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SRI SATYA SAI UNIVERSITY
OF TECHNOLOGY AND MEDICAL SCIENCES

SYLLABUS REVISION

Name of School-School of Engineering

Department/Program-Computer Science and Engineering/(BE & M.Tech)

2017-18 TO 2021-22

www.sssutms.co.in

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Sri Satya Sai
University of Technology and Medical Sciences

(Established under Govt. of M.P. Registered under UGC 2(F) 1956)

Ref No.: SSUTMS/CSE/2 Date: 13/06/2017

Name of Faculty: School of Engineering

Name of Department: Computer Science and Engineering

Minutes of Board of Studies Committee Meeting Dated on 13-06-2017

The Board of Studies Committee was held in room of Department of Computer Science and Engineering at 2:00 PM. on 13-06-2017, Following members were present.

1. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
2. Dr. Tryambak Hiwarkar, Prof., Chairman
3. Mr. Jitendra Sheetlani, Asst. Prof., Member
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

Agenda:

Preparation of Scheme and Syllabus as per CBCS Scheme for III & IV Sem.

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Ref. No.: SSSUTMS/SOE/CSE/02 Date: 13/06/2017

Discussion Scheme & Syllabus

Scheme and Syllabus was put before the members as per AICTE guidelines met the current demand in industry, it was discussed in details by the members and some modifications were suggested.

Resolution of the Discussion:

It was resolved that Scheme and Syllabus for III & IV Sem. Following AICTE guidelines and which also met the current demand in industry should be modified and may be accepted.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
2. Dr. Tryambak Hiwarkar, Prof., Chairman
3. Mr. Jitendra Sheetlani, Asst. Prof., Member
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

Chairman

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Scheme of Examination - CBCS Pattern

Academic Year 2017–2018

Computer Science and Engineering (III Semester/ II Year)

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Periods/ Hour/ Week			Credits	Total Marks
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation	L	T	P		
1	MTH - 301	Computational Techniques	60	30	10	-	-	2	1	-	3	100
2	CSC- 302	Electronics Devices	60	30	10	30	20	2	1	2	4	150
3	CSC - 303	Digital Circuits	60	30	10	30	20	2	1	2	4	150
4	CSC- 304	Programming Language in C	60	30	10	30	20	2	1	2	4	150
5	CSC- 305	Computer System Organization	60	30	10	30	20	2	1	2	4	150
6	CSC- 306	Data Structures & Algorithms	60	30	10	30	20	2	1	2	4	150
TOTAL			**360**	**180**	**60**	**150**	**100**	**12**	**6**	**10**	**23**	**850**

w.e.f July 2017

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Scheme of Examination - CBCS Pattern

Academic Year 2017– 2018 (For B.E 2016 Batch IV Sem)

Computer Science and Engineering (IV Semester/ II Year)

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Periods/ Hour/ Week			Credits	Total Marks
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation	L	T	P		
1	CSC - 401	Discrete Structure	60	30	10	-	-	2	1	-	3	100
2	CSC - 402	Object Oriented Programming & Methodology	60	30	10	30	20	2	1	2	4	150
3	CSC - 403	Analysis & Design of Algorithms	60	30	10	30	20	2	1	2	4	150
4	CSC - 404	Digital Communication	60	30	10	30	20	2	1	2	4	150
5	CSC - 405	Data Communication	60	30	10	30	20	2	1	2	4	150
6	CSC- 406	Operating System	60	30	10	30	20	2	1	2	4	150
TOTAL			360	180	60	150	100	12	6	10	23	850

w.e.f. July 2017-18

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CSC-301 COMPUTATIONAL TECHNIQUES

UNIT I

MATRICES:- Eigenvalues and Eigenvectors of a real matrix , Characteristic equation , Properties of Eigenvalues and eigenvectors, Cayley-Hamilton Theorem, Diagonalization of matrices, Reduction of a quadratic form to canonical form by orthogonal transformation

UNIT II

INFINITE SERIES:- Sequences, Convergence of series, General properties, Series of positive terms , Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's ratio test), Alternating series, Series of positive and negative terms, Absolute and conditional convergence, Power Series, Convergence of exponential, logarithmic and Binomial Series.

UNIT III

FUNCTIONS OF SEVERAL VARIABLES:- Limits and Continuity, Partial derivatives, Homogeneous functions and Euler's theorem, Total derivative, Differentiation of implicit functions, Change of variables, Partial differentiation of implicit functions, Taylor's series for functions of two variables, Errors and approximations, Maxima and minima of functions of two variables

UNIT IV

IMPROPER INTEGRALS:- Improper integrals of the first and second kind and their convergence, Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions, Properties, Evaluation of integrals using Beta and Gamma functions, Error functions.

UNIT V

MULTIPLE INTEGRALS:- Double integrals , Change of order of integration ,Area enclosed by plane curves, Triple integrals, Volume of Solids, Change of variables in double and triple integrals, Area of a curved surface.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd.,

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CSC- 302 ELECTRONICS DEVICES

UNIT I

Semiconductor :-Intrinsic and Extrinsic, p-type and n-type, energy band diagrams, majority and minority carrier, charge density in semiconductor, generation and recombination of charges, process of diffusion, diffusion and drift currents, Hall effects and its applications, p-n junction, depletion layer, potential barrier, electric field, forward and reverse biased junction, current components in p-n diode, current equation, V-I characteristics, cut in voltages of Si and Ge diode, transition and diffusion capacitance, power dissipation,.

UNIT II

Semiconductor Diode:-Semiconductor diodes, ideal & practical diode equivalent circuit & frequency response, graphical analysis of diode circuits, diode applications, clipping and clamping circuits, half wave & full wave rectifier circuits with & without filters. Type of diodes and their applications, Signal diodes, Power Diode, Zener diode, Varactor diode, Schottky diode, PIN diode, Tunnel diode, Photo diode, Direct tunneling equivalent circuit, Tunnel diode oscillator; Solar Cell, LED, LEDs specification & geometry of LEDs, Colours of LEDs, LCD, Diffusion and Transition capacitance of P-N junction diode, Simple zener regulators.

UNIT III

Diode Applications: p-n junction diode as rectifier, clipper and clamper, The diode as a circuit element, The Load line concept, The Pieces wise linear diode modal, Clipping circuits, Clipping at two independent levels, Comparators, Sampling Gate, Rectifiers, Other full wave circuits, Capacitor filter additional diodes circuits.

UNIT IV

Bipolar junction transistor - Construction, basic operation, current components and equations, CB, CE and CC-configuration, input and output characteristics, Early effect, region of operation, active, cutoff and saturation region Ebers-Moll model, , power dissipation in transistor (Pdmax rating), Photo transistor, Uni-junction Transistor (UJT) : Principle of operation, characterisitics.

UNIT V

FET construction- Construction, n channel and p channel, characteristics, parameters, Equivalent model and voltage gain, Enhancement and depletion MOSFET and its Characterisitics, analysis of FET in various configuration.

REFERENCES:

1. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, Pearson Education
2. Millman and Halkias: Integrated electronics, TMH
3. Graham Bell: Electronic Devices and Circuits, PHI
4. Sendra and Smith: Microelectronics, Oxford Press.
5. Donald A Neamen: Electronic Circuits Analysis and Design, TMH

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List of Experiments

1. V-I characteristics of various Diodes (p-n, Zener, Varactor, Schottky, Tunnel, Photodiode etc)
2. Characteristics of Transistors (BJT and FET)
3 Applications of diodes and Design of various clipping and clamping circuits
4 Design half & full wave rectifier
5 Design & Analysis of transistor amplifier in CE, CB & CC configuration.
6 Design & Analysis of JFET Amplifier.
7 Design & Analysis of MOSFET Amplifier.
8. Design Zener diode as voltage regulator.
9. Design of clipper Circuit.
10. Deign of clamper Circuit.

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CSC-303 - DIGITAL CIRCUITS

UNIT-I

Number System & Boolean Algebra:- Review of number system; types and conversion, codes. Boolean algebra: De-Morgan's theorem, switching functions and simplification using K-maps & Quine McCluskey method.

UNIT-II

Combinational Circuits:- Logic gates, Half and Full adders, Half and Full Substractors Series & parallel addition , BCD adders, Look-ahead carry generator, comparators, code converters, multiplexers and demultiplexers, Function realization using gates & multiplexers, encoders, decoders.

UNIT-III

Sequential Circuits:-Flip flops:- S-R, D, J-K and T Flip Flop, Shift Register, Analysis of synchronous sequential circuits; design of synchronous sequential circuits – Counters, types of counters.

UNIT-IV

Programmable Logic Devices, Memory and Logic Families Memories:- ROM, PROM, EPROM, PLA, PLD, FPGA, Logic families: RTL, DTL, All types of TTL circuits, ECL, I2L, PMOS, NMOS & CMOS logic.

Multivibrator:- Monostable, Bistable, & Astable multivibrator. Schmitt trigger circuits & Schmitt-NAND gates.

UNIT-V

A/D Converter and D/A Converter:-Introduction of Analog to Digital & Digital to Analog converters, sample & hold circuits and V-F converters.

References:

1. M. Mano; "Digital Logic & Computer Design"; PHI.
2. Malvino & Leach; "Digital Principles & Applications"; TMH
3. W.H. Gothmann; "Digital Electronics"; PHI.
4. Millman & Taub; "Pulse, Digital & Switching Waveforms"; TMH
5. Jain RP; Modern digital Electronics; TMH
6. R.J. Tocci, "Digital Systems Principles & Applications".

List of Experiments:

1. To study and test of operation of all logic gates for various IC's (IC#7400,IC#7403,IC# 7408, IC#74332,IC#7486).
2. Verification of Demorgan's theorem.
3. To construct half adder and full adder.
4. To construct half and full substractor circuits
5. Verification of versatility of NAND & NOR gate.
6. Design a Multiplexer/ Demultiplexer.
7. To demonstrate the operation of RS, JK and D flip-flops.
8. To study 4-bit magnitude comparator.
9. To study operation of binary and decade counter.
10. To study Analog to Digital & Digital to Analog converters

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CSC- 304 –PROGRAMMING LANGUAGE IN C

UNIT I

Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement.

UNIT II

Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples.

UNIT III

Arrays: Arrays: Introduction to Arrays, Array Declaration, Single and Multidimensional Array, Memory Representation, Strings, String handling functions.

Pointers: Introduction to Pointers, Address operator and pointers, Declaring and Initializing pointers, Assignment through pointers. Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter.

UNIT IV

Structure and Union: Declaration of structure, Accessing structure members, Structure Initialization, Union.

Advanced Programming Techniques: Special constructs – Break, continue, exit(), goto & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free();

UNIT V

Miscellaneous Features: File handling and related functions; printf & scanf family;C preprocessor – basics, #include, #define, #undef, conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef; Variable argument list functions.

References:

1. Kernighan & Ritchie "The C programming language", PHI
2. Schildt "C:The Complete reference" 4th ed TMH.
3. Cooper Mullish "The Spirit of C", Jaico Publishing House, Delhi
4. Kanetkar Y. "Let us C", BPB.

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List of Experiment

1. WAP to perform arithmetic operations (Addition, Subtraction, Multiplication, Division) on two numbers.
2. WAP to calculate gross salary of an employee [using formula: gross_sal = basic_sal+hra+da].
3. WAP to calculate area of circle.
4. WAP to evaluate marks of student for 3 subjects, calculate percentage and display their grades.

	Marks	grades
CASE -1:	90-100	A
CASE -2:	80-89	B
CASE -3:	65-79	C
CASE -4:	Otherwise	D

5. WAP to determine sum of odd series from 1 to N
6. WAP to calculate factorial of a number.
7. WAP to print Fibonacci series up to N. [E.g. - 0 1 1 2 3 5.....)
8. WAP to identify whether given number is prime or not.
9. WAP to identify whether given number is even or odd.
10. WAP to print whether given year is leap year or not.
11. WAP to check whether the 5 digit number is palindrome or not [A palindrome number or numeral palindrome is a number that remains the same when its digits are reversed. Like 16461, for example, it is "symmetrical".].
12. WAP to check whether 5 number entered is Armstrong number or not.[An Armstrong number is an n-digit number that is equal to the sum of the nth powers of its digits. Like 153]
13. WAP to find the sum of the digits of a number.
14. WAP to input 3 sides of triangle and identify the type of triangle.
15. WAP to input 5 digit numbers and find the sum of the first and last digit.
16. WAP to check whether the number is power of 2 or not..
17. WAP to find out GCD of two numbers.
18. WAP to check whether given number is perfect power of any natural number.

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CSC-305 COMPUTER SYSTEM ORGANIZATION

UNIT -I

Computer Basics and CPU :-Basic computer data types, Complements, Fixed point representation, Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer.

UNIT –II

Control Unit Organization:- Hardwired control unit, Micro programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer.

Computer Arithmetic:- Introduction, Addition and subtraction, Multiplication Algorithms (Booth Multiplication Algorithm), Division Algorithms, Floating Point Arithmetic operations, Decimal Arithmetic Unit.

UNIT –III

Input-Output Organization:- Input-Output Interface, Asynchronous Data Transfer, Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPUIOP Communication, Serial communication, simplex/half duplex and full duplex.

UNIT –IV

Memory Organization Memory:- Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Multiprocessors:- Characterisics of Multiprocessors, Interconnection Structures, Inter-processor Communication , Cache Coherence, Shared Memory Multiprocessors.

UNIT –V

Pipeline and Vector Processing: - Flynn's taxonomy, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Reference Books: -

1. M. Morris Mano, Computer System Architecture, Pearson
2. Andrew S. Tanenbaum and Todd Austin, Structured Computer Organization, Sixth Edition, PHI
3. M. Murdocca & V. Heuring, Computer Architecture & Organization, WILEY
4. John Hayes, Computer Architecture and Organization, McGraw-Hill

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List of Experiment (Expandable)

1. To study design AND,OR,NOT gate
2. To study design universal gate NAND& NOR
3. To study convent decimal number system to binary No system
4. To study convent decimal number system to octal number system
5. To study convent decimal Number system to hexadecimal Number system
6. To study Binary Adder Half
7. To study Binary Full Adder
8. To study J-K Flip-Flops.
9. To study counters & shift registers.
10. Implementation of Arithmetic algorithms

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CSC-306 DATA STRUCTURES & ALGORITHMS

UNIT I

Introduction: Data structures, Type of Data structure, ordered lists, operations in ordered list, sparse matrices, , arrays multi - dimensional arrays, linked lists, operations on linked list, doubly linked list and its operations, storage pools, garbage collection.

UNIT II

Stack: Stacks and its Operations, applications of Stacks and queues and operation of queues, difference between Stacks and queues, Circular queues, Mazing problem, Prefix, postfix, infix notations

UNIT III

Trees: Concept of Trees, Type of Trees, applications of Trees , AVL Trees, B -Trees, binary tree, operations on binary tree , Spanning tree, cut sets, graphs, properties of graph, Planner graphs and its applications, Hamiltonian path and circuits Eulerian paths and circuits.

UNIT IV

Sorting & Searching : Sorting, Insertion Sort, Bubble Sort, selection sort Quick Sort, Merge Sort, Heap Sort, Radix sort, Searching & Hashing: Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. Symbol Table, Static tree table, Dynamic Tree table.

UNIT V

Sorting & Searching Technique: Sequential Search, Binary Search, Other search techniques, Time complexity & memory requirements, Bubble Sort, Insertion sort, Quick sort, Selection sort, Merge sort, Heap sort, maxima and minima heap.

References:

1. Data Structure by Tanenbaum
2. Data Structure by Horowitz & Sahan

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List of Experiment

1. Write a program to insert an element in one dimensional array.
2. Write a program to delete an element in one dimensional array.
3. Write a program to traverse an element in array.
4. Write a program to merging a two array.
5. Write a program to insert node from a link list.
6. Write a program to delete node from a link list.
7. Write a program to infix to postfix Expression.
8. Write a program to doubly link list and to perform traverse & insertion in it.
9. Write a program to implementing stack Operation push, pop & display.
10. Write a program of C on perform simple queue in array using program.
11. Write a program of C on perform D-queue in array using program.
12. Write a program of C on perform C-queue in array using program.
13. Write a program of C on perform binary tree traversal.
14. Write a program of C perform binary search tree traversal in C program.

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CSC-401 DISCRETE STRUCTURE

UNIT-I

Introduction of Sets: Sets, Type of Sets, Venn Diagrams, Proofs of theorems on sets, Relation & Its types, Composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation. Job-Scheduling problem, Function & Its Type composition of functions, Recursively defined functions, Pigeonhole principle. Theorem proving Techniques: Mathematical induction, contradiction.

UNIT-II

Groups and rings, subgroups, generators and evaluation of powers, Cosets and Lagrange's theorem, permutation groups and Burnicide's theorem. Codes and group codes, Isomorphism and automorphism, homomorphism and normal subgroups, rings, integral domains and fields, ring homomorphism. polynomial rings and cyclic codes.

UNIT-III

Proposition, First order logic, logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, quantifiers & its Types. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers.

UNIT-IV

Introduction of Graph: Definition of graphs, type of graph, Paths, Cycles and connectivity, Shortest path in weighted graph, Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

UNIT V

Boolean algebra, lattices and algebraic systems, principles of duality, Algebraic system v/s lattices, distributive and complemented lattices, Boolean lattices and Boolean algebra. uniqueness of finite Boolean algebra's, Boolean functions and Boolean expressions, propositional calculus.

REFERENCES:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Lipschutz; Discrete mathematics (Schaum); TMH
5. Deo, Narsingh, "Graph Theory With application to Engineering and Computer Science.", PHI.
6. Krishnamurthy V; "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
7. S k Sarkar " Discrete Mathematics", S. Chand Pub.

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CSC-402 OBJECT ORIENTED PROGRAMMING & METHODOLOGY

UNIT I

Introduction: Object oriented programming, Introduction, Application, characteristics, difference between object oriented and procedure programming, Comparison of C and C++, Cout, Cin, Data Type, Type Conversion, Control Statement, Loops, Arrays and string arrays fundamentals, Function. Returning values from functions, Reference arguments, Overloaded function, Inline function, Default arguments, Returning by reference.

UNIT II

Object and Classes: Implementation of class and object in C++, access modifiers, object as data type, constructor, destructor, Object as function arguments, default copy constructor, parameterized constructor, returning object from function, Structures and classes. Classes objects and memory, static class data, Arrays of object, Arrays as class Member Data, The standard C++ String class, Run time and Compile time polymorphism.

