Hrs) 8051 Instruction Set, Addressing modes & programming. 8051 Timers, Serial I/O.

Unit-III: Memory Interfacing (10Hrs) Memory Interfacing. Programming, Real time interfacing with LED, LED display, LCD display.

Unit-IV: PIC Micro-Controllers (10Hrs) overview; features, PIC 16c6x/7x –architecture, file selection register, Memory organization, Addressing modes, Instruction set, Programming.

Unit-V: ARM Micro-Controllers (10Hrs) ARM Micro-controllers – overview; features, ARM 7 – architecture, Thumb, Register Model, Addressing modes, Instruction set, Programming.

Unit-VI: Industrial Interfacing Buses (10 Hrs) PCI, ISA, EISA, I2C, USB, RS232. Advance topics on embedded system.

Text Books: 1. Myke Predko, “Programming and Customizing The 8051 Micro-controller”, Tata McGraw-Hill edition.

2. John B. Peatman, “Design with PIC Microcontrollers”, Low Price Edition, Pearson Education Asia.

3. Ajay V. Deshmukh ,“Micro-controllers - Theory and Applications”, Tata McGraw Hill.

4. Kenneth J. Ayala “The 8051 Micro-controller – Architecture, Programming & Applications”, Second Edition, Penram International & Thomson Asia.

5. Data sheet of respective microcontrollers.

Reference Books: 1. Embedded System :Architecture, programming and design by Rajkamal, TMH

2. ARM Assembly Language: Fundamentals and Techniques, William Hohl, CRC Press

3. ARM Architecture Reference Manual / Edition 2, by David Seal.

CSP-P-405 EMBEDDED SYSTEMS (Practical)

Total Hrs: 20

1. Study of Microcontroller tools
2. Write a program to perform arithmetic Operation using 8051 Microcontroller.
3. Write a program to perform addition of two arrays using 8051 Microcontroller
4. Write a program to perform Array Sorting
5. Write a program to perform Interrupt Operation
6. Write a program to interface with LED Display
7. Write a program to perform arithmetic Operation using PIC Microcontroller
8. Write a program to perform addition of two arrays using PIC Microcontroller
9. Write a program to perform arithmetic Operation using ARM7 Microcontroller
10. Write a program to perform addition of two arrays using ARM7Microcontroller
11. Write a program in C for interfacing the Display using PIC Microcontroller
12. Open Ended Mini Project

Unit I: Signals (8 Hrs)

ANALOG AND DIGITAL: Analog and digital data, Analog and digital signals; PERIODIC AND APERIODIC SIGNALS, ANALOG SIGNALS: Simple analog signals; TIME AND FREQUENCY DOMAINS; COMPOSITE SIGNALS: Frequency spectrum and Bandwidth; DIGITAL SIGNALS: Decomposition of digital signal; TRANSMISSION MODES: Serial and Parallel transmission, Asynchronous and Synchronous Transmission, Simplex, Half-Duplex and Full-Duplex communication.

Unit II: Encoding And Modulation (8 Hrs)

DIGITAL-TO-DIGITAL CONVERSION: Unipolar, Polar, Bipolar; ANALOG-TO-DIGITAL CONVERSION: Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM), Sampling Rate, How many Bits per Sample? Bit rate; DIGITAL-TO-ANALOG CONVERSION: Aspects of Digital-to-Analog conversion, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase shift Keying (PSK), Quadrature Amplitude modulation (QAM), Bit / Baud comparison; ANALOG-TO-ANALOG CONVERSION: amplitude modulation (AM), Frequency Modulation (FM), Phase Modulation(PM).

Unit III: Interfaces and Modems (Hrs: 8)

DIGITAL DATA TRANSMISSION: Parallel transmission, Serial Transmission; DTE-DCE INTERFACE: Data Terminal Equipment (DTE), Data Circuit-Terminating Equipment (DEC), Standards, EIA-232 Interface; OTHER INTERFACE STANDARDS: EIA-449, EIA-530.

Unit IV: Communication Media (Hrs: 7)

GUIDED MEDIA: Twisted pair cable, Coaxial cable, Optical Fiber cable; UNGUIDED MEDIA: Radio frequency allocation, Propagation of Radio waves, Terrestrial microwave, Satellite communication, Cellular Telephony; TRANSMISSION IMPAIRMENTS: Attenuation, Distortion, Noise; PERFORMANCE: Throughput, Propagation Speed, Propagation time.

Unit V: MULTIPLEXING (Hrs: 7)

FREQUENCY DIVISION MULTIPLEXING (FDM), TIME DIVISION MULTIPLEXING (TDM): Inverse Multiplexing, WAVE-DIVISION MULTIPLEXING, MULTIPLEXING APPLICATIONS: THE TELEPHONE SYSTEM: Common carrier services and hierarchies, Analog services, Digital Services, FTTC: FTTC in the Telephone Network, FTTC in the Cable TV Network.

Unit VI: Data Compression (Hrs: 7)

Huffman code, Run-Length Encoding, Relative Encoding, Lempel-Ziv Encoding, Image Compression, JPEG, MPEG.

Text Books: 1. Behrouz A. Forouzan , 'Data Communications and 161 Networking', 4th edition, Tata McGraw Hill

2. William A. Shay , 'Understanding Data Communications and Networks', 2nd Edition, Vikas Publishing House.

Reference Books: 1. Kennedy , 'Electronic communication Systems'

2. Singh and Sapre , 'Communication systems' 3. Fred Halsall, 'Data communication', Pearson Education.

CS-P-406 DATA COMMUNICATION (PRACTICAL)

Total Hrs: 20

1. Study of basic data communication system.
2. Demonstrate Analog and digital signals.
3. To Convert Analog signal into digital signal.
4. To Convert digital signal into Analog signal .
5. Study of Amplitude modulation.
6. Study of Frequency modulation.
7. Study of Phase modulation.
8. Study of Amplitude shift keying.
9. Study of Frequency shift keying.
10. Study of Binary Phase shift keying.
11. Study of Quadrature amplitude shift keying.
12. Study of Frequency division Multiplexing (FDM)
13. Study of Time division Multiplexing (TDM)
14. Study of various interface standards.
15. Study of Twisted pair cable, Coaxial cable and Optical Fiber cable

FIFTH SEMESTER

CS-501 OPERATING SYSTEMS

Total Hrs: 46

Unit-I: Introduction (6 Hrs)

Evolution of OS, Types of OS, Basic h/w support necessary for modern operating systems, services provided by OS, system programs and system calls, system design and implementation.

Unit-II: File Systems (8 Hrs)

File systems: File concept, Access methods, Disk space management and space allocation strategies, directory structures, Recovery, Log-structured File System, disk arm scheduling strategies.

Unit-III: Process And Its Scheduling (8Hrs)

Process concept, process control block, Types of scheduler, context switch, threads, multithreading model, goals of scheduling and different scheduling algorithms.