UNIT III

Operator overloading and Inheritance: Overloading unary operators, Overloading binary operators, data conversion, pitfalls of operators overloading, Concept of inheritance, Derived class and base class, access modifiers, types of inheritance, Derived class constructors, member function, public and private inheritance.

UNIT IV

Pointer and Virtual Function: Addresses and pointers, the address-of operator & pointer and arrays, Pointer and Function pointer, Memory management: New and Delete, pointers to objects, debugging pointers, Virtual Function, friend function, Static function, friend class, Assignment and copy initialization, this pointer, dynamic type information.

UNIT V

Streams and Files: Streams classes, Stream Errors, Disk File I/O with streams, file pointers, error handling in file I/O with member function, overloading the extraction and insertion operators, memory as a stream object, command line arguments, printer ouput, Function templates, Class templates Exceptions, Containers, exception handling.

REFERENCES:

- David Parsons; Object oriented programming with C++; BPB publication
- Object oriented programming in C++ by Robert Lafore: Galgotia
- Balagurusamy; Object oriented programming with C++; TMH
- Herbert Shildt, "The Complete Reference C++", Tata McGraw Hill publication

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LIST OF EXPERIMENTS:-

1. Write a program that input's a student's marks in five subjects (out of 100) and print the percentage.
2. Write a program to convert given number of days into years, weeks and days.
3. Write a program to find minimum of three numbers using conditional operator.
4. Write a program to print the largest of three numbers.(only if)
5. Write a program to print the mathematical table of a number.
6. Write a program to swap two numbers (call by reference)
7. Write a program to arrange the array elements in ascending order.
8. Write a program to search a specified element in a given array.
9. Write a program to count number of words, characters, vowels in a given string.
10. Write a program to find the product of two matrices.
11. Write a program to make a structure of student with the following details. (Name,Age,Class,Marks, Average, Result)& Get Input from the user for the data Name, Age, Class Marks and Find the average & result of the student if average>=40 result 'P' if not result 'F'
12. Write a program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
13. Write a program to create multilevel inheritance. Create classes A1,A2, A3.
14. Write a program to create an array of pointers. Invoke functions using array objects.
15. Write a program to use pointer for both base and derived classes and call the member function. Use Virtual keyword.
16. Write a program to overload unary operator using friend function.
17. Write a program to overload – operator.
18. Write a program to invoke Constructor and Destructor.
19. Write a program to use this pointer and return pointer reference.
20. Write a program to write text in the file. Read the text from the file from end of file. Display the contents of the file in reverse order.

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CSC-403 ANALYSIS & DESIGN OF ALGORITHMS

UNIT–I

Introduction of Algorithms, Analysis of algorithms: Space Complexity, Time Complexity, recurrence relation and Asymptotic Notation, Divide and Conquer: General Methods, Analysis and Design, Binary Search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II

Greedy Strategy: Introduction, examples of greedy method like optimal merge pattern, Huffman coding, Minimum spanning trees, knapsack problem, job sequencing with dead lines single source shortest path algorithms.

UNIT-III

Dynamic Programming: Introduction, Problem based on this approach such as 0/1 Knapsack Multistage graph, reliability design, Floyd-warshall algorithms.

UNIT-IV

Backtracking Concept and its example like 8 Queen's problem, Hamiltonian cycle, Graph coloring problem, 15 Puzzle problem, Least Cost Search.

UNIT-V

Introduction to branch & bound method, examples of branch & bound methods like traveling sales man problem, meaning of lower bound theory and its use in solving algebraic problem. NPcompleteness & NP hard problems. Basic Concept of non deterministic algorithms. NP hard and NP complete classes.

REFERENCES:

1. Coremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. LChandra Mohan " Design and Analysis of Algorithms" PHI

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LIST OF EXPERIMENTS: -

1. Implement Binary Search using C++.
2. Implement Quick sort using C++.
3. Implement Strassen Matrix multiplication on the given matrix.
4. Implement Merge sort on the given list of elements.
5. Implement Job sequencing problem using C++.
6. Implement Floyd warshall algorithm using C++.
7. Implement 8 – queens problem using backtracking.
8. Implement graph coloring problem using C++.
9. Implement 0/1 knapsack using branch and bound.
10. Implement travelling salesman problem using C++

CSC-404 DIGITAL COMMUNICATION

UNIT-I

Introduction: Introduction to Communication system, Need for modulation. Amplitude Modulation, Time domain and frequency domain description, power relations in Am waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT-II

Base Band Modulation: Base band system, sampling theorem, Sampling and signal reconstruction, Aliasing, Types of sampling, Quantization, PCM, Companding, DPCM, ADPCM, Delta modulation, Adaptive delta modulation, T1 carrier system.

UNIT-III

Digital Modulation Techniques:- Modulation techniques for ASK, QASK, FSK, M-ary FSK, BPSK, DPSK, DEPSK, QPSK, M-ary PSK, QAM, MSK, GMSK.

UNIT-IV

Digital Carrier Demodulation Techniques:- Coherent and non-coherent detection of ASK, QASK, FSK, PSK, QPSK, M-ary PSK, DPSK, Noise temperature, Noise bandwidth, Noise figure.

UNIT-V

Information Theory:- Measure of information, Entropy, Source encoding, Error free communication over Noisy channel, Channel capacity of discrete memory less channel, Channel capacity of continuous channel, Practical communication system in lights of Shannon theorem.

REFERENCE BOOKS:

1. Modern Digital and Analog Communication Systems, B. P. Lathi, (3rd Edition), Oxford Publication.
2. Principles of Communication Systems, Taub & Schilling, (2nd Edition), Tata McGraw Hill Publication.
3. S.Haykin, Communication systems, John Wiley 2001
4. Bhattacharya Amitabh, "Digital Communication", Tata McGraw-Hill, 1st Ed., 2006.

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List of Experiments:

1. To understand Sampling theorem and sample speech and audio signal.
2. To generate and observe Pulse Amplitude Modulation, Pulse Width Modulation and Pulse position modulation waveforms.
3. To transmit and receive digital signal using Amplitude Shift Keying.
4. To transmit and receive digital signal using Frequency Shift Keying.
5. To transmit and receive digital signal using Phase Shift Keying (BPSK and QPSK)
6. To understand Pulse Code Modulation to digitize Speech signal.
7. To understand time division Multiplexing and De-multiplexing.
8. To implement Differential pulse code Modulation and Demodulation.
9. To understand the concept of Delta Modulation and to achieve the Delta Modulation /De-Modulation.

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CSC-405 DATA COMMUNICATION

UNIT - I

Introduction: Data Communication, Components, data representation, data flow and basic model, Serial & Parallel transmission, Data transmission modes, Analog & digital transmission methods, Encoding, Unipolar, Polar, Bipolar, Line & Block codes. Data compression and data compression techniques.

UNIT-II

Multiplexing: Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Statistical Time Division Multiplexing (STDM). Spread spectrum: Frequency Hopping & Direct Sequence. Terminal handling & Polling. Network Switching Techniques: Circuit, Message, Packet & Hybrid. X.25, ISDN.

UNIT-III

Physical Layer: Physical layer characterization, Physical layer interface and Standards, digital interface, Connection specifications & configuration. Modem, Types of Modem, features, signal constellation, block schematic. Network Devices, Active and Passive Hubs, Repeaters, Bridges, Two & Three layer Switches & Gateway, Network Topologies.

UNIT-IV

Transmission Media: Transmission line characteristics, distortions, Crosstalk. Guided Media and Unguided media, Electromagnetic polarization , Rays and Waves front , Electromagnetic spectrum, Radiation & Propagation of Waves, Inverse square law, Wave attenuation and absorption, Terrestrial Propagation, Skip distance, Radio waves, Microwave, Infrared & Satellite Communication system .

UNIT-V

Data Link Layer: Transmission Errors, Content Error, Flow integrity Error, Error detection & Correction methods, Parity checking, Checksum Error Detection, Cyclic Redundancy Check, Hamming Distance, Interleaved codes, Block Parity, Convolution code, Hardware Implementation, Checksum.

References:

1. Forouzan, "Data communication and Networking", 5e, TATA Mc Graw
2. Stallings William, "Data & Computer Communication", Pearson Education
3. Godbole A., "Data Communication & Network" , TMH
4. Miller, " Data Network and Comunication", Cengage Delmar Learning

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List of Experiments

1. Study of Data Communication and Networking. Identify five components of Data communication system.
2. Study of computer network topology and OSI model layered architecture.
3. Study of multiplexing and switching.
4. To Study different types of transmission media.
5. To Study interconnection of cables for data communication.
6. To Study fiber optic communication.
7. To establish a straight over and a Cross over cable in LAN.
8. To Study LAN using Star topology.
9. To Study LAN using Bus topology.
10. To Study LAN using Tree topology
11. Write a program in C to generate Hamming code.

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CSC-406 OPERATING SYSTEM

UNIT I

Introduction:- History of operating System, Types of Operating System: Batch Processing, Real Time, Multitasking & Multiprogramming, Time-sharing system, Operating system services, Operating system structure, System Call & System Boots. Operating system design & Implementations, System protection, Buffering & Spooling.

UNIT II

Processes Management:- The Process concept, The process control block, Systems programmer's view of processes, Operating system services for process management, Scheduling algorithms. First Come first serve, Round Robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues. Performance evaluation of scheduling algorithms stated above.

UNIT III

Deadlock:- Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Process Management in Linux.

File Management:- File system, access methods, free space managements, allocation methods, directory systems, protection, organization,sharing & implementation issues, Disk & Drum Scheduling, File system in Linux & Windows

UNIT IV

I/O Management:- I/0 devices organization, I/0 devices organization, I/0 buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations.

Device Management:- Path managements, Sub module, Procedure, Scheduler, Handler, Interrupt Service Routine.

UNIT V

Memory Management:- Memory Hierarchy, MFT & MVT, logical and physical address space, Concept of swapping and Paging, Memory management without swapping or paging, contiguous and non-contiguous allocation, segmentation, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation and paging combined with segmentation. Structure & implementation of Page table, Virtual memory, Cache Memory Organization.

REFERENCES:

1. Silberschatz ,"Operating system", Willey Pub.
2. Stuart,"Operating System Principles, Design & Applications",Cengage Learning.
3. Tannanbaum, "Modern operating system",PHI Learning.
4. Dhamdhere, "Operating System",TMH.
5. Achyut S Godbole,"Operating System", TMH.

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List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. Write a program to implement classical inter process communication problem (producer consumer).
7. Write a program to implement classical inter process communication problem (Reader Writers).
8. Write a program to implement classical inter process communication problem(Dining_Philosophers).
9. Write a program to implement & Compare various page replacement algorithms.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11. Write a program to implement Banker's algorithms.
12. Write a program to implement Remote Procedure Call.
13. Write the Devices Drivers for any Device or peripheral.

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Ref. No.: SSTMS/BOS/CSE/01 Date: 15/06/2018

Name of Faculty: School of Engineering

Name of Department: Computer Science and Engineering

Minutes of Board of Studies Committee Meeting Dated on 15-06-2018

The Board of Studies Committee was held in room of Department of Computer Science and Engineering at 2:00 PM. on 15-06-2018, Following members were presen.

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Tryambak Hiwarkar, Prof., Chairman
3. Mr. Jitendra Sheetlani, Asst. Prof., Member
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

Agenda:

Preparation of Scheme and Syllabus as per CBCS Scheme for V & VI Sem.

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Ref. No.: SSSUTMS/SoE/2018/01 Date: 15/06/2018

Discussion Scheme & Syllabus

Scheme and Syllabus was put before the members as per AICTE guidelines met the current demand in industry, it was discussed in details by the members and some modifications were suggested.

Resolution of the Discussion:

It was resolved that Scheme and Syllabus for V & VI Sem. Following AICTE guidelines and which also met the current demand in industry should be modified and may be accepted.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Tryambak Hiwarkar, Prof., Chairman
3. Mr. Jitendra Sheetlani, Asst. Prof., Member
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

Chairman

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Bhopal-Indore Road, Opp. Pachama oilfed plant, Pachama, Dist.-Sehore M.P.PIN-466001 Ph. 07562-223647, Fax : 07562-223644, Web: www.sssutms.co.in, info@sssutms.co.in

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Scheme of Examination - CBCS Pattern

Academic Year 2018- 2019

Computer Science and Engineering (V Semester / III Year)

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Periods/ Hour/ Week			Credits	Total Marks
			End Sem. Exam.	Mid Tests	Assignments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation	L	T	P		
1	CSC - 501	Computer Networking	60	30	10	30	20	2	1	2	4	150
2	CSC - 502	Database Management Systems	60	30	10	30	20	2	1	2	4	150
3	CSC - 503	Java Programming	60	30	10	30	20	2	1	2	4	150
4	CSC - 504	Department Elective-I	60	30	10	-	-	2	1	-	3	100
5	CSC - 505	Department Elective-II	60	30	10	-	-	2	1	-	3	100
6	CSC - 506	Open Elective	60	30	10	-	-	2	1	-	3	100
7	CSC - 507	Industrial Training - I	-	-	-	-	100	-	-	4	2	100
TOTAL			360	180	60	90	160	12	6	10	23	850

Department Elective-I	CSC-504(A) Advance Computer Architecture	CSC-504(B) Advance Digital Systems	CSC-504(C)Advanced Data Structure
Department Elective-II	CSC-505(A) Software Engineering	CSC-505(B) Digital Image Processing	CSC-505(C)PHP Technology
Open Elective	CSC-506(A) Multimedia	CSC-506(B) Theory of Computation	CSC-506(C)-Information Theory & Coding

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Scheme of Examination - CBCS Pattern

Academic Year 2018- 2019

Computer Science and Engineering (VI Semester/ III Year)

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Periods/Hour/ Week			Credits	Total Marks
			End Sem. Exam.	Mid Tests	Assignments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation	L	T	P		
1	CSC - 601	Microprocessor & Interfacing	60	30	10	30	20	2	1	2	4	150
2	CSC - 602	Dot Net Technology	60	30	10	30	20	2	1	2	4	150
3	CSC-603	Computer Graphics	60	30	10	30	20	2	1	2	4	150
4	CSC - 604	Department Elective-III	60	30	10	-	-	2	1	-	3	100
5	CSC - 605	Department Elective-IV	60	30	10	-	-	2	1	-	3	100
6	CSC- 606	Open Elective	60	30	10	-	-	2	1	-	3	100
7	CSC- 607	Industrial Training Project - I	-	-	-	100	-	-	-	4	2	100
TOTAL			360	180	60	190	60	12	6	16	23	850

Department Elective-III	CSC-604(A) Simulation & Modeling	CSC-604(B) Embedded System	CSC-604(C) Principles of Programming Languages
Department Elective-IV	CSC-605(A) Internet of Things	CSC-605(B) E-Commerce & Governance	CSC-605(C) Unix & Shell Programming
Open Elective	CSC-606(A) Cyber Crime & Information Warfare	CSC-606(B) Distributed System	CSC-606(C) Statistical Method

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CSC -501 – COMPUTER NETWORKING

UNIT–I

Introduction to computer networks and Internet, overview Advantages - network, Types-server based, peer, hybrid, Server types, Network Topology: Bus, Star, Ring, Star bus, Star ring, Mesh, Network Protocols Hardware Protocols, Software Protocols, Selecting and design the network for an organization.

UNIT-II

Signal Transmission: Digital signaling, Analog Signaling, Bit synchronization, Baseband and Broadband transmission, Network Media types- properties & specialties, Network adapters–working principals, configuration and selection.

UNIT-III

Network Layer: Network Layer Design issues, Store and Forward Packet Switching, connection less and connection oriented networks, routing algorithm's, optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT-IV

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP. Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Crash Recovery.

UNIT-V

UDP, RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP. Application Layer: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH.

REFERENCES:

1. Andrew & Tanenbaum, "Computer Network ".
2. Prakash C Gupta, "Data Communication.
3. William Stallings, "Data and Computer Communication".
4. Computer Networking and the Internet (5th edition),Fred Halsall, Addison Wesley.
5. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill.

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LIST OF EXPERIMENTS:-

1. Establishment and configuration of LAN.
2. Study of WAN.
3. Case study of ARP AND RARP Protocols.
4. Study of basic networking commands like ping, ipconfig, etc.
5. Case study of various Routing Strategies.
6. Case studies of various Network Topologies.
7. Study of sliding window protocol.
8. Configuring routers, bridges and switches and gateways.
9. Case study of client-server application.
10. Study of IPv4, IPv6 Protocol.

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CSC- 502 – DATABASE MANAGEMENT SYSTEMS

UNIT-I

Basic Concepts: Introduction to DBMS, File system vs DBMS, Advantages of database systems, Database System architecture, Data models, Schemas and instances, Data independence, Functions of DBA and designer, Entities and attributes, Entity types, Key attributes, Relationships, Defining the E-R diagram of database.

UNIT-II

Relational Model: Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, Relational algebra queries, **Entity-Relationship model:** Basic concepts, Design process, Constraints, Keys, Design issues, E-R diagrams, Weak entity sets, extended E-R features , Generalization, Specialization and Aggregation.

UNIT-III

SQL: Data definition in SQL, update statements and views in SQL, Data storage and definitions, Data retrieval queries and update statements, Query Processing & Query Optimization, measures of query cost, Selection operation, Sorting, Join, evaluation of expressions, Transformation of relational expressions.

UNIT-IV

Relational Database design: Functional Dependency, definition, Trivial And Non-Trivial FD, closure of FD set, closure of attributes, Irreducible Set Of FD, Normalization –1NF, 2NF, 3NF, Decomposition using FD-dependency preservation, lossless join, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF.

UNIT-V

Introduction of transaction, transaction processing and recovery, Concurrency control: Lock management, specialized locking techniques, concurrency control without locking, Protection and Security Introduction, Distributed databases, Basic concepts of Object Oriented Database System.

REFERENCES:

1. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley.
2. Korth, Silberiz, Sudarshan, "Database Concepts", McGraw Hill.
3. Toledo; Data base management systems;TMH.
4. Ashutosh Kumar Dubey "Data Base Management Concepts" Katson Publication.

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LIST OF EXPERIMENTS:-

1. Study of DBMS, RDBMS and ORDBMS.
2. To study Data Definition language Statements.
3. To study Data Manipulation Statements.
4. Study of SELECT command with different clauses.
5. Study of SINGLE ROW functions (character, numeric, Data functions).
6. Study of GROUP functions (avg, count, max, min, Sum).
7. Study of various type of SET OPERATORS (Union, Intersect, Minus).
8. Study of various type of Integrity Constraints.
9. Study of Various type of JOINS.
10. To study Views and Indices.