Unit-IV: Memory Management (8 Hrs)

Contiguous allocation, Relocation, Paging, Segmentation, Segmentation with paging, demand paging , Virtual Memory Concepts, page faults and instruction restart , page replacement algorithms , working sets , Locality of reference, Thrashing, Garbage Collection .

Unit-V: Process management and synchronization: (8Hrs)

Concurrency conditions, Critical section problem, software and hardware solution, semaphores, conditional critical regions and monitors, classical inter process communication problems

Unit-VI: Deadlocks detection & avoidance: (8Hrs)

Deadlock definitions, Prevention, Avoidance, detection and Recovery, Goals of Protection, access matrix, Deadlock implementation.

Text Books: 1. Operating System concepts – Silberchatz & Galvin, Addison Wesley, 6th Edn.

2. Modern Operating Systems – Tanenbaum, Pearson Edn. 2ndedn.

Reference Books : 1. Operating Systems – S R Sathe, Macmillan Publishers, India, 2008

2. Operating System –Milan Milenkovic, McGraw-Hill, 1987

3. Operating Systems - 3 rd Edition by Gary Nutt, Pearson Education.

Unit-I: Introduction (9Hrs)

The use of computer networks. Network hardware. LAN's, Man's, WAN's, internet works, Network software, protocol hierarchies, design issues for layers, interfaces and services, Connectionless oriented and connectionless services, service primitives, relationship of Services to protocols, the OSI reference model, TCP/IP reference model, comparison of OSI And TCP/IP reference model.

Unit-II: Physical Layer (8Hrs)

The theoretical basis for data communication-Fourier analysis, bandwidth-limited signals, Maximum data rate of a channel, transmission media-magnetic media, and twisted pair coaxial Cable, fiber optics. Wireless transmission, microwave transmission. Multiplexing, switching, Narrow and ISDN - services, architecture, interface, perspective on N-ISDN, broadband ISDN & ATM-virtual circuits versus circuit switching, transmission in ATM networks, ATM Switches.

Unit-III: Data Link Layer (8Hrs)

Design issues - services provided to the network Layer, framing, error control, flow control, Error correcting & detecting codes, elementary data link protocols, simplex stop and wait Simplex protocols for noisy channel, sliding window protocols-one bit protocol, go back Protocol, selective repeat protocol. The medium access sub layer - static and dynamic channel Allocation in LANs and MANs, Multiple access protocols - ALOHA. CSMA, collision free Protocols, limited contention protocols, IEEE 802.11 wireless LAN protocols, IEEE Standards 802 for LAN and MANs-802.3 & Ethernet, token bus. Token ring.

Unit-IV: The Network Layer (9Hrs)

Design issues, services provided to the transport layer, internal organization, comparison of Virtual circuit and datagram subnets, routing algorithms. Optimality principle, shortest path Routing, flooding, flow-based routing, distance vector routing, link state routing, hierarchical Routing, broadcast & multicast routing, 165 congestion control algorithms, general principles Prevention policies, traffic shaping. flow specifications, congestion control in virtual circuit Subnets. choke packets, load shedding, jitter control. IP protocol, IP address. Subnets, internet Control protocols, OSPF. BGP.

Unit-V: Transport and Application Layer (8 Hrs)

Transport and Application Layer - services provided to the upper layer, Quality of Service, Transport service primitives, elements of transport protocols, addressing, establishing a Connection, releasing a connection, flow control & buffering, multiplexing, crash recovery

Unit-VI: Trends And Applications (3Hrs)

Bluetooth protocol stack, Bluetooth connections, piconets and scatternets, WiFi and WiMAX Standard Recent trends and advance topics.

Text Books: 1. Data Communication & Networking by Behrouz A. Forouzan McGraw Hill

Reference Books: 1. Computer Networks Third Edition by Andrew Tanenbaum (PHI Pub.)

2. Data. & Computer Communication, 5th Ed., by William Stallings (PHI Pub.).

CS-503 DATABASE MANAGEMENT SYSTEMS

Total Hrs: 45

Unit-I: Database system concepts and Architecture (8 Hrs)
Concept of relational database, Relational data model, Relational algebra, SQL-the relational database standard, introduction to PL/SQL.

Unit-II: Database Design Theory (8 Hrs)
Functional dependencies and normalization, relational database design algorithms, practical database design and demoralization, Relational constants, programmatic ways for implementing constraints, triggers.

Unit-III: Physical Database Design and Memory Management in database (9 Hrs)
Concept of physical and logical hierarchy, storage, concepts of index, B trees, hash index, function index, bitmap index. , database buffer management, log buffer management code reuse, concept of two tier and Ntier architecture. Database recovery technique. Aries Algorithm for recovery.

Unit -IV: Query Optimization and Performance Tuning (8 Hrs)
Various techniques for query optimization, strong and weak equivalence, cost base optimization, Use of different storage structures in query optimization.

Unit-V : Transaction Management (10 Hrs)
Transaction Processing -Transaction and system concepts, Desirable properties of transaction, Schedules and recoverability, serializability of schedules, concurrency control, lockbased protocols and time stamp based protocols, read consistency.

Unit -VI: Trends in Database Management (2 Hrs)
What is NoSql, History of NoSQL, Important characteristics of NoSQL categories of NoSQL.. Google Database, Twitter and Social networking databases

Text Books: 1. Fundamentals of Database Systems – Emissary ,Navathe & Gupta, Pearson Education

2. Database System Concepts by Henry Korth

Reference Books : 1. Database Systems by S. K. Singh, Pearson Education.

2. Principles of Database Systems – Ullman, Golgotia Publications 1998.

3. Database Systems by Connolly, 3rd edition, Pearson Education.

CS-504 SOFTWARE ENGINEERING

Total Hrs: 45

Unit-I : Introduction

(8 Hrs)

An Introduction to Software Engineering, Software Myths, Software Engineering- A Layered Technology, Software Process Framework, Software Process Models, The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process Model, Agile Process Models.

Unit-II: Software Planning

(8 Hrs)

Software Engineering Practice An overview, Communication Practices, Planning Practices, Modeling Practices, Construction Practice & Deployment, System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling, Requirements Engineering.

Unit-III :Software Analysis And Design

(9 Hrs)

166 Software Engineering Analysis & Design An overview, Requirements Analysis, Analysis Modeling Approaches, Data Modeling, Object-Oriented Analysis, ScenarioBased Modeling, Flow-Oriented Modeling, Class-based Modeling, Behavioral Model.Design Engineering Concepts, Design Model, Pattern-Based Software Design.

Unit-IV:Software Testing

(9 Hrs)

Testing Strategies and Tactics An overview, level of testing :Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging techniques . Software Testing Fundamentals, Black-Box Testing, White-Box Testing.

Unit-V:Software Metrics And Software Quality Management

(8 Hrs)

Product Metrics An overview, Software Quality, A Framework for Product Metrics, Metrics for Analysis & Design Models, Metrics for Source Code, Metrics for Testing & Maintenance, Software Project ManagementAn overview, Software Measurements, Metrics for Software Quality, Software Project Estimation Techniques, Project Scheduling, Risk Management, Quality Management, Change Management, Software Reengineering.

Unit-VI: Trends in Software Engineering And Project Management

(3 Hrs)

Software project management (PERT/CPM):Developing a network plan ,overview of PERT /CPM,basic rules for developing network, basic rules for developing project network. Recent trends in Software Engineering and Project.

Text Book: 1. Software Engineering- A Practitioner's Approach (Sixth Edition) - Roger Pressman (TMH)

Reference Books: 1. Software Engineering (Seventh Edition)- Ian Sommerville, Pearson Education.

2. Software Engineering Theory and Practice by Pfleeger, Pearson Education.

3. Software Engineering- Schaum's Series (TMH).

CS-505 PRINCIPLES OF PROGRAMMING LANGUAGE

Total Hrs: 45

Unit-I : Introduction

(12 Hrs)

Definition of Programming language, Implementation of high-level languages, Data elements, binding time, binding identifiers to names, binding of attributes, Binding time. Concept of r-value and l-value and their implementation. Effect of Environment on a language, Language paradigms. Language translation issues.

Unit-II: Data Types

(10 Hrs)

164 Data type, Type checking and type conversion, elements of specification and implementation of data type. Implementation of elementary data types: integer, real, character, Boolean Pointer, enumerated type Implementation of structured data types. Vectors & arrays, Sets.

Unit-III: Implementation And Subprogram

(12 Hrs)

Abstract data type, encapsulation. Implementation of new data types, Subprogram definition and activation, their Implementation, parameter passing methods, generic subprograms, Scope rules.

Unit-IV: Inheritance And Memory Management

(12Hrs)

Type equivalence, type definitions with parameters, Implementation of Inheritance. Storage management issues like static and dynamic allocation stack based allocation and management, Heap based allocation and management.

Unit-V : Sequence Control

(12Hrs)

Sequence control, Implicit and explicit sequence control, Sequencing with arithmetic expression, Sequence control between statements, prime programs, implementation of case statement, Subprogram sequence control, recursive and non recursive subprogram. Data control, referring environment, dynamic and static scope, static chain implementation and display implementation.

Unit-VI : Trends in Programming

(2 Hrs)

Recent trends in Principle in Programming Languages.

Text Books: 1. Programming Languages, 1st edition by T.W. Pratt and M .V. Zelkowitz & T. V. Gopal by Pearson Education, 2008

2. Programming Languages, Ravi Sethi, Addison Wesley.

Reference Books: 1. Principles of programming languages by Gilles Dowek @ Springer-verlag london Limited 2009

2. Concepts in programming languages by John C. Mitchell copyright @ cambridge university press 2003.

3. Principles of Programming Languages: Design, Evaluation, and Implementation by Bruce J. MacLennan third Edition Copyright @ 1999 by oxford university press.Inc.

4. Programming Languages: Application and Interpretation, Copyright © 2003-07, Shriram Krishnamurthi, United States License

CS-506 COMPUTER GRAPHICS

Total Hrs: 45

Unit-I: Introduction (7 Hrs)

Introduction to Computer Graphics and Image Processing, Basic fundamentals of random scan, raster scan devices, Stereoscopic and Virtual Reality Systems, line and circle drawing algorithms 168

Unit-II: Polygon Filling Methods (8 Hrs)

seed fill, fence fill, edge flag algorithm, scan conversion techniques, aliasing and antialiasing techniques, clipping algorithms

Unit-III: Transformations (9 Hrs)

Basic 2D transformation, composite transformation translation, rotation, scaling, reflection, shear views, windowing, Introduction to 3D transformation

Unit-IV: Projections And Eliminations (8Hrs)

Three dimensional display methods, parallel, perspective projections and types, hidden line and surface elimination techniques, shading and rendering.

Unit-V: Curve Generation (10 Hrs)

Curve Generation: Cubic Spline, Bezier, B-Spline, blending of curves and other interpolation techniques, Introduction to Visualization, Applications, Visualization Techniques- parallel coordinates – a, charts (pie chart, bar chart, histogram, function graph, scatter plot, etc., graphs (tree diagram, network diagram, flowchart, existential graph, etc.) Venn diagram Euler diagram etc

Unit-VI: Trends and Applications (3Hrs)

Recent trends in Computer Graphics and Visualization, Advanced topics & its Application

Books: 1. Procedural Elements of Computer Graphics: Rogers –Mc Graw Hill

2. Principles of Interactive Computer Graphics Newman & Sproull- Mc Graw Hill

3. Computer Graphics: Heam & Baker- PHI India

4. Peter Shirley, et al. "Fundamentals of Computer Graphics," 2nd Edition, A K Peters, 2005.

CS-P-502 COMPUTER NETWORKS (PRACTICAL)

Total Hrs: 20

1. To demonstrate the operation of the Ethernet – network using OPNET IT Guru
2. To demonstrate the implementation of the token ring network using OPNET IT Guru
3. To demonstrate the implementation of the Switched local area network using OPNET IT Guru
4. To demonstrate the basics of designing a network using OPNET IT Guru
5. To examine the effect of ATM adaptation layers and service classes on the performance of network using OPNET IT Guru.
6. To Configure & analyze the performance of routing information protocol (RIP) model using OPNET IT Guru
7. To configure & analyze the performance of open shortest path first (OSPF) routing protocol using OPNET IT Guru
8. To demonstrate the congestion control algorithm implemented by the TCP using OPNET IT Guru
9. To create a network cable using RJ-45 connectors.
10. To install a network interface card
11. Simulation of Dijkstra Algorithm in C
12. Simulation of Spanning tree algorithm in C
13. To configure a Wireless access point in a local network
14. To install and configure wireless LAN card in the computer
15. To understand the working of layer-3 switch for address sub netting in the network.