CSC- 502 JAVA PROGRAMMING

UNIT-I

Introduction to Java : Basics of Java programming, Data types, Variables, Operators, Control structure including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

UNIT-II

Objects and Classes :Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.

UNIT-III

Inheritance and Polymorphism : Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

UNIT-IV

Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.

UNIT-V

Multithreading in java, Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to Java Beans and Network Programming.

REFERENCES:

1. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.
2. The Complete Reference, Java.
3. (Fourth Edition), Herbert Schild, TMH.
4. Java Programming, D. S. Malik, Cengage Learning.
5. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill.

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LIST OF EXPERIMENTS: -

1. Write a Java program that displays area of different (Rectangle, Square, Triangle) using the method overloading.
2. To write a java program to print the individual digits of a 3 digit number.
3. To write a java program to read an integer and find whether the number is odd or even.
4. To write a java program find the biggest of three integers.
5. To write a java program to find the first 15 terms of Fibonacci sequence.
6. To write a java program to work with the creation of objects for the class with overloaded constructor and user defined methods returning a value.
7. To write a java program to get and sort names by command line argument.
8. To write a java program to understand the concept of functionalities of different Bitwise operators.
9. To write a java program to understand the concept of Method Overriding.
10. To write a java program to understand the steps in the creation of packages.

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CSC-504(A) ADVANCE COMPUTER ARCHITECTURE

UNIT-I

Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and Multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and Software Parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, Data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks, Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

UNIT- II

Instruction set Architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning, Interleaved memory organization, Memory interleaving, Pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System, Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

UNIT-III

Linear Pipeline Processor, Nonlinear Pipeline Processor, Instruction Pipeline design, Mechanisms for instruction Pipelining, Pipeline Hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic Pipeline, Multifunctional Arithmetic Pipelines. Superscaler Pipeline design, Super Pipeline Processor Design.

UNIT-IV

Cache Coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, Deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization. Distributed memory model and shared memory model. Principles of Multithreading, Multithreading Issues and Solutions, Multiple-Context Processors.

UNIT-V

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

REFERENCES:

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3.V.Rajaraman & C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning India.

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School of Engineering

CSC-304(B) ADVANCE DIGITAL SYSTEMS

UNIT-I

Sequential Circuit Design: Analysis of clocked synchronous sequential circuits and modeling-State diagram, statetable, state table assignment and reduction, Design of synchronous sequential circuitsdesignof iterative circuits ASM chart and realization using ASM.

UNIT-II

Asynchronous Sequential Circuit Design: Analysis of asynchronous sequential circuit, flow table reduction-races-stateassignment, transition table and problems in transition table- design of asynchronoussequential circuit-Static, dynamic and essential hazards, data synchronizers, mixedoperating mode asynchronous circuits, designing vending machine controller.

UNIT-III

Fault Diagnosis And Testability Algorithms: Fault table method-path sensitization method Boolean difference method, D algorithm, Tolerance techniques, The compact algorithm, Fault in PLA, Test generation DFT schemes, Built in self test.

UNIT-IV

Synchronous Design Using Programmable Devices: Programming logic device families– Designing a synchronous sequential circuit usingPLA/PAL, Realization of finite state machine using PLD-FPGA-Xilinx FPGA-Xilinx4000.

UNIT-V

System Design Using VHDL& VHDL: Operators Arrays concurrent and sequential statements packages,Data flow, Behavioral structural modeling, compilation and simulation of VHDL code Test bench, Realization of combinational and sequential circuits using HDL, Registers, counters sequential, machine serial, adder Multiplier, Divider Design of simplemicropr ocessor.

REFERENCES:

1. Advanced Digital Design with the Verilog HDL by D. Cilecti Micahel.
2. Design through Verilog HDL by B.Bala Tripura Sundari T.R. Padmanabhan.

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CSC-504(C) ADVANCED DATA STRUCTURE

UNIT-I

Introduction: Common operations on data structures, Types of data structures, Data structures & Programming, Program Design, Complexities, Time Complexity, order of Growth, Asymptotic Notation.

UNIT-II

Advanced Data Structures: Hash tables, Heaps, Complexity, Analysis of Heap Operations, Application of Heap, AVL tress, Insertion & Deletion in AVL tree, Red Black Trees, Properties of Red Black trees, Insertion & Deletion in Red Black tree.

UNIT-III

Sorting: Need for sorting, Types of sorting algorithm, Stable sorting Algorithm, Internal & External sorting algorithm, Online and offline algorithm. Sorting Techniques-Insertion, Shell, Selection, Merge, Quick sort, Radix sort, Bucket sort.

UNIT-IV

Augmenting Data structures: Augmenting a red black trees, Retrieving an element with a given rank, Determining the rank of element, Data structure Maintenance, An augmentation strategy, Interval Trees.

UNIT-V

File structures: Basic file operations, File organization, Sequential file organization, Indexed sequential file organization, Direct file organization. External merge sort, Multiway Merge sort, Tournament Tree, Replacement Selection.

REFERENCES:

1. Horowitz and Sahani, "Fundamentals of data Structures",University Press.
2. Trembley and Sorenson , "Data Structures". TMH Publications.
3..A. M. Tenenbaum, "Data Structures using C & C++", Pearson Pub.
4. Venkatesan , Rose, "Data Structures" Wiley India Pvt.Ltd.

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CSC-505(A) SOFTWARE ENGINEERING

UNIT-I

Introduction Software: Problem and prospects Software development process, System Development Life Cycle, Waterfall Model, Spiral Model and other models, Unified processAgile development, Agile Process, Extreme Programming, Other agile Process models.

UNIT-II

Measures, Metrics and Indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics of Software Quality, S/W reliability, Software estimation techniques, LOC and FP estimation, Empirical models like COCOMO, project tracking and scheduling, reverse engineering.

UNIT-III

Software requirements and specification: feasibility study, Informal/formal specifications, pre/post conditions, algebraic specification and requirement analysis models, Specification design tools. Software design and implementation: Software design objectives and techniques, User interface design, Modularity, Functional decomposition, DFD, Data Dictionary, Object oriented design, Design patterns implementation strategies like top- down, bottom-up.

UNIT-IV

Coding standard and guidelines, programming style, code sharing, code review, rapid prototyping, specialization, construction, class extensions, intelligent software agents, reuse performance improvement, debugging. Software Testing Strategies, Verification and Validation, Strategic Issues, test plan, white box, black-box testing, unit and integration testing, system testing test case design and acceptance testing, maintenance activities.

UNIT-V

Software Maintenance: Software Supportability, Reengineering, Business Process Reengineering, Reverse Engineering, Restructuring, Forward Engineering, Economics of Reengineering, project scheduling and tracking plan, project management plan, SQA and quality planning, SCM activities and plan, CMM, Software project management standards, Introduction to component based software engineering.

REFERENCES:

1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005.
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition. PHI Learning.
3. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
4. Sommerville,"Software Engineering",Pearson Education.

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S.S.U.T.M.S. School of Engineering SEHORE (M.P.)

CSC-505(B) DIGITAL IMAGE PROCESSING

UNIT-I

Digital Image Processing: Elements of a Digital Image Processing system, Structure of the Human eye, Image formation and contrast sensitivity, Sampling and Quantization, Neighbours of a pixel, Distance measures, Photographic file structure and exposure, Filem characteristics, Linear scanner, Video camera, Image processing applications.

UNIT-II

Image Transforms: Introduction to Fourier transform DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transform, Hadamard transform, Discrete Cosine transform.

UNIT-III

Image Enhancement: Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Lowpass filtering, Averaging of multiple images, Image sharpening by differentiation and high pass filtering.

UNIT-IV

Image Restoration: Definition, Degradation model, Discrete formulation, Circulant matrices, Block circulant matrices, Effect of diagnolization of circulant and block circulant matrices, Unconstrained and constrained restorations, Inverse filtering, Wiener filter, Restoration in spatial domain.

UNIT-V

Image Encoding: Objective and subjective fidelity criteria, Basic encoding process, The mapping, The quantizer, The coder, Differential encoding, Contour encoding, Run length encoding, Image encoding relative to fidelity criterion, Differential pulse code modulation.

REFERENCES:

1. Rafael, C. Gonzlez., and Paul, Wintz, "Digital Image Processing", Addison-Wesley Publishing Company.
2. Jain Anil K., "Fundamentals of Digital Image Processing", Prentice Hall.
3. Sosenfeld, and Kak, A.C., "Digital Image Processing", Academic Press.
4. William K. Pratt., "Digital Image Processing", John Wiley and Sons.

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CSC-505(C) PHP TECHNOLOGY

UNIT-I

Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.

Handling HTML Form With PHP: Capturing Form Data, Dealing with Multi-value filed, Generating File uploaded form , Redirecting a form after submission.

UNIT-II

Decisions and loop: Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html.

Function: What is a function, Define a function, Call by value and Call by reference, Recursive function.

UNIT-III

String: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function.

Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and foreach(), Some useful Library function.

UNIT-IV

Working with file and Directories: Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading.

State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session.

UNIT-V

String matching with regular expression: What is regular expression, Pattern matching in Php, Replacing text, Splitting a string with a Regular Expression.

Generating Images with PHP: Basics of computer Graphics, Creating Image, Manipulating Image, Using text in Image.

REFERENCES:

1. Learning PHP, MySQL, books by ' O' riley Press.
2. PHP & MySQL: Novice to Ninja by Kevin Yank.
3. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman.

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CSC-506(A)- MULTIMEDIA

UNIT-I

Multimedia System Design: An Introduction Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Databases.

UNIT-II

Compression and Decompression Techniques: Types of Compression, Binary Image Compression Schemes, Color, Gray scale, Still-video image compression, Discrete Cosine Transform, Video Image compression, MPEG Coding methodology, Audio Compression, Data and File format standards- RTF, TIFF,RIFF, MIDI, JPEG, AVI, JPEG, TWAIN Architecture.

UNIT-III

Multimedia Input And Output Technologies: Key Technology Issues, Pen Input, Video and Image Display Systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Video Images and Animation, Full Motion Video.

UNIT-IV

Storage And Retrieval Technologies: Magnetic Media Technology, RAID-Level-0 To 5, Optical Media, WORM optical drives, Hierarchical Storage Management, Cache Management for storage systems.

UNIT-V

Multimedia Application Design: Types of Multimedia systems, Virtual Reality Design, Components of Multimedia syste, Distributed Application Design Issues, Multimedia Authoring and User Interface, Hypermedia Messaging, Distributed Multimedia Systems.

REFERENCES:

1. Andleigh PK and Thakrar K, "Multimedia Systems", Addison Wesley Longman, 1999.
2. Fred Halsall, "Multimedia Communications", Addison Wesley, 2000.
3. Ralf Steinmetz, Klara Nahrstedt, "Multimedia, computing, communications and applications", Prentice Hall, 1995.
4. Tay Vaughan, "Multimedia making it work", TMH 5th Edition 2001.
5. Weixel, Fulcon, Barksdale,Morse, "Multimedia Basics", Easwar Press 2004.

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CSC-506(B)- THEORY OF COMPUTATION

UNIT-I

Introduction of the theory of computation, Finite state automata– description of finite automata, properties of transition functions, Transition graph, designing finite automata, FSM, DFA, NFA, 2-way finite automata, equivalence of NFA and DFA, Mealy and Moore machines.

UNIT-II

Regular grammars, regular expressions, regular sets, closure properties of regular grammars, Arden's theorem, Myhill-Nerode theorem, pumping lemma for regular languages, Application of pumping lemma, applications of finite automata, minimization of FSA.

UNIT-III

Introduction of Context Free Grammar, derivation trees, ambiguity, simplification of CFGs, normal forms of CFGs, Chomsky Normal Form and Greibach Normal forms, Pumping lemma for CFLs, Decision algorithms for CFGs, Designing CFGs, Closure properties of CFL's.

UNIT-IV

Introduction of PDA, formal definition, closure property of PDA, examples of PDA, Deterministic Pushdown Automata, NPDA, conversion PDA to CFG, conversion CFG to PDA.

UNIT-V

Turing machines: basics and formal definition, language acceptability by TM, examples of TM, variants of TMs: multitape TM, NDTM, Universal Turing Machine, offline TMs, equivalence of single tape and multitape TMs. Recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility. Introduction of P, NP, NP complete, NP hard problems and Examples of these problems.

REFERENCES:

1. Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India.
2. John E. Hopcroft, Jeffrey D.Ullman and Rajeev Motwani, "Introduction to Automata Theory, Languages and Computation", Pearson Education.
3. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning.
4. Peter Linz, "Introduction to Automata Theory and Formal Languages", Narosa Publishing.
5. John C Martin, "Introduction to languages and the theory of computation", TATA McGraw Hill.

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CSC-506(C)- INFORMATION THEORY & CODING

UNIT-I

Uncertainty, Information and Entropy Information Measures, Characteristics on information measure, Shannon's concept of information, Shannon's measure of information, Model for source coding theorem, Communication system, Source coding and line/channel coding, channel mutual information capacity (Bandwidth).

UNIT-II

Channel coding, Theorem for discrete memory less channel, Information capacity theorem; Error detecting and error correcting codes, Types of codes, Block codes, Tree codes, Humming Codes, Description of linear block codes by matrices, Description of linear tree code by matrices, Parity check codes, Parity check polynomials.

UNIT-III

Compression: Lossless and lossy, Huffman codes, Binary Image compression schemes, Run length Encoding, CCITT group-3 1D compression, CCITT group-3 2D compression, CCITT group-4 2D compression.

UNIT-IV

Video Image Compression: Requirement of full motion video compression, CCITT H 261 video coding algorithm, MPEG compression methodology, MPEG-2 compression, Audio (Speech)compression.

UNIT-V

Cryptography: Encryption, Decryption, Cryptogram (cipher text), Concept of cipher, Cryptanalysis, Keys: Single key (Secret key), Cryptography, two-key (Public key) cryptography, Single key cryptography, Ciphers, Block Cipher code, Stream ciphers, Requirements for secrecy, The data Encryption Standard, Public Key Cryptography, Diffie- Hellmann public key distribution, The Rivest- Shamin Adelman(R-S-A) system for public key cryptography, Digital Signature.

REFERENCES:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.
3. Cole, "Network Security", Bible, Wiley INDIA, Second Addition.
4. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 2006.

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CSC-601-MICROPROCESSOR & INTERFACING

UNIT-I

Introduction to microprocessors, Microprocessor architecture and its operations, memory, inputs-outputs (I/Os), data transfer schemes interfacing devices, architecture, advancements of microprocessors.

UNIT-II

Architecture of 8085 microprocessor, Instruction set and Addressing modes of 8085 microprocessor, Assembly language programs of 8085 microprocessor, Stack, Subroutines, Time-Delay loops, Modular programming, Macro.

UNIT-III

8086 Microprocessor: Architecture, Register, Memory Segmentation, 8086 Memory Addressing Memory Read and Write Bus Cycle of 8086, Demultiplexing of the system Bus in 8086 and 8088 microprocessors, Instruction set and Addressing modes of 8086 microprocessor, Assembly language programs of 8086 microprocessor.

UNIT-IV

I/O and Memory Interfacing Using 8085/8086, Interrupts of 8085/8086 Microprocessors, 8259A Programmable Interrupt Controller, Programmable peripheral Interface, 8253 Programmable Counter/Interval Timer, Communication and Bus Interfacing with 8085/8086 Microprocessor, Serial Communication Interface, DMA Controller 8257, 8279-Programmable Keyboard and Display I/O Interface, Bus Interface, 8089 I/O processor.

UNIT-V

8051 Microcontroller: Architecture of 8051 microcontroller, Memory organization, Timers/Counters, Interrupts, Addressing modes, 8051 Instruction set, Assembly language Programs, Applications of microcontrollers.

REFERENCES:

1. Douglas V Hall, "Microprocessors and interfacing – Programming & Hardware" TMH
2. Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085", TMH Grading System 2013 - 14
3. Rafiquzzaman, "Microprocessors-Theory & Applications", PHI
4. Savaliya, "8086 Programming & Advance Processor Architecture", Wiley India
5. Ray, Bhurchandi, "Advanced Microprocessor and peripherals" TMH Pub
6. Soumitra Kumar Mandal, "Microprocessors and Microcontroller" TMH Pub

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LIST OF EXPERIMENTS:-

1. To study 8085 based microprocessor system.

2. To study 8086 based microprocessor system.

3. To develop and run a program for finding out the largest/smallest number from a given set of numbers.

4. To develop and run a program for arranging in ascending/descending order of a set of numbers.

5. To perform multiplication/division of given numbers.

6. To perform conversion of temperature from 0F to 0C and vice-versa.

7. To perform computation of square root of a given number.

8. To perform floating point mathematical operations (Addition, Subtraction, Multiplication and Division).

9. To obtain interfacing of RAM chip to 8085/8086 based system.

10. To obtain interfacing of keyboard controller.

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CSC-602-DOT NET TECHNOLOGY

UNIT-I

Introduction to .NET Technology, Introduction to VB.NET, Software development and Visual Basic .NET, Visual Basic .NET and .NET frame.

UNIT-II

Visual Basic fundamentals: The Visual Basic .NET Development Environment, The element of VB.NET, VB.NET operators, Software design, Conditional structure and control flow, Methods.

UNIT-III

Classes and Objects: Types, Structure and Enumeration, Classes, Interfaces, Exception handling and Classes. Collections, Arrays and other Data Structure.

UNIT-IV

Advance design concepts, Patterns, Roles and Relationships, Advanced Interface Patterns: Adapters and Delegates and Events Data Processing and I/O.

UNIT-V

Writing Software with Visual Basic .NET, Interfacing with the End User, Introduction to ASP.NET and C#. NET and their features.

REFERENCES:

1. Jeffrey R. Shapiro "The Complete Reference Visual Basic .NET" Tata Mcgraw Hill (2002 Edition).
2. Rox "Beginner and Professional Edition VB.NET" Tata Mcgraw Hill.
3. Steven Holzner "Visual Basic .NET Black Book" Wiley Dreamtech Publication.
4. Alex Homer, Dave Sussman "Professional ASP.NET1.1" Wiley Dreamtech.

LIST OF EXPERIMENTS:

1. Working with call backs and delegates in C#.
2. Code access security with C#.
3. Creating a Windows Service with C#.
4. Interacting with a Windows Service with C#.
5. Using Reflection in C#.
6. Perform String Manipulation with the String Builder and String Classes and C#.
7. Using the System .Net Web Client to Retrieve or Upload Data with C#.
8. Working with Page and forms using ASP .Net.
9. Data Sources access through ADO.Net.
10. Working with Data readers, Transactions.