CS-P-503 DBMS (PRACTICAL)

Total Hrs: 20

1. Configure and Install PostgreSQL followed by Connect to PostgreSQL GUI
- 2 Create the University schema using the commands in the DDL and insert sample data in it
- 3 Execution of basic Basic SQL
- 4 Execution of basic Basic SQL
- 5 Execution of Intermediate SQL: Aggregates and grouping and ordering
- 6 Execution of Nested Sub queries and SQL Updates
- 7 Execution of SQL DDL and updates
- 8 Schema creation and constraints
- 9 Create an ER diagram for Real world scenario
- 10 Execute Database design and apply Normalization
- 11 Build Web Application using Servlets
- 12 Indexing and Query Processing
- 13 implement a simple map reduce job that builds an inverted index on the set of input documents
- 14 SQL Implementation of Concurrency and Transactions

CS-P-504 SOFTWARE TOLLS LAB (PRACTICAL)

Total Hrs: 20

1. To Study Rational Rose Suite
2. Study of testing tools and project management tools
3. Design Domain Analysis Document for the Projects using Rational Rose
 - a. Automation Software for LIC Agents.
 - b. Web Server.
 - c. Inventory Control System.
 - d. Safe-Home Security System.
 - e. Library Management.
 - f. Employee Payroll System...
 - g. Railway Reservation System.
4. Design Requirements Analysis documents for the Various Projects Rational Rose.
 - a. Automation Software for LIC Agents.
 - b. Web Server.
 - c. Inventory Control System.
 - d. Safe-Home Security System.
 - e. Library Management.
 - f. Employee Payroll System..
 - g. Railway Reservation System.
5. Design Use Case Diagram for the Various Projects Rational Rose.
6. Design Interaction Diagram for the Various Projects
7. Design Sequence Diagram for the Various projects..
8. Design Collaboration Diagram for the various projects..
9. Design Activity/State Diagram for the Various Projects.
10. Case Study: Object Oriented Analysis And Design Of Course Registration System.
11. Case Study: Object Oriented Analysis And Design Of employee Payroll System.
12. Case Study: Object Oriented Analysis and Design of Global Positioning system
13. Case Study: Object Oriented Analysis and Design of Web Server
14. Case Study: Object Oriented Analysis and Design of Library Management system
15. Case Study: Object Oriented Analysis and Design of safe- Home security system

SIXTH SEMESTER

CS-601 DISTRIBUTED DATABASES

Total Hrs: 45

Unit-I: Distributed Databases Features (8 Hrs)

Distributed database management systems - review of databases and computer networks, levels of distribution transparency. reference architecture, type of data fragmentation, distribution transparency for read only applications and update applications. distributed database access primitives and integrity constraints.

Unit-II: Distributed database Design (9 Hrs)

A frame work for distributed database design, the design of database fragmentation, the allocation of fragments. translation global queries to fragment queries, equivalence transformation for queries. transforming global queries into fragment queries. distributed grouping and aggregate function evaluation, parametric queries.

Unit-III: Query Optimization (9 Hrs)

Query optimization, problems in query Optimization objectives in query process optimization. simpler representation of queries, model for query optimization, - join query, general queries, 'concept of two phase commit, resolving distributed transaction. concept of replication, snapshot on replication and multi master replication, conflict resolution in MultiMate replication, concurrency control and database recovery in distributed databases.

Unit-IV: Concepts Of Object Oriented Data Model (9 Hrs)

The evolution of object oriented concepts. Object oriented concepts, characteristics of an object-oriented data mode!, object schemas, class-subclass relationships. Inter object relationships, late and early binding, support for versioning. Similarities & differences between OODM and other data models, features of air object-oriented databases management system, OODBMS architectural approaches-extended relational model approach, semantic database approach, object oriented database programming language extension approach. DBMS generator approach. object definition language and object query language.

Unit-V: Object Oriented Databases (8 Hrs)

OODBMS architectures, performance issues in OODBMS. application selection for OODBMS, database design for an object relational database management system (ORDBMS). Structured types & ADTs. object identity, extending ER model using nested collections, storage and access methods, query processing, query optimization. design and architecture of POSTGRES, Distributed computing in CORBA and EJB.

Unit-VI: Trends of Distributed databases (2 Hrs)

Recent trends.

Textbooks: 1. Distributed data bases principles and systems by Ceri & Pelagatti (McGraw Hill Pub!.)

2. Fundamentals of Database System by Elmasri & Navathe (3rd Ed. Addison Wesley)

3. Object Oriented Database System - Approaches & Architectures by C.S.R. Prabhakar (PHE Pub.)

Reference Book:- 1. Database System - Design Implementation & Management by Peter Rob & Carlos Coronel. (Course Tech.)

2. Database Management Systems by Raghu Ramakrishnan & Johannes Gehrke.(McGraw Pub.)

3. Oracle 9i Distributed Database Replication Manual.

4. Database—principles, Programming and performance, 2nd edition, Patrick O'Neil.

CS-602 DESIGN AND ANALYSIS OF ALGORITHMS

Total Hrs: 45

Unit – I: Mathematical foundations (7Hrs)

summation of arithmetic and geometric series, n , n^2 , bounding summations using integration, recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions, Complexity calculation of various standard functions, principles of designing algorithms

Unit – II: Asymptotic notations (8 Hrs)

Asymptotic notations of analysis of algorithms, analyzing control structures, worst case and average case analysis, amortized analysis, application of motorized analysis, Sorting networks, comparison networks, biotonic sorting network.

Unit – III: Advanced data structures (6Hrs)

Advanced data structures like Fibonacci heap, Binomial heap, disjoint set representation, red and black trees and their applications. Divide and conquer basic strategy, matrix operation, binary search, quick sort, merge sort, fast fourier transform.

Unit – IV :Greedy Method & Dynamic Programming (10 Hrs)

Greedy method – basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path etc. Dynamic Programming basic strategy, multistage graphs, all pairs shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem, Maximum flow networks.

Unit-V: Traversal And Search Techniques (7 Hrs)

Basic Traversal and Search Techniques, breadth first search and depth first search, connected components. Backtracking basic strategy, 8-Queen's problem, graph colouring, Hamiltonian cycles etc

Unit -VI: Completeness Problems And Applications (7 Hrs)

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, decision and optimization problems, Computational Geometry, Approximation algorithm and concepts based on approximation algorithms.

Text Books: 1. Thomas H. Cormen et. al. "Introduction to Algorithms", Prentice Hall of India.

2. Design & Analysis of Computer Algorithms by Aho., Horowitz, Sahani, Rajsekham, Pearson education

Reference Books: 1. "Computer Algorithms", Galgotia Publications Pvt. Ltd. Brassard, Bratley, "Fundamentals of Algorithms", Prentice Hall

2. Computer Algorithms: Introduction to Design and analysis, 3rd Edition, By Sara Baase & A. V. Gelder Pearson Education.

Unit-I : Introduction to JAVA, Class and Object (3Hrs)

Introduction to data types, operators and control statements, Classes: fundamentals of classes, declaring objects, Assigning objects, reference variables, methods, constructor, variable handling and garbage collection. Methods and classes: Overloading methods, using objects as parameters, arguments passing, returning objects, recursion, access control, understanding static, introducing final, nested inner classes, storage classes, command line arguments.

Unit-II: JAVA Packages, Interface and Exception Handling (6 Hrs)

Packages and interface: Packages, access protection, importing packages, interfaces. Exception handling: Fundamentals exception types, uncaught exception, trycatch, displaying description of an exception, multiple catch clauses, nested try statements. throw, throws, finally, built in exceptions, creating own exception subclasses.