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CSC- 603 – COMPUTER GRAPHICS

UNIT-I

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

UNIT-II

Output primitives: Points and lines, line drawing algorithms, Mid-point circle and ellipse algorithms, Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-III

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, Transformations between coordinate systems.

UNIT-IV

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-V

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, Basic illumination models, polygon rendering methods.

REFERENCES:

1. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.

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LIST OF EXPERIMENTS:

1. To implement Bresenham's algorithms for circle and ellipse drawing.
2. Program for Line Drawing using Bresenham"s algorithm using C and OpenGL.
3. To perform 2D Transformations such as translation, rotation, scaling, reflection and shearing.
4. To implement Cohen–Sutherland 2D clipping and window–viewport mapping.
5. To perform 3D Transformations such as translation, rotation and scaling.
6. To visualize projections of 3D images and Hidden Surface Elimination.
7. To convert between color models.
8. To implement text compression algorithm.
9. Program to implement basic graphics primitives in OpenGL.
10. Program for Line Drawing using DDA algorithm using C and OpenGL.

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CSC- 604(A) –SIMULATION & MODELING

UNIT-I

Introduction to Modeling and Simulation: Nature of Simulation Systems, Models and Simulation, Continuous and Discrete Systems, system modeling, concept of simulation, Components of a simulation study, Principles used in modeling, Static and Dynamic physical models, Static and Dynamic Mathematical models, Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.

UNIT-II

System Simulation and Continuous System Simulation: Types of System Simulation, Monte Carlo Method, Comparision of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model, Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages, Hybrid simulation, Real Time simulations.

UNIT –III

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT-IV

Simulation of Queueing Systems and Discrete System Simulation: Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue, Application of queuing theory in computer system, Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times.

UNIT-V

Introduction to Simulation languages and Analysis of Simulation output GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements, **SIMSCRIPT:** Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements, Estimation methods, Relication of Runs, Batch Means, Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes.

REFERENCES:

1. Gurden G., System simulation, Prentice Hall.
2. Seila, Simulation Modeling, Cengage Learning.
3. Law .,Simulation Modeling And Analysis, McGraw Hill.
4. Deo, System Simulation with Digital Computer, PHI.
5. Harrington, Simulation Modeling methods, McGraw Hill.
6. Severance, " System Modeling & Simulation, Willey Pub.

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CSC- 604(B) –EMBEDDED SYSTEM

UNIT-I

Introduction to Embedded System, Categories, Requirements, Applications, Challenges and Issues, Core of Embedded system, Memory, Sensors and Actuators, communication interface, Embedded firmware, System components.

UNIT-II

Fundamental issues of hardware software co-design, computational models in embedded design, data flow graph, control flow graph, state machine model, sequential programmed model, concurrent model, unified modeling language.

UNIT-III

Architecture of 8085 microcontroller, memory organization, registers, interrupts, addressing modes, instruction sets.

UNIT-IV

Embedded firmware design approaches-OS based, Super loop based,
Embedded firmware development languages, Assembly language based, high level language based, mixed. Programming in embedded C.

UNIT-V

Types of Operating system, Task, process and threads, Multi processing and multi task, Task scheduling, Task communication, Task synchronization.

REFERENCES:

1. Shibu K V, "Introduction to Embedded System", TMH.
2. David B Simon, "An Embedded Software Primer", Pearson education Asia, 2001.
3. Steven F. Barret, Daniel J. Pack, "Embedded Systems" Pearson education, First Impression 2008.
4. Vahid Frank, Tony Givargis, "Embedded System Design", John Wiley and Sons, Inc.
5. Raj Kamal "Embedded Systems", TMH.

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CSC- 604(C) PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT-I

Programming Language and its Implementation: Programming Language, Language categories, Language Evaluation Criteria, impacts on Language design, Programming Paradigms Imperative, Object Oriented programming Structure,' functional Programming, Logic Programming, Programming Language Implementation, Compilation process and Virtual Machines, programming environments.

UNIT-II

Data types and Statements: Overviews of Data type, category of data type, primitive and Non primitive data types, design and Implementation uses related to these types, Names, Variable, type checking, strong typing, type compatibility, named constants, variable initialization, control statement with Expressions, Conditional Statements, Loops, Exception handling.

UNIT-III

Subprograms and Blocks: Overviews of sub-programs, Lifetime and Scope of variable, static and dynamic scope, Design issues of subprograms, **parameter passing methods:** call by value, address and reference, overloaded sub-programs, Method Overriding, generic subprograms, co-routines.

UNIT-IV

Abstract Data types: Data abstraction, level of abstraction, Abstractions and encapsulation, abstract data type, Static and Stack-Based Storage management, heap based storage management, Garbage Collection, object oriented programming in small talk, C++, Java, C#, PHP, Perl, **Concurrency:** Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

UNIT-V

Exception handling: Error, Type of Error, Exceptions, Type of Exception, exception Propagation, Exception handler in C++ and Java, Try, catch and throw statement, multiple catch.

REFERENCES:

1. Sebesta, "Concepts of programming Language", Pearson Edu.
2. Louden, "Programming Languages: Principles & Practices", Cengage Learning.
3. Tucker, " Programming Languages: Principles and paradigms ", Tata McGraw –Hill.
4. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Edu.

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CSC- 605(A) INTERNET OF THINGS

UNIT-I

Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

UNIT-II

Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

UNIT-III

Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST. HTTP Restful and Web Sockets. Internet Connectivity Principles, Internet Connectivity, Internet based communication, IP addressing in IOT. Media Access control.

UNIT-IV

Sensor Technology, Participatory Sensing, Industrial IOT and Automotive IOT, Actuator, Sensor data Communication Protocols, Radio Frequency Identification Technology, Wireless Sensor Network Technology.

UNIT-V

IOT Design methodology: Specification requirement, process model, service, functional & operational view, IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies, smart city streetlights control & monitoring.

REFERENCES:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition ,Universal Press.
3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
4. Charless Bell "MySQL for the Internet of things", Apress publications.

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CSC- 605(B) E-COMMERCE & GOVERNANCE

UNIT-I

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal, environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

UNIT-II

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money. Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

UNIT-III

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

UNIT-IV

E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, **Case studies:** NICNET-role of nationwide networking in e-governance, e-seva.

UNIT-V

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

REFERENCES:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governance: concepts and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.

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SSSUTMS Sehore (M.P.)

CSC- 605(C) UNIX & SHELL PROGRAMMING

UNIT–I

General Overview of the System: System structure, user perspective, O/S services assumption about Hardware,The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache.

UNIT–II

Internal Representation of Files: Inodes, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks, Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES mounting and unmounting files system, Link Unlink.

UNIT–III

Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination, The user Id of a process, changing the size of a process, Killing process with signals, job control, **Scheduling commands:** AT and BATCH,TIME,CORN,

UNIT-IV

Introduction to shell scripts: shell Bourne shell, C shell, Unix commands, permissions, editors, grep family, shell variables, scripts, metacharacters and environment, if and case statements, for while and until loops, Shell programming.

UNIT-V

Introduction of Awk and perl Programming: Awk pattern scanning, BEGIN and END patterns, Awk arithmetic and variables, and operators, functions, perl, the chop() function, variable and operators, **Networking tools:** Resolving IP addressing, TELNET, FTP, Socket programming, introduction of Linux structure.

REFERENCES:

1. M.J. Bach "Design of UNIX O.S. ", PHI Learning.
2. Y.Kanetkar "Unix shell programming", BPB Pub.
3. B.W. Kernighan & R. Pike, "The UNIX Programming Environment", PHI Learning.
4. S.Prata "Advanced UNIX: A Programming's Guide", BPB Publications, New Delhi.

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S.S.S.U.T.M.S. * SEHORE (M.P.)

CSC- 606(A) CYBER CRIME & INFORMATION WARFARE

UNIT-I

Introduction of Cyber Crime, Challenges of cyber crime, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Internet Time Theft, Salami attack/Salami Technique.

UNIT-II

Web jacking, Online Frauds, Software Piracy, Computer Network Intrusions, Password Sniffing, Identity Theft, cyber terrorism, Virtual Crime, Perception of cyber criminals: hackers, insurgents and extremist group etc. Web servers were hacking, session hijacking.

UNIT-III

Cyber Crime and Criminal justice: Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cheating, Defamation, Harassment and E-mail Abuse, Other IT Act Offences, Monetary Penalties, jurisdiction and Cyber Crimes, Nature of Criminality, Strategies to tackle Cyber Crime and Trends.

UNIT-IV

The Indian Evidence Act of 1872 v, Information Technology Act 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records, Relevancy, Admissibility and Probative Value of EEvidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

UNIT-V

Tools and Methods in Cybercrime: Proxy Servers and Anonymizers, Password Cracking, Key loggers and Spywares, virus and worms, Trojan Horses, Backdoors, DoS and DDoS Attacks, Buffer and Overflow, Attack on Wireless Networks, Phishing: Method of Phishing, Phishing Techniques.

REFERENCES:

1. Principles of Cyber crime, Jonathan Clough Cambridge University Press.

2. John R. Vacca, Computer Forensics:Computer Crime Scene Investigation, 2nd Edition, Charles River Media, 2005.

3. Cyber Law Simplified, VivekSood, Pub: TMH.

4. Cyber Security by Nina Godbole, SunitBelapure Pub: Wiley-India.

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Scientific Engineering
SEHORE (M.P.)

CSC- 606(B) DISTRIBUTED SYSTEM

UNIT-I

Introduction to distributed systems Architecture: for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System.

UNIT-II

Distributed Share Memory And Distributed File System: Basic Concepts of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues in DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing, Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance, **Naming:** Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

UNIT-III

Inter Process Communication And Synchronization API for Internet Protocol: Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages, **Synchronization:** Clock Synchronization, Mutual Exclusion, **Election Algorithms:** Bully & Ring Algorithms.

UNIT-IV

Distributed Scheduling And Deadlock Distributed Scheduling: Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues, Deadlock-Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms.

UNIT-V

Distributed Multimedia & Database system: Distributed Data Base Management System(DDBMS), Types of Distributed Database, **Distributed Multimedia:** Characteristics of multimedia Data, Quality of Service Managements.

REFERENCES:

1. Sinha, Distributed Operating System Concept & Design, PHI.
2. Coulouris & Dollimore, Distributed System Concepts and Design, Pearson Pub.
3. Singhal & Shivratari, Advance Concept in Operating System, McGraw Hill.
4. Attiya & Welch, Distributed Computing, Wiley Pub.

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CSC- 604(C) STATISTICAL METHOD

UNIT-I

Interpolation: Forward, Backward, central (Striplings) and divided difference formulas, **Ingrangie's** interpolation, **Inverse** interpolation for equal and **unequal** intervals, **Numerical Integration:** Newton Cote's formula, Simpson's 1/3rd and 3/8th rule, Gauss Legendre (two and three points) integration formula.

UNIT –II

Introduction of operation research, LP Formulations, Graphical method for solving LP's with 2 variables, Simplex method, Duality, Transportation problem.

UNIT-III

Numerical Solutions of Ordinary Different Equations: Linear Second– order Equations with variable coefficients, Correlation and Regression, Curve Fitting, Numerical solution by Runge Kutta Method, Its application to higher order equations.

UNIT-IV

Second Order linear differential equation with variable coefficients: Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method.

UNIT-V

Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff, equation of nth order with constant coefficients, Separation of variable method for the solution of wave and heat equations.

REFERENCES:

1. Iyengyr M.K. Jain & R.K. Jain "Numerical Methods for scientific and engineering computation", Wiley Eastern (New Age), 1995.
2. E.V. Krishnamurthy & S.K. Sen "Computer Based Numerical Algorithms".
3. Miller & Freund's "Probability and Statistics for Engineers".
4. Dr. D.K. Jain Engineering Mathematics volume III & II.

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S.S.S.U.T.M.S. School of Engineering SEHORE (M.P.)

Sri Satya Sai
University of Technology and Medical Sciences
(Established under Govt. of M.P. Registered under UGC 2(F) 1956)

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Name of Faculty: **School of Engineering**

Name of Department: Computer Science and Engineering

Minutes of Board of Studies Committee Meeting Dated on 04.06.2019

The Board of Studies Committee Meeting was held in the room of Department of Computer Science Engineering at 2:30 PM. on 04.06.2019, Following members were present.

1. Dr. Tryambak Hiwarkar Prof,(Computer Science and Engineering), Chairman
2. Mr. Arif Hakeem Asst. Prof,(Computer Science and Engineering), Member
3. Dr. Anil Kumar Prof. ,(Computer Science and Engineering), Member
4. Mr. Gajendra Singh, Asst. Prof. ,(Information & Technology), Member
5. Mr. Narendra Sharma, Asst. Prof. ,(Information & Technology), Member
6. Mr. Harsh Pratap Asst. Prof. ,(Information & Technology), Member
7. Mr Kailash Patidar Asst. Prof. ,(Computer Science and Engineering), Member
8. Mr. Manoj Yadav Asst. Prof. ,(Computer Science and Engineering), Member
9. Mr. Harsh Lohiya Asst. Prof. ,(Computer Science and Engineering), Member
10. Ms. .Naina Solanki Asst. Prof. ,(Computer Science and Engineering), Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

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Agenda Preparation of syllabus as per CBCS Scheme for VIIth and VIIIth Sem.

Discussion Scheme

Scheme and syllabus was put before the members as per AICTE guidelines and CBCS Scheme which also met the current demand in Industry, it was discussed in detail by the members and some modifications were suggested.

Resolution of the Discussion

It was resolved that scheme and syllabus for VIIth and VIIIth Sem following AICTE guidelines and CBCS Scheme which also met the current demand in Industry should be modified and may be accepted.

Signature of All members (Including Chairman)

1. Dr. Tryambak Hiwarkar Prof.,(Computer Science and Engineering), Chairman
2. Mr. Arif Hakeem Asst. Prof.,(Computer Science and Engineering), Member
3. Dr. Anil Kumar Prof. ,(Computer Science and Engineering), Member
4. Mr. Gajendra Singh, Asst. Prof. ,(Information & Technology), Member
5. Mr. Narendra Sharma, Asst. Prof. ,(Information & Technology), Member
6. Mr. Harsh Pratap Asst. Prof. ,(Information & Technology), Member
7. Mr Kailash Patidar Asst. Prof. ,(Computer Science and Engineering), Member
8. Mr. Manoj Yadav Asst. Prof. ,(Computer Science and Engineering), Member
9. Mr. Harsh Lohiya Asst. Prof. ,(Computer Science and Engineering), Member
10. Ms. .Naina Solanki Asst. Prof. ,(Computer Science and Engineering), Member

Chairman

Board of Studies

SSSUTMS SEHORE (M.P.)

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Scheme of Examination - CBCS Pattern

Academic Year 2019-2020

Computer Science and Engineering (VII Semester/ IV Year)

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Periods/ Hour/ Week			Credits	Total Marks
			End Sem. Exam.	Mid Tests	Assign-ments /Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation	L	T	P		
1	CSC-701	Automata & Compiler Design	60	30	10	30	20	2	1	2	4	150
2	CSC-702	Cloud Computing	60	30	10	30	20	2	1	2	4	150
3	CSC-703	Object Oriented Analysis And Design	60	30	10	30	20	2	1	2	4	150
4	CSC-704	Department Elective-V	60	30	10	-	-	2	1	-	3	100
5	CSC-705	Department Elective-VI	60	30	10	-	-	2	1	-	3	100
6	CSC-706	Open Elective	60	30	10	-	-	2	1	-	3	100
7	CSC-707	Industrial Training - II	-	-	-	-	100	-	-	4	2	100
TOTAL			360	180	60	90	160	12	6	10	23	850

Department Elective-V	CSC-704(A) Software Testing	CSC-704(B) Quantum computing	CSC-704(C) Wireless Sensor Network
Department Elective-VI	CSC-705(A) Natural Language Processing	CSC-705(B) Computer Vision	CSC-705(C) Web Search & Mining
Open Elective	CSC-706(A) Graph Theory And Applications	CSC-706(B) Wireless Network	CSC-706(C) Ethical Hacking

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Scheme of Examination - CBCS Pattern

Academic Year 2019-2020

Computer Science and Engineering (VIII Semester/ IV Year)

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Periods/ Hour/ Week			Credits	Total Marks
			End Sem. Exam.	Mid Tests	Assign-ments /Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation	L	T	P		
1	CSC-801	Soft Computing	60	30	10	30	20	2	1	2	4	150
2	CSC-802	Web Engineering	60	30	10	30	20	2	1	2	4	150
4	CSC-803	Department Elective-VII	60	30	10	-	-	2	1	-	3	100
5	CSC-804	Department Elective-VIII	60	30	10	-	-	2	1	-	3	100
6	CSC-805	Open Elective	60	30	10	-	-	2	1	-	3	100
7	CSC-806	Industrial Training Project - II	-	-	-	50	100	-		8	4	150
8	CSC-807	General Proficiency	-	-	-	-	100	-	2	-	2	100
TOTAL			300	150	50	110	240	10	7	12	23	850

Department Elective-VI	CSC-803(A) Mobile computing	CSC-803(B) Pattern Recognition	CSC-803(C) Android Technology
Department Elective-VIII	CSC-804(A) Big Data Analytics	CSC-804(B) Optical Fiber Communicatio	CSC-804(C)Data Mining & Warehousing
Open Elective	CSC-805(A)Network and Web Security	CSC-805(B) Optimization Techniques	CSC-805(C) Biometrics

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CSC – 701 AUTOMATA & COMPILER DESIGN

UNIT – I

Introduction: Alphabets, Strings and Languages, Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.

UNIT – II

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Implementation of Lexical Analyzer. The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG. Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers.

UNIT – III

Bottom–Up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC, Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

UNIT – IV

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

UNIT – V

Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

REFERENCE BOOKS:

1. Principles of compiler design -A.V. Aho , J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
3. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
4. Raghavan, Compiler Design, TMH Pub.

LIST OF EXPERIMENTS

1. Write a program to convert regular expression into NFA
2. Write a program to find first in CFG.
3. Write a program to find string is keyword or not.
4. Write a program to find string is identifier or not.
5. Write a program to find string is constant or not.
6. An ALGO to convert NFA to DFA.
7. Write a program to generate tokens for the given grammar
8. An ALGO for minimizing of DFA
9. Write a program to check string is in grammar or not
10. Write a program to calculate leading for all non-terminals

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CSC - 702-CLOUD COMPUTING

UNIT-I

Introduction, Cloud computing history, Cloud architecture, Characteristics of cloud computing as per NIST, Cloud services requirements, System Models for Distributed and Cloud Computing, NIST Cloud Computing Reference Architecture, Applications, ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis, Satellite Image Processing, CRM and ERP, Social networking.