Unit-III: Multithreaded Programming (9 Hrs)

JAVA thread model, thread priorities, synchronization, messaging, the thread class, runnable interface, creating thread, creating multiple thread. using isAlive(), join(), thread priority, synchronization, interthread communication, suspending, resuming, stopping threads using multithreading.

Unit-IV: I/O, Applet and String Handling (12 Hrs)

I/O stream, bytes stream,, character stream, predefined streams, reading console input reading character, reading string, writing console output, the PrintWriter class, reading and writing files, applets fundamentals, transient and volatile modifiers, using instance of strictfp, native method. String Handling: string constructor, special string operator, character extraction, string comparison, searching string, modifying a string, data conversion using valueOf(), changing case of Characters within a string, string buffer.

Unit-V: Networking and Generic (12 Hrs)

Networking: networking basics & socket overview, client/server, reserved socket, proxy server, internet addressing, networking classes and interfaces, factory methods and instance method TCP/IP client socket, URL, URL connections, TCP/IP server socket, datagram. generics: General form of generic class and examples, creating generic method, generic interfaces, class hierarchies, erasure, generic restrictions.

Unit-VI: Recent Trends (3Hrs)

Recent trends and advance topics.

Text Books: 1. The Complete Reference by Herbert Schild, TMH Publication

2. Programming with Java- A Primer by E. Balagurusamy, 3rd Edition, TMH Publication

Reference Books: 1. The Complete Reference- JAVA

2- 3rd Edition By Patrick Naughton, TMH Publ.

3. Java 6 Programming Black Book by Kogent Solution Inc., Dreamtech Press Publ.

4. Java 2 Black Book by Steve Holzner, Paraglyph Press, 2nd Ed. BCSL312 COMPUTER GRAPHIC

Unit-I : Introduction (8 Hrs)
Compilers and translators, Phases of compiler design, cross compiler, Bootstrapping, Design of Lexical analyzer, LEX.

Unit-II : Syntax Analysis (8Hrs)
Specification of syntax of programming languages using CFG, Top-down parser, design of LL (1) parser, bottom up parsing technique, LR parsing algorithm, Design of SLR, LALR, CLR parsers, Study of YACC.

Unit-III : Syntax Directed Translation (9 Hrs)
Study of syntax directed definitions & syntax directed translation schemes, implementation of SDTS, intermediate notations: postfix, syntax tree, TAC, translation of expression, controls structures, declarations, procedure calls, and Array reference.

Unit-IV : Storage Allocation And Error Handling (8Hrs)
Run time storage administration, stack allocation, symbol table management, Error detection and recovery: lexical, syntactic, semantic.

Unit-V : Code Optimization (9Hrs)
Important code optimization techniques, loop optimization, control flow analysis, data flow analysis, Loop invariant computation, Induction variable removal, Elimination of Common sub expression, Code generation – Problems in code generation, Simple code generator, Register allocation and assignment, Code generation from DAG, Peephole optimization.

Unit-VI : Trends in Language Processor (3 Hrs)
Recent trends in Language Processor, Compiler tools, Advanced topics & its Application

Text Book: 1. Compilers: Principles Techniques and Tools 1st edition by A. V. Ahoy, Sethi, Ullman, Pearson education.

Reference Book: 1. Principal of Compiler Design – Alfred V. Ahoy & Jeffery D. Ullman, Narosa Pub. House.

CS-P-602 LANGUAGE PROCESSORS (Practical)

Total Hrs: 20

List of Practical: 1. Assignment to understand the syntax of LEX specifications built-in functions and variables

2. Write a LEX program to convert a number in words to integer.
3. Write a Lex Program to count no. of words & Characters supplied at a command prompt.
4. Write a lex program to identify keywords of C language.
5. What is LEX and YACC. Write a Lex Program to Count no. of lines & blanks supplied at a command prompt.
6. Write LEX specification to generate a lexical analyzer that will capitalize all the identifier names in a given program.
7. Assignment to understand the syntax of YACC specifications built-in functions and variables
8. Write a LEX program for basic desktop calculator using YACC
9. Implement a lexical analyzer in "C"
10. Write a procedure for recursive descent parser for the grammar $T \rightarrow a.S \mid [T] \mid [T]T \mid [T]T \mid [T]T \mid [T]T$
11. Write a program to find FIRST and FOLLOW set of all non-terminals in the grammar input through keyboard or read from file.
12. Write a program to construct LL (1) parsing table for the grammar input through keyboard or read from file.
13. Justify bottom-up parsing technique is more efficient than Top-down approach
14. Left recursive grammar is not suitable for Top-down parsing" explain with suitable example

CS-604 Parallel and Distributed Computing

Total Hrs: 45

Unit-I : Parallel & Distributed Processing (8 Hrs)

Four Decades of Computing, Flynn's Taxonomy of Computer Architecture, SIMD Architecture, MIMD Architecture, Superscalar and VLIW Processors, Multiprocessors Interconnection Networks, The PRAM Model and Its Variations, Simulating Multiple Accesses on an EREW PRAM

Unit-II: Shared Memory Architecture: (8 Hrs)

Classification of Shared Memory Systems, Bus-Based Symmetric Multiprocessors, Basic Cache Coherency Methods, Snooping Protocols, Directory Based Protocols, Shared Memory Programming

Unit-III: Message Passing Architecture (9 Hrs)

The Generations of Multicomputers, Introduction to Message Passing, Routing in Message Passing Networks, Switching Mechanisms in Message Passing, Message Passing Programming Models, Processor Support for Message Passing, Message Passing Versus Shared Memory Architectures

Unit-IV: Program Partitioning and Scheduling (10 hours)

Program Partitioning and Scheduling: Conditions of Parallelism, Grain Size and Latency, Grain Packing and Scheduling, Static Multiprocessor Scheduling, Program Flow Mechanisms: Control Flow Mechanism, Data Flow Mechanism, Demand-Driven Mechanism

Unit-V: Open Specifications for Multi-Processing: (10 hours)

Programming Model, terminologies and Directives, Clauses, Parallel Construct, Message Passing Interface: Communicators, Virtual Topologies, Task Communication, Synchronization, Collective Operations, Task Creation, One-Sided Communication

Text Books: 1. Barry Wilkinson and Michael Allen. Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers (2nd Edition), Prentice Hall PTR (2005), ISBN 0-13- 140563-2 (Home Page for Text Book).

2. Parallel and Distributed Computing Handbook, Albert Y. Zomaya, International Thomson Computer Press, McGraw-Hill, 1996 3. Michael J. Quinn. Parallel Programming in C with MPI and OpenMP, McGraw Hill (2003)

Reference Books: 1. A. Grama, A. Gupta, G. Karypis and V. Kumar. Introduction to Parallel Computing (2nd edition), Addison Wesley (2002), ISBN 0-201-64865-2.

2. H. El-Rewini and T.G. Lewis. Distributed and Parallel Computing, Manning (1997), ISBN 0-13-795592-8.

3. I. Foster. Designing and Building Parallel Programs, Addison Wesley (1995), ISBN 0-201-57594-9. 4. Kai Hwang and Zhiwei Xu. Scalable Parallel Computing, McGraw Hill (1998), ISBN 0-07-031798-

CS-603 DATA MINING & WAREHOUSING

Total Hrs: 45

Unit-I : Introduction to Data Warehousing (7 Hrs)

Introduction to Decision Support System: DSS Defined, History of DSS, Ingredients of DSS, Data and Model Management, DSS Knowledge base, User Interfaces, The DSS Users, Categories and Classes of DSSs Need for data warehousing, Operational & informational data, Data Warehouse definition and characteristics, Operational Data Stores.

Unit-II :Data warehouse architecture (7 Hrs)

Data warehouse Components, Architectural components, Data Preprocessing: Why Preprocess Data? Data Cleaning Techniques, Data Integration and Transformation, Data Reduction Techniques, Discretization and Concept Hierarchy Generation for numeric and categorical data, significant role of metadata, Building a Data warehouse, Benefits of Data Warehousing.

Unit-III: Multidimensional data Models (8 Hrs)

OLAP in the Data Warehouse A Multidimensional Data Model, Schemas for Multidimensional Databases: Stars, Snowflakes, Star join and Fact Constellations Measures, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model, Need for OLAP, OLAP tools , Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Unit-IV: Introduction to data Mining (10 Hrs)

Data Mining Algorithms Concept Description: What is Concept Description? Data Generalization and Summarization-Based Characterization, Mining Descriptive Statistical Measures in Large Databases. Mining Association Rules: Association Rule Mining, Market Basket Analysis, Association Rule classification, The Apriori Algorithm, Mining Multilevel Association Rules, Constraint-Based Association Mining, Sequential mining. Classification and Prediction: What is Classification and Prediction? Data Classification Process, Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification.

Unit-V: Knowledge Discovery in Large Data Sets (10 Hrs)

Classification, Knowledge Discovery Classification Based on Association Rule Mining, Other Classification Methods Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods. Introduction to Knowledge Discovery, innovative techniques for knowledge discovery, application of those techniques to practical tasks in areas such as fraud detection, scientific data analysis, web mining, Introduction to huge data sets such as Web, telecommunications networks, relational databases, object-oriented databases, and other sources of structured and semi-structured data, Problem of Large Data sets 20

Unit-VI: Recent Trends in Data Mining and warehousing (3 Hrs)

Recent trends in Data Mining and Warehousing, Advanced topics & its Application

Text Book: 1. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann. R

reference Books: 1. Paul Punniyan, "Data Warehousing Fundamentals", John Wiley Pub 170

2. Alex Berson, S.J. Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw Hill

3. Margaret Dunham, "Data Mining: Concepts and Techniques", Morgan Kaufmann Pub.

4. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.

5. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.

6. A B M Shaukat Ali, Saleh A Wasimi, "Data Mining: Methods and Techniques", Cengage Learning Pub.

7. Ian Witten and Eibe Frank, Data Mining, "Practical Machine Learning Tools and Techniques with Java Implementations", Morgan Kaufman, ISBN 1558605525, 1999,

SEVENTH SEMESTER

CS-701 ADVANCE COMPUTER ARCHITECTURE

Total Hrs: 45

Unit-I: Overview of Computer Architecture (9 Hrs)

Overview of von Neumann architecture: Instruction set architecture; The Arithmetic and Logic Unit, The Control Unit, Memory and I/O devices and their interfacing to the CPU; Measuring and reporting performance; CISC and RISC processors.

Unit-II: Pipelining and Multiple Issues Processors (9 Hrs)

Basic concepts of pipelining, data hazards, control hazards, and structural hazards; Techniques for overcoming or reducing the effects of various hazards. Linear Pipeline, Classification of Pipeline Processors, Construction Pipeline, Arithmetic Pipeline, Instruction Prefetch, Branch Handling, Data Buffering, Internal Forwarding and Register Tagging. Concepts of instruction-level parallelism (ILP), Techniques for increasing ILP; Superscalar, super pipelined and VLIW processor architectures.

Unit-III: Memory and I/O (9Hrs)

Hierarchical Memory Technology, Inclusion, Coherence and locality properties; Cache memory organizations, Techniques for reducing cache misses; Virtual memory organization, mapping and management techniques, memory replacement policies.

Unit-IV: Multiprocessor and Thread Level Parallelism (9Hrs)

Multiprocessor Architecture: Taxonomy of parallel architectures; Centralized shared-memory architecture, synchronization, memory consistency; Cluster computers, Non von Neumann Architectures: Data flow Computers, Reduction computer architectures. Symmetric and distributed shared memory architectures – Performance issues –Synchronization – Models of memory consistency – Introduction to Multithreading.

Unit-V: Multi Core Architectures (9Hrs)

Software and hardware multithreading – SMT and CMP architectures – Design issues Case studies – Intel Multi-core architecture – SUN CMP architecture - heterogeneous multi-core processors – case study: IBM Cell Processor. 4.

Text Books: 1. John L. Hennessey and David A. Patterson, “Computer architecture – A quantitative approach”, Morgan Kaufmann / Elsevier Publishers, 5th. Edition, 2012.

2. Advanced Computer Architecture: Parallelism, Scalability and Programmability, Kai Hwang, McGraw-Hill Inc, 1993.

Reference Book: 1. Parallel Computer Architecture: A Hardware/Software Approach, D. E. Culler, J. Pal Singh, and A. Gupta, HarcourtAsia Pte Ltd., 1999. 179

2. Computer Architecture: A Quantitative Approach, J. H. Hennessey and D. A. Patterson, 2nd Ed., Morgan Kaufmann, 1996.

CS-E II-704 DIGITAL IMAGE PROCESSING

Total Hours: 45

Unit-I: Introduction (8Hrs)

Origins of digital image processing, Various Imaging techniques, components of an image processing system, Image sensing and acquisition, Image sampling and quantization, neighbors of a pixel, Adjacency, Connectivity, Regions and boundaries.

Unit-II: Filtering (8Hrs)

Basic intensity transformation and spatial filtering, Image negatives, log transforms power-law transformations, median filtering, Histogram equalization, Histogram matching spatial correlation and convolutions

Unit-III: Transformation (8Hrs)

Two-dimensional orthogonal and Unitary Transforms, properties of unitary transforms 2D-DFT, Cosine transforms, Sine transforms, Hadamard transform, Haar transforms, Slant transforms.