UNIT-II

Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources, Cloud services (Iaas, Paas & Saas).

UNIT-III

Basics of Virtualization, Types of Virtualization, Implementation Levels of Virtualization, Virtualization Structures, Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices, Virtual Clusters and Resource management, Virtualization for Data-center Automation, Virtual LAN (VLAN) and Virtual SAN (VSAN) and their benefits.

UNIT-IV

Cloud Security:- Security Overview Infrastructure security, Data security and storage, Network security – I , Network security – II, Host security, Disaster recovery and management, Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

UNIT-V

Cloud Solutions: - Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management Third Party Cloud Services, Market Based Management of Clouds. Case study: - Amazon cloud services, Amazon EC2, Amazon S3, Google cloud services, Google Map reduce, GFS, Sales Force, Windows Azure- EMC cloud services, IBM cloud services, Apache Hadoop.

REFERENCE BOOKS:

1. Kenneth Hess, Amy New Man – Practical Virtualization Solutions – Prentice Hall, 2010
2. Shahed Latif, Tim Mather, Subra Kumara swamy – Cloud Security and Privacy: An Enterprise perspective on risks and compliance – O'Reilly Media Inc., 2009
3. Gautam Shroff – Enterprise Cloud Computing: Technology, Architecture, Applications – Cambridge Press, 2010

LIST OF EXPERIMENTS

1. Creating and working with a new document in Google docs.
2. Preparing a presentation of ten slides on using Google docs.
3. Setting up service for running hadoop daemons on windows 7
4. Create and Deploy a Cloud Service
5. Study of Eucalyptus
6. Installation of Eucalyptus Cloud
7. Study of Cloudsim.
8. CloudSim setup and installation
9. Working and installation of Google App Engine
10. Working in Cloud9 to demonstrate different language

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CSC-703 OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT- I Introduction to OOAD

Introduction to OOAD – Unified Process - UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

UNIT II DESIGN PATTERNS

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller – Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioural – Strategy – observer.

UNIT III CASE STUDY

Case study – the Next Gen POS system, Inception -Use case Modeling – Relating Use cases – include, extend and generalization – Elaboration – Domain Models – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition.

UNIT IV APPLYING DESIGN PATTERNS

System sequence diagrams – Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams – UML interaction diagrams – Applying GoF design patterns.

UNIT V CODING AND TESTING

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

TEXT BOOK:

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

REFERENCES:

1. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
2. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.
3. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language"

LIST OF EXPERIMENTS

1. Study and implementation of Infrastructure as a Service. Study of Cloud Computing & Architecture.
2. Installation and Configuration of virtualization using KVM.
3. Study and implementation of Infrastructure as a Service
4. Study and implementation of Storage as a Service
5. Study and implementation of identity management.
6. Study Cloud Security management
7. Write a program for web feed.
8. Study and implementation of Single-Sing-On.

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CSC-704A - SOFTWARE TESTING

UNIT 1:
Introduction to Software Testing:-Definition of Software Testing, Need for software Testing, various approaches to Software Testing, defect distribution, Software Testing Fundamentals, General characteristics of testing, seven principles of testing, Software testing strategies Testing strategies in software testing, basic concept of verification and validation, criteria for completion of testing and debugging process.

UNIT 2:
Software development life cycle and testing:-Water fall model, V-model, Spiral model, agile model, Life cycle testing concepts, testing methods, testing levels. Static Testing and dynamic testing Static Testing, static analysis tools, dynamic testing, White box testing, block box testing, Regression testing, dynamic testing tools.

UNIT 3:
Static Testing and dynamic testing:-Static Testing, static analysis tools, dynamic testing, White box testing, block box testing, Regression testing, dynamic testing tools. Functional testing:-Functional testing concepts, Equivalence class partitioning, Boundary value analysis, Decision tables, Random testing, Error guessing.

UNIT 4:
Functional testing"-Functional testing concepts, Equivalence class partitioning, Boundary value analysis, Decision tables, Random testing, Error guessing.Test management-Test planning, cost-benefit analysis of testing, Test organization, Test strategies, Test progress monitoring and control- test reporting, test control, Specialized testing.

UNIT 5:
Testing tools:-Test automation approach, Testing frame work, types of testing tools, Object-Oriented testing Object-Oriented testing challenges, Unit testing for Object-Oriented programming, Integration testing (top-down, bottom-up), cluster testing.

REFERRENCE

1. Glenford J. Myers, Corey Sandler, Tom Badgett," The Art of Software Testing, 3rd Edition"
2. Ron Patton," Software Testing, 2nd Edition, 2005"
3. Paul C. Jorgensen" Software Testing: A Craftsman's Approach, Fourth Edition"
4. James Whittaker," How to Break Software: A Practical Guide to Testing"

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CSE 704B - QUANTUM COMPUTING

UNIT-I

Introducing quantum mechanics. Quantum kinematics, quantum dynamics, quantum measurements. Single qubit, multi qubits, gates. Density operators, pure and mixed states, quantum operations, environmental effect, decoherence. Quantum no-cloning, quantum teleportation.

UNIT-II

Quantum Cryptography: Cryptography, classical cryptography, introduction to quantum cryptography. BB84, B92 protocols. Introduction to security proofs for these protocols.

UNIT-III

Quantum Algorithm: Introduction to quantum algorithms. Deutsch-Jozsa algorithm, Grover's quantum search algorithm, Simon's algorithm, Shor's quantum factorization algorithm. Error Correction: Errors and correction for errors. Simple examples of error correcting codes in classical computation. Linear codes. Quantum error correction and simple examples. Shor code.

UNIT-IV

Quantum Entanglement: Quantum correlations, Bell's inequalities, EPR paradox. Theory of quantum entanglement. Entanglement of pure bipartite states. Entanglement of mixed states. Peres partial transpose criterion. NPT and PPT states, bound entanglement, entanglement witnesses.

UNIT-V

Implementations: Different implementations of quantum computers. NMR and ensemble quantum computing, Ion trap implementations. Optical implementations.

TEXT BOOK:

1. Quantum Computation and Quantum Information by Michael Nielsen and Isaac Chuang
2. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge University Press. 2002
3. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. I: Basic Concepts, Vol II: Basic Tools and Special Topics, World Scientific. 2004
4. Pittenger A. O., An Introduction to Quantum Computing Algorithms 2000

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CSC-704C WIRELESS SENSOR NETWORK

UNIT-I

Characteristics Of WSN: Characteristic requirements for WSN - Challenges for WSNs – WSN vs Adhoc Networks - Sensor node architecture – Commercially available sensor nodes –Imote, IRIS, Mica Mote, EYES nodes, BTnodes, TelosB, Sunspot -Physical layer and transceiver design considerations in WSNs, Energy usage profile, Choice of modulation scheme, Dynamic modulation scaling, Antenna considerations.

UNIT-II

Medium Access Control Protocols: Fundamentals of MAC protocols - Low duty cycle protocols and wakeup concepts - Contentionbased protocols - Schedule-based protocols - SMAC - BMAC - Traffic-adaptive medium access protocol (TRAMA) - The IEEE 802.15.4 MAC protocol.

UNIT-III

Routing And Data Gathering Protocols Routing Challenges and Design Issues in Wireless Sensor Networks, Flooding and gossiping – Data centric Routing – SPIN – Directed Diffusion – Energy aware routing - Gradient-based routing - Rumor Routing – COUGAR – ACQUIRE – Hierarchical Routing - LEACH, PEGASIS – Location Based Routing – GF, GAF, GEAR, GPSR – Real Time routing Protocols – TEEN, APTEEN, SPEED, RAP - Data aggregation - data aggregation operations - Aggregate Queries in Sensor Networks - Aggregation Techniques – TAG, Tiny DB.

UNIT-IV

Embedded Operating Systems: Operating Systems for Wireless Sensor Networks – Introduction - Operating System Design Issues - Examples of Operating Systems – TinyOS – Mate – MagnetOS – MANTIS - OSPM - EYES OS – SenOS – EMERALDS – PicOS – Introduction to Tiny OS - NesC – Interfaces and Modules- Configurations and Wiring - Generic Components -Programming in Tiny OS using NesC, Emulator TOSSIM.

UNIT-V

Applications Of WSN: WSN Applications - Home Control - Building Automation - Industrial Automation - Medical Applications - Reconfigurable Sensor Networks - Highway Monitoring - Military Applications - Civil and Environmental Engineering Applications - Wildfire Instrumentation - Habitat Monitoring - Nanoscopic Sensor Applications – Case Study: IEEE 802.15.4 LR-WPANs Standard - Target detection and tracking - Contour/edge detection - Field sampling.

TEXT BOOKS

1. I.Kazem Sohraby, Daniel Minoli and Taieb Znati, " Wireless Sensor Networks Technology, Protocols, and Applications", John Wiley & Sons, 2007.
2. Holger Karl and Andreas Willig, "Protocols and Architecrures for Wireless Sensor Networks", John Wiley & Sons, Ltd, 2005.

REFERENCE BOOKS

1. .K. Akkaya and M. Younis, "A survey of routing protocols in wireless sensor networks", Elsevier Ad Hoc Network Journal, Vol. 3, no. 3, pp. 325–349
2. Philip Levis, " TinyOS Programming" 3.Anna Ha'c, "Wireless Sensor Network Designs", John Wiley & Sons Ltd.

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CSC-705A NATURAL LANGUAGE PROCESSING

UNIT-I

Introduction- Human languages, models, ambiguity, processing paradigms; Phases in natural language processing, applications. Text representation in computers, encoding schemes. Linguistics resources- Introduction to corpus, elements in balanced corpus, Tree Bank, PropBank, Word Net, Verb Net etc. Resource management with XML,

UNIT-II

Management of linguistic data with the help of GATE, NLTK. Regular expressions, Finite State Automata, word recognition, lexicon. Morphology, acquisition models, Finite State Transducer. N-grams, smoothing, entropy, HMM, ME, SVM, CRF. Part of Speech tagging- Stochastic POS tagging, HMM, Transformation based tagging (TBL)

UNIT-III

Handling of unknown words, named entities, multi word expressions. A survey on natural language grammars, lexeme, phonemes, phrases and idioms, word order, agreement, tense, aspect and mood and agreement, Context Free Grammar, spoken language syntax.

UNIT-IV

Parsing- Unification, probabilistic parsing, Tre eBank. Semantics- Meaning representation, semantic analysis, lexical semantics, WordNet Word Sense Disambiguation- Selectional restriction, machine learning approaches, and dictionary based approaches.

UNIT-V

Discourse- Reference resolution, constraints on co-reference, algorithm for pronoun resolution, text coherence, discourse structure. Applications of NLP- Spell-checking, Summarization Information Retrieval- Vector space model, term weighting, homonymy, polysemy, synonymy, improving user queries. Machine Translation– Overview.

TEXTBOOK:

1. Daniel Jurafsky and James H Martin. Speech and Language Processing, 2e, Pearson Education, 2009 Reference Books: 1. James A.. Natural language Understanding 2e, Pearson Education, 1994
2. Bharati A., Sangal R., Chaitanya V.. Natural language processing: a Paninian perspective, PHI, 2000 3. Siddiq

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CSC-705B : COMPUTER VISION

UNIT-I

Digital Image Formation and low-level processing: Overview and State-of-the-art, Fundamentals of Image Formation, Transformation: Orthogonal, Euclidean, Affine, Projective, etc; Fourier Transform, Convolution and Filtering, Image Enhancement, Restoration, Histogram Processing.

UNIT-II

Depth estimation and Multi-camera views: Perspective, Binocular Stereopsis: Camera and Epipolar Geometry; Homography, Rectification, DLT, RANSAC, 3-D reconstruction framework; Auto-calibration.

UNIT-III

Feature Extraction: Edges - Canny, LOG, DOG; Line detectors (Hough Transform), Corners - Harris and Hessian Affine, Orientation Histogram, SIFT, SURF, HOG, GLOH, ScaleSpace Analysis- Image Pyramids and Gaussian derivative filters, Gabor Filters and DWT.

UNIT-IV

Image Segmentation: Region Growing, Edge Based approaches to segmentation, Graph-Cut, Mean-Shift, MRFs, Texture Segmentation; Object detection. Motion Analysis: Background Subtraction and Modeling, Optical Flow, KLT, Spatio-Temporal Analysis, Dynamic Stereo; Motion parameter estimation.Pattern Analysis: Basics of Probability and Statistics, Clustering: K-Means, K-Medoids, Mixture of Gaussians, Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised; Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA; Non-parametric methods.

UNIT-V

Shape from X: Light at Surfaces; Phong Model; Reflectance Map; Albedo estimation, Photometric Stereo; Use of Surface Smoothness Constraint; Shape from Texture, color, motion and edges.

TEXT BOOKS

1. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer-Verlag London Limited 2011.
2. Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, 2003.

REFERENCES

1. Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press, March 2004.
2. K. Fukunaga; Introduction to Statistical Pattern Recognition, Second Edition, Academic Press, Morgan Kaufmann, 1990.
3. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Addison- Wesley, 1992.

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CSC-705C WEB SEARCH AND MINING

UNIT-I

Document clustering, classification, routing, and recommendation systems. Machine learning methods.

UNIT-II

Information extraction methods: terminologies and ontology acquisition, named entity recognition, co reference resolution

UNIT-III

Web Wrappers and Web Agents. Natural language processing techniques; summarization

UNIT-IV

Cross-lingual retrieval, event tracking, question answering and text mining. Biomedical text: special constraints

UNIT-V

Knowledge discovery, improved performance from integrating textual information.

TEXTBOOKS:

1. Soumen Chakrabarti. 2003. Mining the Web: Discovering Knowledge from Hypertext Data. Amsterdam: Morgan Kaufmann.
2. Christopher Manning and Hinrich Schütze. 1999. Foundations of Statistical Natural Language Processing. Cambridge, MA: MIT Press.
3. Tom Mitchell. 1997. Machine Learning. McGraw Hill.
4. Ian Witten and Eibe Frank. 2000. Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations. San Francisco, CA: Morgan Kaufmann.

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CS706 A GRAPH THEORY AND APPLICATIONS

UNIT I INTRODUCTION

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits –Connectedness – Components – Euler graphs – Hamiltonian paths and circuits – Trees – Properties of trees – Distance and centres in tree – Rooted and binary trees.

UNIT II TREES. CONNECTIVITY & PLANARITY

Spanning trees – Fundamental circuits – Spanning trees in a weighted graph – cut sets – Properties of cut set – All cut sets – Fundamental circuits and cut sets – Connectivity and separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and geometric graphs – Planer graphs – Different representation of a planer graph.

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH

Chromatic number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four color problem – Directed graphs – Types of directed graphs – Digraphs and binary relations – Directed paths and connectedness – Euler graphs.

UNIT IV PERMUTATIONS & COMBINATIONS

Fundamental principles of counting – Permutations and combinations – Binomial theorem – combinations with repetition – Combinatorial numbers – Principle of inclusion and exclusion – Derangement – Arrangements with forbidden positions.

UNIT-V.GENERATING FUNCTIONS

Generating functions – Partitions of integers – Exponential generating function – Summation operator – Recurrence relations – First order and second order – Non-homogeneous recurrence relations – Method of generating functions.

TEXT BOOKS:

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.
2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.

REFERENCES:

1. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
2. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians" , Prentice Hall of India, 1996.
3. Liu C.L., "Elements of Discrete Mathematics", Mc Graw Hill, 1985.
4. Rosen K.H., "Discrete Mathematics and Its Applications", Mc Graw Hill, 2007.

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CSC-706B WIRELESS NETWORK

UNIT – I

Introduction of Wireless Networks, wireless network architectures, Different Generations of Wireless Networks, Characteristics of the Wireless Medium: Radio Propagation Mechanisms, Path Loss Modeling and Signal Coverage, Effect of Multipath and Doppler, Channel Measurement and Modeling Techniques, Narrowband digital modulation and Coding under wireless fading environments.

UNIT – II

Introduction WLAN technologies: Infrared, UHF narrowband, spread spectrum IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM,BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security IEEE802.16WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX.

UNIT – III

Network Planning: Introduction, Wireless Network Topologies, Cellular Topology, Cell Fundamentals, Signal to Interferences Radio Calculations, Network Planning for CDMA Systems. Wireless Network Operations: Mobility Management, Radio Resources and Power Management.

UNIT – IV

Introduction Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6 Network layer in the internet Mobile IP session initiation protocol mobile adhoc network: Routing, Destination Sequence distance vector, Dynamic source routing. MOBILE TRANSPORT LAYER TCP enhancements for wireless protocols Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP TCP over 3G wireless networks.

UNIT – V

IEEE 802.15 WPAN, Home RF, Bluetooth, Interference between Bluetooth and 802.11, Adhoc Networks, Introduction to 2.5G and 3G Networks. Overview of UTMS Terrestrial Radio access network UMTS Core network Architecture: 3GMSC, 3GSGSN, 3GGGSN, SMSGMSC/ SMSIWMSC, Firewall, DNS/DHCP High speed Downlink packet access (HSDPA) LTE network architecture and protocol. 4G NETWORKS Introduction – 4G vision – 4G features and challenges Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDMMIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.
3. Simon Haykin, Michael Moher, David Koilpillai, "Modern Wireless Communications", First
4. Edition, Pearson Education 2013

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CSC-706C ETHICAL HECKING

UNIT-I

Introduction to Ethical Disclosure: Ethics of Ethical Hacking, Ethical Hacking and the legal system, Proper and Ethical Disclosure

UNIT-II

Penetration Testing and Tools: Using Metasploit, Using BackTrackLiveCD Linux Distribution.

UNIT-III

Exploits: Programming Survival Skills, Basic Linux Exploits, Advanced Linux Exploits, Shell code Strategies, Writing Linux Shell code, Basic windows Exploits

UNIT-IV

Vulnerability Analysis: Passive Analysis, Advanced Static Analysis with IDA Pro, Advanced Reverse Engineering, Client-side browser exploits, Exploiting Windows Access Control Model for Local Elevation Privilege, Intelligent Fuzzing with Sulley. From Vulnerability to Exploit

UNIT-V

Malware Analysis: Collecting Malware and Initial Analysis, Hacking Malare.

REFERENCES:

1. Shon Harris, Allen Harper, Chris Eagle and Jonathan Ness, Gray Hat Hacking: The Ethical Hackers' Handbook, TMH Edition
2. Jon Erickson, Hacking: The Art of Exploitation, SPD

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CSC – 707 Industrial Training - II

Students must observe following points to enrich their learning in electrical engineering during industrial training:

- The training must be the advance/ different already done on minor training.
-Industrial environment and work culture.
- Organizational structure and inter personal communication.
- Machines/ equipment/ instruments - their working and specifications.
- Product development procedures and phases.
- Project planning, monitoring and control.
- Quality control and assurance.
- Maintenance system.
- Costing system.
- Stores and purchase systems.
- Roles and responsibilities of different categories of personnel.
- Customer services.
-Problems related to various areas of Work etc.
- Layout if any

To be submitted : The students has to submit the power point presentation of minimum15 slides of the training performed (comprising of points stated above) along with the original certificate of training performed with proper seal and signature of the authorized person.

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CSC-801
SOFT COMPUTING

UNIT-I

Soft Computing:- Introduction of soft computing, soft computing vs hard computing, various types of soft computing techniques, applications of soft computing.

Introduction to Neural Network:- Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervise & Unsupervised) and activation function, Models of ANN-Feed forward network and feedback network, Learning Rules Hebbian, Delta, Perceptron Learning and Windrow-Hoff, winner take all.

UNIT – II

Supervised Learning:- Perceptron learning.- Single layer/multilayer, linear Separability, Adaline, Madaline, Back propagation network, RBFN. Application of Neural network in forecasting, data compression and image compression.

UNIT – III

Unsupervised learning:- Kohonen SOM (Theory, Architecture, Flow Chart, Training Algorithm) Counter Propagation (Theory, Full Counter Propagation NET and Forward only counter propagation net), ART (Theory, ART1, ART2), Application of Neural networks in pattern and face recognition, intrusion detection, robotic vision.

UNIT – IV

Fuzzy Set:- Basic Definition and Terminology, Set-theoretic Operations, Member Function, Formulation and Parameterization, Fuzzy rules and fuzzy Reasoning, Extension Principal and Fuzzy Relations, Fuzzy if-then Rules, Fuzzy Inference Systems. Hybrid system including neuro fuzzy hybrid, neuro genetic hybrid and fuzzy genetic hybrid, fuzzy logic controlled GA. Application of Fuzzy logic in solving engineering problems.

UNIT – V

Genetic Algorithm:- Introduction to GA, Simple Genetic Algorithm, terminology and operators of GA (individual, gene, fitness, population, data structure, encoding, selection, crossover, mutation, convergence criteria). Reasons for working of GA and Schema theorem, GA optimization problems including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Network design routing, timetabling problem. GA implementation using MATLAB.

REFERENCES:-

1. S.N. Shivnandam, "Principle of soft computing", Wiley
2. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
3. Klir & Yuan, Fuzzy sets & Fuzzy Logic: Theory & Appli., PHI Pub.
4. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.

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LIST OF EXPERIMENTS

1. Form a Perceptron Net for basic gates with binary input and output
2. Using ADALINE Net, generate XOR function with bipolar inputs and targets
3. To Study the ADALINE NET and their training algorithm
4. To study the MADALINE NET and their training algorithm
5. Learn pattern, target output, learning rate and activation function
6. To implement AND function using Mc-Culloch Pitts neuron model
7. Design fuzzy inference system for a given problem
8. Implement Travelling salesman problem using Genetic algorithm
9. To study the training algorithm of ART

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CSC 802
WEB ENGINEERING

UNIT-1

Web Engineering: Introduction, History, Evolution and Need, Time line, Motivation, Categories & Characteristics of Web Applications, Web Engineering Models, Software Engineering v/s Web Engineering. World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP. Browser and search engines: Introduction, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines. Web Servers: Introduction, Features, caching, case study-IIS, Apache.

UNIT- 2

Information Architecture: Role, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets Website Design: Development, Development phases, Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems, Good & bad web design, Process of Web Publishing. Web-site enhancement, submission of website to search engines. Web security: issues, security audit. Web effort estimation, Productivity Measurement, Quality usability and reliability. Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, ,Noutions Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application.

UNIT- 3

Technologies for Web Applications I: HTML and DHTML: Introduction, Structure of documents, Elements, Linking, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, CSS, Positioning with Style sheets, Forms Control, Form Elements. Introduction to CGI, PERL, JAVA SCRIPT, JSP, PHP, ASP & AJAX. Cookies: Creating and Reading

UNIT-4

Technologies for Web Applications II: XML: Introduction, HTML Vs XML, Validation of documents, DTD, Ways to use, XML for data files, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology.

UNIT- 5

E- Commerce: Business Models, Infrastructure, Creating an E-commerce Web Site, Environment and Opportunities, Modes & Approaches, Marketing & Advertising Concepts. Electronic Publishing issues, approaches, legalities and technologies, Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act. Electronic Cash, Electronic Payment Systems: RTGS, NEFT, Internet Banking, Credit/Debit Card. Security: Digital Certificates & Signatures, SSL, SET, 3D Secure Protocol.

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Recommended Books:

1. Roger S.Pressman. David Lowe, "Web Engineering", Tata Mc Graw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P , Akilandeswari, "Web Technology: A Developer s Perspective" , PHI
4. Neil Gray, "Web server Programming" Wiley
5. Chris Bares, "Web Programming: Building Internet applications" Wiley
6. Moller, "An Introduction to XML and Web Technologies", Pearson Education New Delhi, 2009
7. "Web Technologies: Black Book", Kogent, Dreamtech
8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9. C. Xavier, "Web Technology & Design ", Tata McGraw Hill.
10. Ivan Bay Ross, "HTML,DHTML,Java script,Perl CGI" , BPB

LIST OF EXPERIMENTS

1. Program to show HTML Page Structure.
2. Program to show the Impact of HTML Headings.
3. Program to show the id attribute in HTM page.
4. Program to show The HTML <style> Element
5. Create The IT Department website home page for various tags.
6. Program to Make a hyperlink of an image IN HTML.
7. Program to implement table in HTML.
8. Program for HTML Document, which provides a form that collects names and phone numbers.
9. JavaScript program to show factorial of a number.
10. Design a Home Page for IT Department OIST using various HTML Tags.

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CSC 803 A
MOBILE COMPUTING

UNIT I INTRODUCTION

Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA

UNIT II MOBILE TELECOMMUNICATION SYSTEM

Introduction to Cellular Systems – GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS- UMTS – Architecture – Handover – Security

UNIT III MOBILE NETWORK LAYER

Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security.

UNIT IV MOBILE TRANSPORT AND APPLICATION LAYER

Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture – WML

UNIT V MOBILE PLATFORMS AND APPLICATIONS

Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues

TEXT BOOKS:

1. Jochen Schiller, —Mobile Communicationsl, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile Computingl, PHI Learning Pvt.Ltd, New Delhi – 2012

REFERENCES

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems",Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklous and Thomas Stober, —Principles of Mobile Computingl, Springer, 2003.
3. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systemsl, Second Edition,TataMcGraw Hill Edition ,2006.
4. C.K.Toh, —AdHoc Mobile Wireless Networksl, First Edition, Pearson Education, 2002.
5. Android Developers : http://developer.android.com/index.html
6. Apple Developer : https://developer.apple.com/
7. Windows Phone DevCenter : http://developer.windowsphone.com
8. BlackBerry Developer : http://developer.blackberry.com

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CSC 803 B
PATTERN RECOGNITION

UNIT 1
Introduction and mathematical preliminaries
Introduction and mathematical preliminaries - What is pattern recognition?, Clustering vs. Classification; Applications; Linear Algebra, vector spaces, probability theory, estimation techniques.

UNIT 2
Classification
Classification: Bayes decision rule, Error probability, Error rate, Minimum distance classifier, Mahalanobis distance; K-NN Classifier, Linear discriminant functions and Non-linear decision boundaries.Fisher's LDA, Single and Multilayer perceptron, training set and test sets, standardization and normalization.

UNIT 3
Clustering
Clustering: Different distance functions and similarity measures, Minimum within cluster distance criterion, K-means clustering, single linkage and complete linkage clustering, MST, medoids, DBSCAN. Visualization of datasets. existence of unique clusters or no clusters.

UNIT 4
Feature selection
Feature selection: Problem statement and Uses, Probabilistic separability based criterion functions. interclass distance based criterion functions, Branch and bound algorithm, sequential forward/backward selection algorithms, (l,r) algorithm. Feature Extraction: PCA, Kernel PCA

UNIT 5
Recent advances in Pattern Recognition
Recent advances in PR: Structural PR, SVMs, FCM, Soft-computing and Neuro-fuzzy.

REFERENCES

1. Devi V.S.; Murty, M.N.(2011) Pattern Recognition:An Introduction, Universities Press, Hyderabad.
2. R. O. Duda,P.E. Hart and D. G.Stork,Pattern Classification, Wiley, 2000.
3. R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2001.
4. Statistical pattern Recognition; K. Fukunaga; Academic Press, 2000.
5. S.Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009

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CSC 803 C
ANDROID TECHNOLOGY

Unit 1:

Introduction: What is Android, Android versions and its feature set The various Android devices on the market , The Android Market application store ,Android Development Environmem - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs)

Unit 2:

Android Architecture Overview and Creating an Example Android Application: The Android Software Stack. The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Revicwing the Layout and Resource Files,

Unit 3:

Android Software Development Platform

Understanding Java SE and the Dalvik Virtual Machine , The Directory Structure of an Android Project , Common Default Resources Folders , The Values Folder , Leveraging Android XML, Screen Sizes , Launching Your Application: The AndroidManifest.xml File ,

Creating Your First Android Application

Unit 4:

Android Framework Overview

Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components

Android Manifest XML: Declaring Your Components

Unit 5:

Understanding Android Views, View Groups and Layouts

Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool.

Reference Books:

1. **Android** App Development for Dummies.
2. Head First **Android** Development.
3. Hello, **Android**: Introducing Google's Mobile Development Platform.
4. Professional **Android** 4th edition.

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CSC-804 A
BIG DATA ANALYTICS

UNIT 1 Understanding Data:
Data Wrangling and Exploratory Analysis, Data Transformation & Cleaning, Feature Extraction, Data Visualization. Introduction to contemporary tools and programming languages for data analysis like R and Python.

UNIT 2 Statistical & Probabilistic analysis of Data:
Multiple hypothesis testing, Parameter Estimation methods, Confidence intervals, Bayesian statistics and Data Distributions.

UNIT 3 Introduction to machine learning:
Supervised & unsupervised learning, classification & clustering Algorithms, Dimensionality reduction: PCA & SVD, Correlation & Regression analysis, Training & testing data: Overfitting & Under fitting.

UNIT 4 Introduction to Information Retrieval:
Boolean Model, Vector model, Probabilistic Model, Text based search: Tokenization,TF-IDF, stop words and n-grams, synonyms and parts of speech tagging.

UNIT 5 Introduction to Web Search& Big data:
Crawling and Indexes, Search Engine architectures, Link Analysis and ranking algorithms such as HITS and PageRank, Hadoop File system & MapReduce Paradigm

Text Books:

1.Field Cady, "The Data Science Handbook" , 1/e ,2018,Publisher: Wiley

2. Sinan Ozdemir, "Principles of Data Science ", 1/e, 2016Packt Publishing Limited

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CS-804 (B)

Optical Fiber Communication

UNIT –I

OVERVIEW OF OPTICAL FIBER COMMUNICATION: Introduction, Historical development, general system, advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, Ray theory, cylindrical fiber (no derivations in article 2.4.4), single mode fiber, cutoff wave length, mode filed diameter. Optical Fibers: fiber materials, photonic crystal, fiber optic cables specialty fibers.

UNIT –II

TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS: Introduction, Attenuation, absorption, scattering losses, bending loss, dispersion, Intra modal dispersion, Inter modal dispersion.

UNIT –III

OPTICAL SOURCES AND DETECTORS: Introduction, LED's, LASER diodes, Photo detectors, Photo detector noise, Response time, double hetero junction structure, Photo diodes, comparison of photo detectors.

UNIT –IV

FIBER COUPLERS AND CONNECTORS: Introduction, fiber alignment and joint loss, single mode fiber joints, fiber splices, fiber connectors and fiber couplers. WDM concepts, overview of WDM operation principles.

UNIT –V

OPTICAL RECEIVER: Introduction, Optical Receiver Operation, receiver sensitivity, quantum limit, eye diagrams, coherent detection, burst mode receiver operation, Analog receivers. Analog links – Introduction, overview of analog links, CNR, Radio over fiber links, optical amplifiers, basic applications.

TEXT BOOKS:

1. Optical Fiber Communication – Gerd Keiser, 4th Ed., MGH, 2008.
2. Optical Fiber Communications– – John M. Senior, Pearson Education. 3 rd Impression, 2007.

REFERENCE BOOK:

1. Fiber optic communication – Joseph C Palais; 4th Edition, Pearson Education

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CSC-804 (C)
DATA MINING & WAREHOUSING

UNIT I

Data Mining: Basic concepts, technology and rules, DM techniques, Mining problems, Issues and Challenges in DM, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining, DM Application areas. Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

UNIT II

Mining Association Rules in Large Databases: Association Rule Mining, SingleDimensionalBoolean Association Rules, Multi-Level Association Rule, Apriori Algorithm, FpGrowthAlgorithm, Time series mining association rules, latest trends in association rules mining.

UNIT III

Rules & Clustering Techniques: Introduction. Various association algorithms like A Priori,Partition, Pincersearch etc. Clustering paradigms; Partitioning algorithms like K-Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH.CURE; Categorical Clustering algorithms, STIRR, ROCK, CACTUS.

UNIT IV

Data Mining of Image and Video:A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis,E-Metrics.

UNIT V

Data Warehousing: Need for data warehousing , Basic elements of data warehousing,Data Mart. Data Warehouse Architecture, extract and load Process, Clean and Transform data,Star,Snowflake and Galaxy Schemas for Multidimensional databases, Fact and dimension data,Partitioning Strategy-Horizontal and Vertical Partitioning.

References Books:-

1. Han,Kamber, "Data Mining Concepts & Techniques".
2. M.Kaufman.Data Mining Techniques;Arun K.Pujari ; University Press.
3. Mastering Data Mining; Berry Linoff; Wiley
4. Data Mining; Adriaans & Zantinge; Pearson education.

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CSC-805 (A)
NETWORK & WEB SECURITY

UNIT-I

Symmetric Ciphers -Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, A Model of Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. System Security-Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.

UNIT-II

Block Cipher and the Data Encryption Standard: Simplified DES, Block Cipher Principles, The DES, The Strength of DES, Differential and Linear Cryptanalysis. Symmetric Ciphers: Triple DES, Blowfish. Confidentiality using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation

UNIT-III

Public Key Encryption, Digital Signatures-Number Theory, Prime Numbers, Format's and Euler "s Theorems. Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, The RSA Algorithms, Key Management, Diffie Hellman Key Exchange.

UNIT-IV

Authentication Protocols-Message Authentication:-Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithms, Digital Signatures and Authentication Protocols: -Digital Signatures, Authentication Protocols, Digital Signature Standards.

UNIT-V

Network Security-Authentication Applications: Kerberos, X.509 Directory, Authentication Service. Electronic Mail Security: Pretty Good Privacy. IP Security: -Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload. Web Security: Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

References Books:

1.Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private Communication in PublicWorld, 2ndEdition,2011, Pearson Education.
2.Atul Kahate, Cryptography and Network Security, TMH. (2003)
3. William Stallings, Cryptography and Network Security,
4 Edition, Pearson Education/PHI. 2006

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CSC-805 (B)
OPTIMIZATION TECHNIQUES

UNIT-1
Mathematical preliminaries: Linear algebra and matrices, Vector space, eigen analysis, Elements of probability theory, Elementary multivariable calculus.

UNIT-2
Linear Programming: Introduction to linear programming model, Simplex method, Duality, Karmarkar's method.

UNIT-3
Unconstrained optimization:One-dimensional search methods,Gradient-based methods,Conjugate direction and quasi-Newton methods.

UNIT-4
Constrained Optimization:Lagrange theorem,FONC, SONC, and SOSC conditions.

UNIT-5
Non-linear problems:Non-linear constrained optimization models, KKT conditions,Projection methods.

Reference Books:
1.An introduction to Optimization byEdwin P K Chong, Stainslaw Zak
2.Nonlinear Programming by Dimitri Bertsekas.
3. J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd.
4. N D Vohra, Quantitative Techniques in management, Tata McGraw Hill.
5. Handy A Taha, Operations Research – An Introduction, Prentice Hall of India, New Delhi.
6. Wagner H M, Principles of Operations Research: With Applications to Management Decisions, Prentice-Hall of India, New Delhi.

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CSC-805 (C)
BIOMETRICS

UNIT-I

The Basics of Biometrics: Overview of field and applications. Development of biometric authentication. Basic terms, biometric data, biometric characteristics, biometric features, biometric templates and references. Expected properties of biometric identifiers. Basics in biometric errors estimation. Enrollment, verification and identification.

UNIT-II

Face Recognition: Introduction to the face processing pipeline: acquisition, face detection, alignment, feature extraction, matching. Classic subspace methods. Hand-tuned feature descriptors. Deep learning architectures for face representation learning. Distance, similarity and learning-based matching. Face recognition in video. Describable visual attributes. Face pair matching, verification, and identification. Data sets for evaluation. Face image quality. Considerations for social media, mobile authentication, surveillance and other real-world applications.

UNIT-III

Fingerprint Recognition: Fingerprint capture, sensor types, latent fingerprints. Fingerprint image preprocessing, segmentation, binary and skeletal images. Fingerprint singularities, detection of loops, deltas, whirls and cores, using singularities in fingerprints classification. Gabon's details, base and complex minutiae, detection of minutiae. Fingerprint recognition, minutiae- and correlation-based methods. Fingerprints in forensics and biometrics, similarities and differences.

UNIT-IV

Iris Recognition: Eye and iris morphogenesis, genetic penetrance. Principles of iris image capture, iris sensors. Iris image preprocessing, segmentation, formaning and filtering. Daugman's method, iris code, statistical properties of the iris code. Other iris coding methods, wavelet analysis.

Multi-Biometric Fusion Levels of fusion: sensor, feature, rank, decision. Score normalization and fusion rules. Quality-based fusion and failure prediction.

UNIT-V

Spoofing (2 Lectures) Static and dynamic liveness features. What we want to detect (subversive actions) vs. what we can detect (suspicious actions). Liveness detection in biometrics. Selected liveness detection techniques, frequency analysis for paper printouts detection, pupil dynamics and blood pulse analyses for detection of sophisticated eye and finger spoofing trials.