Unit-IV: Image Degradation /Restoration Process (7Hrs)

Model of image Degradation/Restorations process, Noise models, Restoration in the presence of noise only, periodic noise reduction by Frequency domain filtering, Image reconstruction from Projections, Image compression models, Huffman coding, LZW coding, Run length coding, Bit-plane coding.

Unit-V: Image Morphology (7Hrs)

Some basic morphological algorithms, Boundary extraction, convex hull, thinning, skeletons, morphological Reconstruction. Color image processing, color models, RGB color models, CMY and CMYK color models the HSI color models.

Unit-VI: Image Segmentation (7Hrs)

Image segmentation, Fundamentals, Point, Line and edge detection, of segmentation, Thresholding, Regionbased segmentation, watershed segmentation algorithm Applications of segmentation. .

Text Book: 1. Digital image processing by Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson PHI Publication.

Reference Books: 1. Fundamental of Digital Image Processing by A. K. Jain, P. H. I. Publication.

2. Digital image processing by S. Jayaraman, S. Esakkirajan, T. Virakumar, McGraw Hill.

CS-E III-705 REAL TIME SYSTEMS

Total Hrs: 45

Unit-I: Introduction

(9Hrs)

Real-time Versus Conventional Software, Computer Hardware for Monitoring and Control, Software Engineering Issues. SOFTWARE ARCHITECTURES: Process and State-based Systems model, Periodic and Sporadic Process, Cyclic Executives, CE definitions and Properties, Foreground-Background Organizations, Standard OS and Concurrency, Systems Objects and Object-Oriented Structures, Abstract Data Types, General Object Classes.

Unit-II: Requirements And Design Specifications

(8 Hrs)

Classification of Notations, Data Flow Diagrams, Tabular Languages, State Machine, Communicating Real Time State Machine- Basic features, Timing and clocks, Semantics Tools and Extensions, State charts- Concepts and Graphical Syntax, Semantics and Tools.

Unit-III: Declarative Specifications And Deterministic Scheduling

(8 Hrs)

DECLARATIVE SPECIFICATIONS Regular Expressions and Extensions, Traditional Logics-Propositional Logic, Predicates, Temporal logic, Real time Logic. DETERMINISTIC SCHEDULING Assumptions and Candidate Algorithms, Basic RM and EDF Results, Process Interactions-Priority Inversion and Inheritance. 184 +

Unit-IV: Execution Time Specification

(8Hrs)

Measurement of Software by software, Program Analysis with Timing Schema, Schema Concepts, Basic Blocks, Statements and Control, Schema Practice, Prediction by optimization, System Interference and Architectural Complexities Timer Application, Prosperities of Real and ideal clocks, Clock Servers – Lamport’s Logical clocks, Monotonic Clock service, A software Clock server, Clock Synchronization Centralized Synchronization, Distributed Synchronization.

Unit-5: Programming Language

(9 Hrs)

PROGRAMMING LANGUAGES: Real Time Language Features, Ada-Core Language, Annex Mechanism for Real Time Programming, Ada and Software Fault Tolerance, Java and Real-time Extensions, CSP and Occam.

Unit-VI: Trends And Applications

(3 Hrs)

Recent trends in Real time operating System , Advanced topics & its Application

Text Book: 1. Real – Time Systems and software by Alan C. Shaw ; John Wiley & Sons Inc, 2001.

Reference Book: 2. Real-Time Systems, Jane W.S. Liu, Prentice Hall, 2000.

EIGHTH SEMESTER

CS-801 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM

Total Hours: 45

Unit-I: (8Hrs)

Introduction: Aim and objective of AI, AI problems, AI technique, Production system Characteristics, Basics of problem solving: problem representation paradigms defining problem as a state space representation. Intelligent Agents, Performance Measure, Rationality, Structure of Agents, Problem-solving agents, Problem Formulation.

Unit-II: (8 Hrs)

Search Techniques: Uninformed Search Strategies Problem size, complexity, approximation and search; depth, breadth and best search; Informed Heuristic Based Search: Informed (Heuristic) Search and Exploration, Greedy best first search, Memory bounded heuristic search, Heuristic functions, inventing admissible heuristic functions, Hill climbing, best-first search, branch and bound And OR Graph: A* algorithm and AO* Algorithm. Simulated Annealing, Online search.

Unit-III: (9 Hrs)

Constraint Satisfaction Problems, Backtracking Search, variable and value ordering, constraint propagation, intelligent backtracking, local search for CSPs, Adversarial Search, Games, The minimax algorithm, Alpha-Beta pruning, Imperfect Real-Time Decisions, Games that include an Element of Chance

Unit-IV: (9Hrs)

Structured Knowledge Representation: Semantic Nets, Frames, and Scripts. Learning: Block architecture of learning system, Types of learning, performance Measures First order Logic, Unification, and Resolution in Predicate Logic Uncertainty Treatment: formal and empirical approaches including Exact and Approximate inference in Bayesian Networks, Bayesian theory, belief functions, certainty factors

Unit-V: (8 Hrs)

Inference Techniques: Types of reasoning deductive, inductive, abductive, analogical, common-sense and non-monotonic, types of inference forward and backward chaining, inference using full joint distributions, fuzzy logic.

Unit-VI: (3 Hrs) Recent advances in Artificial Intelligence, Algorithms for artificial intelligence, Genetic algorithms. Tools for development of Artificial Intelligence: Open Neural network library. Applications of artificial Intelligence.

Text Books: 1. Artificial Intelligence a Modern Approach: Russel and Norvig , Pearson Education, 2nd

2. Artificial Intelligence – A Practical Approach: Patterson, Tata McGraw Hill, 3rd

Reference Books: 1. Maus, R. and Keyes, J., “Handbook of Expert Systems in Manufacturing”, McGraw Hill, 1991

2. Robert Levine, "A comprehensive guide to artificial intelligence and expert systems",
3. Elain Rich ,"Artificial Intelligence", PHI Publication
4. Introduction to Artificial Intelligence by E.Chamiack and D. Mcdermott, Pearson Education.
5. Artificial Intelligence structures and strategies for complex problem solving, 4 th edition, Pearson education.

CS-802 CLOUD COMPUTING

Total Hrs: 45

Unit-I: Introduction to Cloud Computing (8 Hrs)

Virtualization Concepts, Cloud Computing Fundamental: Overview of Computing Paradigm, Evolution of cloud computing, Defining cloud computing, Components of a computing cloud, Essential Characteristics of Cloud Computing, Cloud Taxonomy.

Unit-II: Cloud Computing Architectural Framework (7 Hrs)

Cloud architectural principles, Role of Networks in Cloud computing, Role of Web services, Benefits and challenges to Cloud architecture, Cloud Service Models, cloud computing vendors. Cloud Services Management, Performance and scalability of services, tools and technologies used to manage cloud services deployment.

Unit-III: Exploiting Cloud Services (8 Hrs)

Software as a Service(SaaS): Introduction to SaaS, Inspecting SaaS technologies, Implementing web services, Deploying Infrastructure as a Service(IaaS): Introduction to IaaS, Scalable server clusters, Machine Image, Virtual Machine (VM). Elastic storage devices, Data storage in cloud computing, Delivering Platform as a Service(PaaS): Introduction to PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management, Hardware-as-a-service: HaaS.

Unit-IV: Cloud Application Development (7 Hrs)

Role of business analyst, Technical architecture considerations, Service creation environments to develop cloud based applications, Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages, Cloud Economics.

Unit-V: Cloud Security and Risk Management (8 Hrs)

Cloud Security: Understanding cloud based security issues and threats, Data security and Storage, Identity & Access Management, Risk Management in cloud, Governance and Enterprise Risk Management.

Unit-VI: Analysis on Case study (7 Hrs)

Business Case: Business case evaluation criteria, Business outcomes examples, Case Studies: Case Study on Open Source & Commercial Cloud: Eucalyptus, Microsoft Windows Azure, Amazon EC2, Amazon Elastic Block Storage – EBS. Google Cloud Infrastructure, MapReduce. AWS, Simple Storage Service – S3,.

Text Books: 1. Distributed and Cloud Computing: Clusters, Grids, Clouds, and the Future Internet by Kai Hwang, Jack Dongarra & Geoffrey C. Fox., Morgan Kaufmann Publishers, 2012.

2. Cloud Computing Bible, Barrie Sosinsky, WileyIndia, 2010

3. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011

4. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012

- References Books: 1. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010
2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN: 978-0521137355]
3. Dimitris N. Chorafas, Cloud Computing Strategies [ISBN: 1439834539]

CS-803 CYBER LAWS

Total Hrs: 45

Unit-I: (9 Hrs)
Concepts Of Technology And Law Understanding Technology, Basic Concepts of Technology and Law Understanding the Technology of Internet, Scope of Cyber Laws, Cyber Jurisprudence

Unit-II: Law Of Digital Contracts (8 Hrs)
The Essence of Digital Contracts, the System of Digital Signatures, The Role and Function of Certifying Authorities, The Science of Cryptography.

Unit-III: Intellectual Property Issues In Cyber Space (8 Hrs)
Domain Names and Related issues, Copyright in the Digital Media, Patents in the Cyber World, Rights of Netizens and E-Governance ,Privacy and Freedom Issues in the Cyber World, E-Governance ,E-Governance, Cyber Crimes and Cyber Laws.

Unit-IV: International Scenario In Cyber Laws (10 Hrs)
Data Protection Laws in EU and USA ,Child Abuse Protection Laws in EU and USA,Cyber Laws - the Malaysian Approach

Unit-V: Cyber law Issues For Management (7Hrs)
Cyber Law Issues in E-Business Management, Major issues in Cyber Evidence Management ,Cyber Law Compliancy Audit

Unit-VI: Trends (3 Hrs)
Recent trends in cyber law

Text Book: 1. "The Law of the Internet" by J. Rosenoer, Cyber Law (Springer Verlag).

Reference Books: 1. "Cyber Laws in India.. ITA-2000 and Beyond" by Nawvi

2. "Handbook of Cyber Laws" By Sharma Vakul.

CS-804 COMPUTER SYSTEM AND SECURITY

Total Hrs: 52

Unit-I: Introduction (10 Hrs)

attacks, services, mechanisms, security attacks, security services, a model for internet work security, encryption model, steganography, classical encryption techniques, modern techniques - simplified DES, block cipher principles, data encryption standard, strength of DES, differential & linear cryptanalysis, block cipher design principles, block cipher modes of operation, Algorithm - triple DES, international data encryption algorithm, blowfish, RCS, CAST, RC2, characteristics of advanced symmetric block ciphers.

Unit-II: Confidentiality And Key Management (10Hrs)

Confidentiality using conventional encryption: placement of encryption function, traffic confidentiality, key distribution, random number generation. Public key cryptography: principles, RSA algorithm, key management, diffie-hellman key exchange, elliptic curve remainder theorem, discrete logarithms.

Unit-III: Message Authentication and Hash Functions (10 Hrs)

Authentication requirements, functions, codes, hash functions, security of hash function & MACs. Hash & Mac algorithms: MD5 message digest algorithm, secure hash algorithm (SHA- I), RIPEMD- 160, HMAC digital signatures & authentication protocols: digital signatures, authentication protocols, digital signature standard.

Unit-IV: Network Security Issues (10Hrs)

authentication applications - kerberos. X.509 directory authentication service, kerberos encryption techniques, E-mail security: pretty Good privacy, S/MIME, data compression using ZIP Radix-64 conversion. PGP random number generation, IP security: overview, architecture, authentication header, encapsulating 175 security payload, combining security associations, key management.

Unit-V: Web And System Security (10Hrs)

Web security: requirements, secure sockets layer & transport layer security, secure electronic transaction, networks management security: basic concepts of SNMP, SNM Pvl community facility, SNMPv3. System Security: Intruders, viruses and worms - intruders, viruses & related threats, Firewalls: design principles, trusted systems.

Unit-VI: Trends And Applications Of Network Security (2Hrs)

Recent trends in Computer System & Security, Advanced topics & its Application.

Text Books: 1. Cryptography and networks security principles & practice 2/c by William Stallings (Pearson Education prentice Hall).

2. Networks security Essentials Applications & standards by William Stallings (Pearson Education, LPF).

Reference Books: 1. Cryptography in C and C++ by Michael Welschenbach (A press IDG Books India).

2. Introduction to Data Compression 2/c by Khalid Sayood (Morgan kaufmann/Harcourt India).

CS-P-804 COMPUTER SYSTEM AND SECURITY PRACTICAL

1. Write a C program: Consider a plain text message I AM A HACKER. Encrypt it with the help of the following algorithm: a. Replace each alphabet with its equivalent 7- bit ASCII code. b. Add a 0 bit as the leftmost bit to make each of the above bit patterns 8 positions long. c. Swap the first four bits with the last four bits for each alphabet. d. Write the hexadecimal equivalent of every four bits.
2. Write a C program to perform encryption and decryption using the following algorithms:
 - Caesar Cipher
 - Rail Fence Technique
 - Simple Transposition Technique.
3. Write a C program that can encrypt and decrypt using DES.
4. Write a program to implement RSA Algorithm.
5. Write a program to implement Diffie –Hellman Key Exchange.
6. Write a program to implement extended Euclidean Algorithm. .
7. Write a program to implement Message Digest -5
8. Write a program to implement SHA-1(Secure Hash algorithm)
9. To Study and analyze SHTTP
- 10 To Study and analyze Firewall