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References:

1. Digital Image Processing using MATLAB, By: Rafael C. Gonzalez, Richard EugeneWoods, 2nd Edition, Tata McGraw-Hill Education 2010

2. Guide to Biometrics, By: Ruud M. Bolle, Sharath Pankanti, Nalini K. Ratha, Andrew W.Senior, Jonathan H. Connell, Springer 2009

3. Pattern Classification, By: Richard O. Duda, David G.Stork, Peter E. Hart, Wiley 2007

4.Samir Nanavathi, Michel Thieme, and Raj Nanavathi : "Biometrics -Identity verification in a network", 1st Edition, Wiley Eastern, 2002.

5..John Chirillo and Scott Blaul : "Implementing Biometric Security", 1st Edition, Wiley Eastern Publication, 2005.

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CSC – 806 INDUSTRIAL TRAINING PROJECT – II

Industrial Training Project - II should be the outcome of the training done/performed during after 7th semester .It should be submitted in hardware form (proto type)or simulation form along with proper data and certificates issued during project training. It should cover the electrical engineering aspects learned during training. A Power point presentation should also be submitted at the time of submission. It can be in the form of major project..

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CSC- 807 General Proficiency

This course objective is to develop the ability to handle all the tasks associated with the job and Ethics refers to behavior that adheres to societal norms and human conscience. In other words, a way of working that is honest and transparent.

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S S S T M S
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Sri Satya Sai
University of Technology and Medical Sciences
(Established under Govt. of M.P. Registered under UGC 2(F) 1956)

Bhopal-Indore Road, Opp. Pachama oilfed plant, Pachama, Dist.-Sehore M.P.PIN-466001
Ph. 07562-225847, Fax : 07562-223644, Web: www.ssstms.co.in, info@ssstms.co.in

Name of Faculty: School of Engineering

Name of Department: **Computer Science and Engineering**

Minutes of Board of Studies Committee Meeting Dated on 03.06.2019

The Board of Studies Committee Meeting was held in the room of Department of Computer Science Engineering at 2:30 PM. on 04.06.2019, Following members were present.

1. Dr. Tryambak Hiwarkar Prof,(Computer Science and Engineering), Chairman
2. Mr. Arif Hakeem Asst. Prof,(Computer Science and Engineering), Member
3. Dr. Anil Kumar Prof.,(Computer Science and Engineering), Member
4. Mr Gajendra Singh , Asst. Prof,(Computer Science and Engineering), Member
5. Mr. Manoj Verma, Asst. Prof. ,(Computer Science and Engineering), Member
6. Mr. Harsh Lohiya,, Asst. Prof. ,(Computer Science and Engineering), Member
7. Mr. Gaurav Saxena, Asst. Prof. ,(Computer Science and Engineering), Member
8. Mr. Rishi Khushwah, Asst. Prof. ,(Computer Science and Engineering), Member
9. Mr. Manoj Yadav Asst. Prof. ,(Computer Science and Engineering), Member
10. Ms. .Naina Solanki Asst. Prof. ,(Computer Science and Engineering), Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

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AICTE Scheme

Agenda Preparation of as per syllabus & Scheme for III[rd] and IV[th] Sem.

Discussion Scheme

Scheme and syllabus was put before the members as per AICTE guidelines and current demand in Industry, it was discussed in detail by the members and some modifications were suggested.

Resolution of the Discussion

It was resolved that scheme and syllabus for III[rd] and IV[th] Sem following AICTE guidelines and Scheme which also met the current demand in Industry should be modified and may be accepted.

Signature of All members (Including Chairman)

1. Dr. Tryambak Hiwarkar Prof.,(Computer Science and Engineering), Chairman
2. Mr. Arif Hakeem Asst. Prof.,(Computer Science and Engineering), Member
3. Dr. Anil Kumar Prof.,(Computer Science and Engineering), Member
4. Mr Gajendra Singh , Asst. Prof.,(Computer Science and Engineering), Member
5. Mr. Manoj Verma, Asst. Prof. ,(Computer Science and Engineering), Member
6. Mr. Harsh Lohiya, Asst. Prof. ,(Computer Science and Engineering), Member
7. Mr. Gaurav Saxena, Asst. Prof. ,(Computer Science and Engineering), Member
8. Mr. Rishi Khushwah, Asst. Prof. ,(Computer Science and Engineering), Member
9. Mr. Manoj Yadav Asst. Prof. ,(Computer Science and Engineering), Member
10. Ms. .Naina Solanki Asst. Prof. ,(Computer Science and Engineering), Member

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Chairman
School of Engineering
SEHORE

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Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P)

Scheme of Examination

Bachelor of Engineering (Computer Science and Engineering)

III Semester/ II Year — Academic Year 2019-20

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical) Slot		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	BEA-301	Mathematics- III	60	30	10	-	-	100	3	-	-	3
2	CSA-302	Discrete Structure	60	30	10	-	-	100	2	1	-	3
3	CSA-303	Data Structure	60	30	10	30	20	150	3	-	2	4
4	CSA- 304	Digital Systems	60	30	10	30	20	150	2	1	2	4
5	CSA-305	Object Oriented Programming & Methodology	60	30	10	30	20	150	3	-	2	4
6	CSA-306	Computer Workshop	-	-	-	30	20	50	-	-	2	1
7	CSA-307	Self-Study/GD Seminar	-	-	-	-	50	50	-	-	2	1
Total			300	150	50	120	130	750	13	2	10	20

w.e.f. july 2019

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S.S.S.U.T.M.S. School of Engineering SEHORE (M.P.)

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P)

Scheme of Examination

Bachelor of Engineering (Computer Science and Engineering)

IV Semester/ II Year Academic Year 2019-20

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assignments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	BEA-401	Energy, Ecology, Environment And Society	60	30	10	-	-	100	3		-	3
2	CSA-402	Analysis Design of Algorithm	60	30	10	30	20	150	2	1	2	4
3	CSA-403	Software Engineering	60	30	10	30	20	150	3		2	4
4	CSA-404	Computer Org. & Architecture	60	30	10	30	20	150	2	1	2	4
5	CSA-405	Operating Systems	60	30	10	30	20	150	3		2	4
6	CSA-406	Programming Practices	-	-	-	30	20	50	-	-	2	1
7	CSA-407	Industrial Training-I	To be completed during fourth semester semester break. Its evaluation/credit to be added in fifth semester									
TOTAL			300	150	50	150	100	750	13	2	10	20

w.e.f. july 2019

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BEA- 301 Mathematics-III

UNIT-I

Numerical Methods – 1 Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson method and Regular-Falsi method. Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

UNIT-II

Numerical Methods – 2 Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Solution of Simultaneous Linear Algebraic Equations by Gauss's Elimination, Gauss's Jordan, Crout's methods, Jacobi's, Gauss-Seidal, and Relaxation method.

UNIT-III

Numerical Methods – 3 Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. RungeKutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods. Partial differential equations: Finite difference solution two dimensional Laplace equation and Poisson equation, Implicit and explicit methods for one dimensional heat equation (Bender- Schmidt and Crank-Nicholson methods), Finite difference explicit method for wave equation.

UNIT-IV

Transform Calculus Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace Transform method, Fourier transforms.

UNIT-V

Concept of Probability Probability Mass function, Probability Density Function, Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution.

Textbooks/References:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. I, 3rd Ed., Wiley,1968.Statistic

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CSA- 302 Discrete Structure

UNIT-I

Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction.

UNIT-II

Algebraic Structures: Definition, Properties, types: Semi Groups, Monod, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

UNIT-III

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

UNIT-IV

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

UNIT-V

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices.

Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimonial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions.

References:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Bisht, "Discrete Mathematics",Oxford University Press
5. Biswal,"Discrete Mathematics & Graph Theory", PHI

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CSA-303 Data Structure

UNIT-I

Review of C programming language. Introduction to Data Structure: Concepts of Data and Information, Classification of Data structures, Abstract Data Types, Implementation aspects: Memory representation. Data structures operations and its cost estimation. Introduction to linear data structures- Arrays, Linked List: Representation of linked list in memory, different implementation of linked list, Circular linked list, doubly linked list, etc. Application of linked list: polynomial manipulation using linked list, etc.

UNIT-II

Stacks: Stacks as ADT, Different implementation of stack, multiple stacks. Application of Stack: Conversion of infix to postfix notation using stack, evaluation of postfix expression, Recursion. Queues: Queues as ADT, Different implementation of queue, Circular queue, Concept of Dqueue and Priority Queue, Queue simulation, Application of queues.

UNIT-III

Tree: Definitions - Height, depth, order, degree etc. Binary Search Tree - Operations, Traversal , Search. AVL Tree, Heap, Applications and comparison of various types of tree; Introduction to forest, multi-way Tree, B tree, B+ tree, B* tree and red-black tree.

UNIT-IV

Graphs: Introduction, Classification of graph: Directed and Undirected graphs, etc, Representation, Graph Traversal: Depth First Search (DFS), Breadth First Search (BFS), Graph algorithm: Minimum Spanning Tree (MST)- Kruskal, Prim's algorithms. Dijkstra's shortest path algorithm; Comparison between different graph algorithms. Application of graphs.

UNIT-V

Sorting: Introduction, Sort methods like: Bubble Sort, Quick sort, Selection sort, Heap sort, Insertion sort, Shell sort, Merge sort and Radix sort; comparison of various sorting techniques. Searching: Basic Search Techniques: Sequential search, Binary search, Comparison of search methods. Hashing & Indexing. Case Study: Application of various data structures in operating system, DBMS etc.

Text Books

1. AM Tanenbaum, Y Langsam& MJ Augustein, "Data structure using C and C++", Prentice Hall India.
2. Roberi Kruse, Bruse Leung, "Data structures & Program Design in C", Pearson Education.

Reference Books

1. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education.
2. N. Wirth, "Algorithms + Data Structure = Programs", Prentice Hall.
3. Jean – Paul Trembly , Paul Sorenson, "An Introduction to Structure with application", TMH.
4. Richard, GilbergBehrouz, Forouzan ,"Data structure – A Pseudocode Approach with C", Thomson press.

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List of experiments

1. To read the numbers and display it.
2. To demonstrate the concept of one dimensional array finding the sum of array elements.
3. To insert an element in an array.
4. To add two matrix A and B.
5. Implementation of linked list using array.
6. Implementation of stack using array.
7. Implementation of binary search tree using array.
8. Implement linear search.
9. To Search an element using binary search.
10. Implement bubble sort.

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CSA- 304 Digital Systems

UNIT-I

Review of number systems and number base conversions. Binary codes, Boolean algebra, Boolean functions, Logic gates. Simplification of Boolean functions, Karnaugh map methods, SOP-POS simplification, NAND-NOR implementation.

UNIT-II

Combinational Logic: Half adder, Half subtractor, Full adder, Full subtractor, look- ahead carry generator,BCD adder, Series and parallel addition, Multiplexer – demultiplexer, encoder-decoder, arithmetic circuits, ALU

UNIT-III

Sequential logic: flip flops, D,T, S-R, J-K Master- Slave, racing condition, Edge & Level triggered circuits, Shift registers, Asynchronous and synchronous counters, their types and state diagrams. Semiconductor memories, Introduction to digital ICs 2716, 2732 etc. & their address decoding. Modern trends in semiconductor memories such as DRAM, FLASH RAM etc. Designing with ROM and PLA.

UNIT-IV

Introduction to A/D & D/A convertors & their types, sample and hold circuits, Voltage to Frequency & Frequency to Voltage conversion. Multivibrators : Bistable, Monostable, Astable, Schmitt trigger, IC 555 & its applications. TTL, PMOS, CMOS and NMOS logic. Interfacing between TTL to MOS.

UNIT-V

Introduction to Digital Communication: Nyquist sampling theorem, time division multiplexing, PCM, quantization error, introduction to BPSK & BFSK modulation schemes. Shannon's theorem for channel capacity.

References:

1. Morris Mano, Digital Circuits & Logic Design, PHI
2. Gothman, Digital Electronics, PHI
3. Tocci, Digital Electronics, PHI
4. Mavino& Leach, Digital Principles & Applications, PHI
5. Taub and schilling, Digital Integrated electronics.
6. Simon Haykin, Introductionto Analog& Digital Communication, Wiley.
7. Lathi B.P., Modern analog& digital communication , Oxford University.

Professor
Sri Sai Iqbal University of Technology
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List of Experiments:

1. To study and verify the truth tables of various Logic gates.
2. To verify the properties of NAND and NOR gates as Universal Building Blocks.
3. Simplification and implementation of a Boolean function.
4. Implementation of basic Boolean arithmetic logic circuits such as Half-adder, Half-subtractor, Full adder and Full subtractor.
5. Conversion from Binary to Gray and Gray to Binary code.
6. To construct a binary multiplier using combinational logic and to verify with the truth table
7. To verify 2-bit Magnitude comparator for all possible conditions
8. Generation of various logical functions using 8-to-1 multiplexer
9. Construction of a 4-bit ripple counter and study of its operation.
10. Operation of IC-555 Timer as Monostable, Astable and Bistablemultivibrators.
11. To characterize binary ladder type digital to analog (D/A) and analog to digital (A/D) convertor.
12. Comparison of various Logic families.
13. Design and implementation of various types of flip-flops using JK flip-flop.
14. To study natural sampling of continuous time waveforms using different sampling rates.
15. To study Pulse-Code modulation with Time-division multiplexing (PCM-TDM)
16. To study generation and detection of BPSK and QPSK waveforms.

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CSA- 305 Object Oriented Programming & Methodology

Unit-I

Introduction to Object Oriented Thinking & Object Oriented Programming: Comparison with Procedural Programming, features of Object oriented paradigm– Merits and demerits of OO methodology; Object model; Elements of OOPS, IO processing.

UNIT-II

Encapsulation and Data Abstraction- Concept of Objects: State, Behavior & Identity of an object; Classes: identifying classes and candidates for Classes Attributes and Services, Access modifiers, Static members of a Class, Instances, Message passing, and Construction and destruction of Objects.

UNIT-III

Relationships – Inheritance: purpose and its types, 'is a' relationship; Association, Aggregation. Concept of interfaces and Abstract classes.

UNIT-IV

Polymorphism: Introduction, Method Overriding & Overloading, static and run time Polymorphism.

UNIT-V

Strings, Exceptional handling, Introduction of Multi-threading and Data collections, Case study like: ATM, Library management system.

Text Books

1. Timothy Budd, "An Introduction to Object-Oriented Programming", Addison- Wesley Publication, 3rd Edition.
2. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I, Fundamentals", Prentice Hall publication.

Reference Books

1. G. Booch, "Object Oriented Analysis& Design", Addison Wesley.
2. James Martin, "Principles of Object Oriented Analysis and Design", Prentice Hall/PTR.
3. Peter Coad and Edward Yourdon, "Object Oriented Design", Prentice Hall/PTR.
4. Herbert Schildt, "Java 2: The Complete Reference", McGraw-Hill Osborne Media, 7th Edition.

List of Experiment:-

1. Write a program for multiplication of two matrices using OOP.
2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialized real and imag to two different values.
3. Write a program to find the greatest of two given numbers in two different classes using friend function.

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4. Implement a class string containing the following functions:

   Overload + operator to carry out the concatenation of strings.
   Overload = operator to carry out string copy.
   Overload <= operator to carry out the comparison of strings.
   Function to display the length of a string.
   Function tolower( ) to convert upper case letters to lower case.
   Function toupper( ) to convert lower case letters to upper case.

5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.

6. Write a program to define the function template for calculating the square of given numbers with different data types.

7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.

8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space, line feed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.

9. Write a program to read the class object of student info such as name , age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.

10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

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CSA- 306 Computer Workshop

UNIT - I

Basic components: - Type of component, Active and Passive, A.C. and D.C. Resistors: Types of resistors, color code. Capacitors: Type of capacitors, color code. Inductor: inductance and its type, concept of a coil. Diode: Introduction working and types. Transistors: Introduction and its type.

UNIT-II

Transformer: Introduction, working and its type. Function Generator: Introduction and its type. SMPS: Introduction, working and its type. LED: Introduction, working and its type. Voltage Regulator: Introduction, working and its type. Battery: Introduction, working and its type. IFT: Introduction, working and its type. Relay: Introduction, working and its type.

UNIT – III

Testing & Measurement Tools: Introduction, Working and uses of Multimeter, Voltmeter, Ammeters, Wattmeter and CRO.

UNIT – IV

Printed Circuit Board: Introduction, Manufacturing Process, PCB Type, Designing, Etching Component Assembly, Soldering.

UNIT – V

Personal Computer Assembling: Assemble All Computer parts like Motherboard, RAM, Hard Disk, SMPS, Cable, Buses, Keyboard, Mouse.

References:

1. Electronic Device and Circuit,Jacob Millman, Christos C. Halkias, McGraw-Hill
2. Hardware bible By : Winn L Rosch, Techmedia publications.
3. Modern All about printers By: Manohar Lotia, Pradeep Nair, Bijal Lotia BPB publications.
4. The complete PC Upgrade and maintenance guide, Mark Minasi BPB Publication

List of Experiments :-

1. Testing of NPN and PNP Transistor using Multimetre
2. Testing of Ceramic and Electrolytic Capacitor using Multimetre
3. Testing of Inductor using Multimetre.
4. Testing of Values Voltages at different points on PCB using Multimetre.
5. Testing of Current at different points on PCB using Multimetre.
6. Testing of SMPS using Multimetre. Testing of Step Up and Step down Transformers using Multimetre.
7. Testing of IFT(Intermediate Frequency Transformer) using Multimetre
8. Testing of Resistance using Multimetre and Reading of Resistance using Colour Coding Table.
9. Assemble Mono Stable, Astable, and Bistable multivibrator(Clocked and Unclocked) using PCB.

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CSA 307 Self Study / Gd Seminar

Objective of GD and seminar is to improve the mass communication and convincing/understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group.

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BEA-401 Energy, Ecology, Environment and Society

UNIT -1

Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydro, nuclear sources.

UNIT-2

Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation

UNIT-3

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement of sound pollution (decibiage), Industrial and non – industrial.

UNIT-4

Water Pollution– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent. Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

UNIT-5

Society, Ethics & Human values– Impact of waste on society. Solid waste management Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

REFERENCES:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering" ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA; principles of Environment Sc; TMH
11. Gandhiji M.K.- My experiments with truth

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CSA- 402 Analysis Design Of Algorithm

UNIT-I

Algorithms, Designing algorithms, analyzing algorithms, asymptotic notations, heap and heap sort, Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, merge sort, quick sort, strassen's matrix multiplication.

UNIT-II

Study of Greedy strategy, examples of greedy method like optimal merge patterns, Huffman coding, minimum spanning trees, knapsack problem, job sequencing with deadlines, single source shortest path algorithm.

UNIT-III

Concept of dynamic programming; problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm

UNIT-IV

Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms.

UNIT-V

Binary search trees, height balanced trees, 2-3 trees, B-trees, basic search and traversal techniques for trees and graphs (In order, preorder, postorder, DFS, BFS), NP-completeness.

References:

1. Corremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. Michael T Goodrich, Roberto Tamassia, Algorithm Design, Wiely India
6. Rajesh K Shukla: Analysis and Design of Algorithms: A Beginner's Approach; Wiley

List of Experiments:

1. Write a program for Iterative and Recursive Binary Search.
2. Write a program for Merge Sort.
3. Write a program for Quick Sort.
4. Write a program for Strassen's Matrix Multiplication.
5. Write a program for optimal merge patterns.
6. Write a program for Huffman coding.
7. Write a program for minimum spanning trees using Kruskal's algorithm.
8. Write a program for minimum spanning trees using Prim's algorithm.
9. Write a program for single sources shortest path algorithm.
10. Write a program for Floyd-Warshal algorithm.
11. Write a program for traveling salesman problem.
12. Write a program for Hamiltonian cycle problem.

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CSA- 403 Software Engineering

UNIT I

The Software Product and Software Process Software Product and Process Characteristics, Software Process Models: LinearSequential Model, Prototyping Model, RAD Model, Evolutionary Process Models likeIncremental Model, Spiral Model, Component Assembly Model, RUP and Agileprocesses. Software Process customization and improvement, CMM, Product andProcess Metrics.

UNIT II

Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

UNIT III

Software Design The Software Design Process, Design Concepts and Principles, Software Modeling andUML, Architectural Design, Architectural Views and Styles, User Interface Design, Function- oriented Design, SA/SD Component Based Design, Design Metrics.

UNIT IV

Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing, Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, TestOracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit, Testing Frameworks, Integration Testing, System Testing and other Specialized, Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured Software Engg.

UNIT V

Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Suppon, Project Managemem Concepts, Feasibility Analysis, Project and Process Planning, Resources
Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance(SQA), Project Plan, Project Metrics.

Practical and Lab work Lab work should include a running case study problem for which different deliverable sat the end of each phase of a software development life cycle are to be developed. Thiswill include modeling the requirements, architecture and detailed design. Subsequentlythe design models will be coded and tested. For modeling, tools like Rational Roseproducts. For coding and testing, IDE like Eclipse, Net Beans, and Visual Studio can be used.

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References
1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning
3.R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition2006, McGraw-Hill.
4.Sommerville,"Software Engineering",Pearson Education.
5.Richard H.Thayer,"Software Engineering & Project Managements", WileyIndia
6.Waman S.Jawadekar,"Software Engineering", TMH
7.Bob Hughes, M.Cotterell, Rajib Mall " Software Project Management", McGrawHill

List of Experiments:
1.To identify the role of the software in today's world across a few significant domains related to day to day life.
2.To identify the problem related to software crisis for a given scenario
3.To identify the suitable software development model for the given scenario.
4.To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenarios.
5.To identify the various elicitation techniques and their usage for the Banking case study.
6.To Classify the requirement into functional and non-functional requirements.
7.To identify the elements in software Requirements Specification document.
8.To verify the requirements against the quality attributes.
9.Understand Importance of SDLC approach & various processes.

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CSA- 404 Computer Organization & Architecture

UNIT-I

Basic Structure of Computer: Structure of Desktop Computers, CPU: General Register Organization-Memory Register, Instruction Register, Control Word, Stack Organization, Instruction Format, ALU, I/O System, bus,CPU and Memory Program Counter, Bus Structure, Register Transfer Language-Bus and Memory Transfer, addressing modes. Control Unit Organization: Basic Concept of Instruction, Instruction Types, Micro Instruction Formats, Fetch and Execution cycle, Hardwired control unit, Micro-programmed Control unit microprogram sequencer Control Memory, Sequencing and Execution of Micro Instruction.

UNIT-II

Computer Arithmetic: Addition and Subtraction, Tools Compliment Representation, Signed Addition and Subtraction, Multiplication and division, Booths Algorithm, Division Operation, Floating Point Arithmetic Operation, design of Arithmetic unit.

UNIT-III

I/O Organization: I/O Interface –PCI Bus, SCSI Bus, USB, Data Transfer: Serial, Parallel, Synchronous, Asynchronous Modes of Data Transfer, Direct Memory Access(DMA), I/O Processor.

UNIT-IV

Memory Organization: Main memory-RAM, ROM, Secondary Memory –Magnetic Tape, Disk, Optical Storage, Cache Memory: Cache Structure and Design, Mapping Scheme, Replacement Algorithm, Improving Cache Performance, Virtual Memory, memory management hardware.

UNIT-V

Multiprocessors: Characteristics of Multiprocessor, Structure of Multiprocessor-Inter-processor Arbitration, Inter-Processor Communication and Synchronization, Memory in Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing, RISC And CISC, Study of Multicore Processor –Intel, AMD.

Reference Books:

1.Morris Mano , "Computer System Organization "PHI
2.Alan Clements: "Computer Organization and Architecture", Cengage Learning
3.Subrata Ghosal: "Computer Architecture and Organization", Pearson
4.William stalling ,"Computer Architecture and Organization" PHI
5.M. Usha, T.S. Shrikant: "Computer System Architecture and Organization", Willey India 6.Chaudhuri, P.Pal: "Computer Organization and Design", PHI
7.Sarangi: "Computer Organization and Architecture",Mc-Graw Hills

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List of Experiments:

1. **Study of Multiplexer and Demultiplexer**
2. **Study of Half Adder and Subtractor**
3. **Study of Full Adder and Subtractor**
4. **WAP to add two 8 bit numbers and store the result at memory location 2000**
5. **WAP to multiply two 8 bit numbers stored at memory location 2000 and 2001 and stores the result at memory location 2000 and 2001.**
6. WAP to add two 16-bit numbers. Store the result at memory address starting from 2000.
7. WAP which tests if any bit is '0' in a data byte specified at an address 2000. If it is so, 00 would be stored at address 2001 and if not so then FF should be storedat the same address.
8. Assume that 3 bytes of data are stored at consecutive memory addresses of the data memory starting at 2000. Write a program which loads register C with (2000), i.e. with data contained at memory address2000, D with (2001), E with (2002) and A with (2001).
9. Sixteen bytes of data are specified at consecutive data-memory locations starting at 2000. Write a program which increments the value of all sixteen bytes by 01.
10. WAP to add t 10 bytes stored at memory location starting from 3000. Store the result at memory location 300A

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CSA- 405 Operating Systems

UNIT-I

Introduction to Operating Systems: Function, Evolution, Different Types, Desirable Characteristics and features of an O/S, Operating Systems Services: Types of Services, Different ways of providing these Services – Utility Programs, System Calls.

UNIT-II

File Systems: File Concept, User's and System Programmer's view of File System, Disk Organization, Tape Organization, Different Modules of a File System, Disk Space Allocation Methods – Contiguous, Linked, Indexed. Directory Structures, File Protection, System Calls for File Management, Disk Scheduling Algorithms.

UNIT-III

CPU Scheduling : Process Concept, Scheduling Concepts, Types of Schedulers, Process State Diagram, Scheduling Algorithms, Algorithms Evaluation, System calls for Process Management; Multiple Processor Scheduling; Concept of Threads.

Memory Management: Different Memory Management Techniques – Partitioning, Swapping, Segmentation, Paging, Paged Segmentation, Comparison of these techniques, Techniques for supporting the execution of large programs: Overlay, Dynamic Linking and Loading, Virtual Memory – Concept, Implementation by Demand Paging etc.

UNIT-IV

Input / Output : Principles and Programming, Input/Output Problems, Asynchronous Operations, Speed gap Format conversion, I/O Interfaces, Programme Controlled I/O, Interrupt Driven I/O, Concurrent I/O.

Concurrent Processes : Real and Virtual Concurrency, Mutual Exclusion, Synchronization, Inter- Process Communication, Critical Section Problem, Solution to Critical Section Problem : Semaphores – Binary and Counting Semaphores, WAIT & SIGNAL Operations and their implementation. Deadlocks: Deadlock Problems, Characterization, Prevention, Avoidance, Recovery.

UNIT-V

Introduction to Network, Distributed and Multiprocessor Operating Systems. Case Studies: Unix/Linux, WINDOWS and other Contemporary Operating Systems.

TEXT BOOKS RECOMMENDED:

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", Wiley, 9/E
2. William Stalling, "Operating Systems", Pearson Education.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "Modern Operating Systems", 3/e, Prentice Hall
2. Maurice J. Bach, " The Design of Unix Operating System", Prentice Hall of India,
3. Bovet & Cesati, "Understanding the Linux Kernel", O'Reily, 2/E.

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List of Experiment:

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. Write a program to implement classical inter process communication problem(producer consumer).
7. Write a program to implement classical inter process communication problem(Reader Writers).
8. Write a program to implement classical inter process communication roblem (Dining_Philosophers)
9. Write a program to implement & Compare various page replacement algorithm.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11. Write a program to implement Banker's algorithms.
12. Write a program to implement Remote Procedure Call(RPC).
13. Write a Devices Drivers for any Device or pheriperal.

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CSA-406 Programming Practices

UNIT-I

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods,Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT-II

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector, Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un- modifiable Collections.

UNIT-III

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI,Monitors and Monitor Locks, Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT-IV

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT-V

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. E. Balaguruswamy, "Programming In Java"; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH
3. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
4. Cay Horstmann, Big JAVA, Wiley India.
5. Merlin Hughes, et al: Java Network Programming, Manning Publications/Prentice H

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List of Experiment:

1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show "HELLO JAVA " in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.

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CSA-407 Industrial Training –I

The following objective should be fulfilled in industrial training –I, and student must participate in any aerospace/aeronautical industry where they can learn to apply the Technical knowledge in real Industrial situations.

- Gain experience in writing Technical reports/projects.
- Expose students to the engineer's responsibilities and ethics.
- Expose the students to future employers.
- Understand the social, economic and administrative considerations that influence the working environment of industrial organizations

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Ref. No. : SSSUTMS/SOE/CSE/01 Date : 08-06-2020

Name of Faculty: School of Engineering

Name of Department: Computer Science and Engineering

The Board of Studies Committee Meeting of Department of Computer Science and Engineering was conducted in online mode through Microsoft Team at 12:30 PM, On **08-06-2020**, Following members were present.

1.	Dr. Rajeev Pandey UIT R.G.P.V. Bhopal	External Member
2.	Dr. Sanjay Sharma OIST Bhopal	External Member
3.	Mr. Arif Hakeem, Asso. Prof. (CSE)	Chairman
4.	Dr. Jitendra Sheetlani Asso. Prof (CSE)	Member
5.	Mr. Kailash Patidar Asst. Prof. (CSE)	Member
6.	Mr. Harsh Lohiya, Asst. Prof. (CSE)	Member
7.	Mr. Rishi Khushwah Asst. Prof. (CSE)	Member
8.	Mr. Manoj Yadav Asst. Prof. (CSE)	Member
9.	Mr. Sudeesh Chouhan Asst. Prof. (CSE)	Member
10.	Mr. Narendra Sharma Asst. Prof. (CSE)	Member

Minutes of Meeting:

1. The Chairman of Board of Studies Committee welcomes and addressed the members and introduced external BOS Members to the Board.
2. Address by chair regarding the rationale for the proposal of Scheme and Syllabus based on AICTE Model curriculum for 5th to 8th Semester
3. Chairman of the Board of Studies explained the guidelines, commonalities, workshop to suit discipline requirements and uniqueness.
4. Proposed Scheme and syllabus 5th to 8th semester is presented by chair and following issue has been discussed and resolved.

I. Chairman of Board of Studies Committee expressed their concern about motivating students towards domain specific courses in 3rd semester and discuss about 4th semester courses like ecology and environment and other necessary courses.

II. Dr. Rajeev Pandey gathered the information and suggested to include some sensors based chapter as a part of curriculum keeping in view the utility of IOT in near future.

III. Contents of core electives course should be revisited keeping in view of present and future demand in Computer Science and Engineering, suggested by Dr. Sanjay Sharma.

IV. Mr. Arif Hakeem gives their concern over Emerging and Enduring Fields, Areas identified for Additional Training, Emerging and Enduring Tools and Techniques required for the Computer Science engineering graduates to meet the global challenges in the next 10 to 20 years

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Keeping in view the suggestions of BOS member as above, The final syllabus is prepared and mailed to all. No BOS member raise any objection. Hence ,the syllabus and scheme of 5th to 8th semester are hereby approved.

The Chairman thanks the member for cooperation, their suggestions and peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Rajeev Pandey UIT R.G.P.V. Bhopal
2. Dr. Sanjay Sharma OIST Bhopal
3. Mr. Arif Haleem Asso. Prof (CSE) Chairmen
4. Dr. Jitendra Shastiani Asso. Prof (CSE) Member
5. Mr. Narendra Sharma Asst. Prof. (CSE) Member
6. Mr. Kailash Patidar Asst. Prof. (CSE) Member
7. Mr. Harsh Lohiya, Asstc. Prof. (CSE) Member
8. Mr. Rishi Khushwah Asstc. Prof. (CSE) Member
9. Mr. Manoj Yadav Asst. Prof. (CSE) Member
10. Mr. Sudeesh Chouhan Asst. Prof. (CSE) Member

Chairman

S.S.S.U.T.M.S. SEHORE (M.P.)

S.S.S.U.T.M.S. School of Engineering SEHORE (M.P.)

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SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Outcome based Curriculum for

Undergraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering

Scheme of Examination AICTE (Computer Science and Engineering)

V SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assignments/Quiz	End Sem. Practical & Viva	Practical [Record] / Assignments / Quiz / Presentation		L	T	P	
1	CSA-501	Database Management Systems	60	30	10	30	20	150	2	1	2	4
2	CSA-502	Computer Graphics	60	30	10	30	20	150	2	1	2	4
3	CSA-503	PHP Technology	60	30	10	30	20	150	2	1	2	4
4	CSA-504	Program Elective-I	60	30	10	-		100	3	1	0	4
5	CSA-505	Open Core Elective-I	60	30	10	-		100	3	1	0	4
6	CSA-506	Industrial Training-I			50	150	50	250			4	2
		TOTAL	300	150	100	240	110	900	12	5	10	22

Program Elective-I	CSA-504(A) Formal Language & Automata Theory	CSA-504(B) Simulation & Modeling
Open Core Elective-I	CSA-505(A) E-Commerce & Governance	CSA-505(B) Signal & Systems

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SCHOOL OF ENGINEERING

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Outcome based Curriculum for

Undergraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering

VI SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Term	Assign ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-601	Compiler Design	60	30	10	30	20	150	2	1	2	4
2	CSA-602	Computer Network	60	30	10	30	20	150	2	1	2	4
3	CSA-603	Program Elective-II	60	30	10			100	3	1	0	4
4	CSA-604	Program Elective-III	60	30	10	-		100	3	0	0	3
5	CSA-605	Open Core Elective – II	60	30	10	-	-	100	3	0	0	3
6	CSA-606	Minor Project	-	-	-	100	100	200	-	-	4	2
		TOTAL	300	150	50	240	160	900	15	3	8	20

Program Elective-II	CSA-603(A)Advance Computer Architecture	CSA-603(B) Advanced Data Structure
Program Elective-III	CSA-604 (A) Data Mining and Data Warehousing	CSA-604(B) Soft Computing
Open Core Elective – II	CSA-605(A) Information Theory & Coding	CSA-605(A) Cyber Law & Ethics

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SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Scheme of Examination - AICTE Pattern

Undergraduate Degree Courses in Engineering & Technology

Bachelor of Engineering (Computer Science Engineering)

VII SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assignments/ Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-701	Ad-hoc and Sensor Networks	60	30	10	30	20	150	3	0	2	4
2	CSA-702	Digital Image Processing	60	30	10	30	20	150	3	0	2	4
3	CSA-703	Program Elective-IV	60	30	10	-	-	100	3	0	0	3
4	CSA-704	Open Core Elective - III	60	30	10	-	-	100	3	0	0	3
5	CSA-705	Project Stage-I	-	-	-	100	80	200	-	-	10	5
6	CSA-706	Self-Study /GD/Seminar	-	-	-	-	200	200	-	-	2	1
	TOTAL		240	120	40	160	320	900	12	0	16	20

Program Elective-IV	
CSA-703	(A) Artificial Intelligence
	(B) Neural Networks
Open Core Elective-III	
CSA-704	(A) Information and Storage Management
	(B) Optimization Techniques

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Scheme of Examination - AICTE Pattern

Undergraduate Degree Courses in Engineering & Technology

Bachelor of Engineering (Computer Science Engineering)

VIII SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assignments/ Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-801	Web Engineering	60	30	10	30	20	150	3	0	2	4
2	CSA-802	Program Elective-V	60	30	10	-	-	100	3	0	0	3
3	CSA-803	Open Core Elective - IV	60	30	10	-	-	100	3	0	0	3
4	CSA-804	Project Stage-II	-	-	-	240	160	400	-	-	16	8
		TOTAL	180	90	30	270	180	750	9	0	18	18

Program Elective-V	
CSA-802	(A) Distributed Computing
	(B) Network Management
Open Core Elective-IV	
CSA-803	(A) Internet of Things
	(B) Mobile computing

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-501	Database Management Systems	2	1	0	3	3

Objectives :-

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Learning Outcomes:

Upon successful completion of this course, students should be able to:
- Describe the fundamental elements of relational database management systems
- Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
- Design ER-models to represent simple database application scenarios
- Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.

UNIT-I (9 Hr.)

Basic Concepts: - DBMS Concepts and architecture, Introduction, Review of file organization techniques, Database approach v/s Traditional File accessing approach, Advantages of database systems, Data models, Schemas and Instances, Data independence, Functions of DBA and designer, Entities and attributes, Entity types, Value, Sets, Key attributes, Relationships, Defining the E-R diagram of database,

UNIT-II (9 Hr.)

Data models and Relational Databases: - Various data models, Basic concepts of Hierarchical data model, Network data model, and Relational data model, Comparison between the three types of models, Relational Data models: - Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints, Intension and Extension,

UNIT-III (8 Hr.)

Relational Query languages & SQL: - Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union. SQL: - Data definition in

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SQL update statements and views in SQL, QUEL & QBE, Data storage and definitions, Data retrieval queries and update statements.

UNIT-IV (7 Hr.)

Database Design:- Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multi-valued dependencies.

UNIT-V (7 Hr.)

Advance Concepts:- Introduction of Distributed databases, protection, security and integrity constraints, concurrent operation on databases, recovery and transaction processing, basic concepts of object oriented data base system and design.

References:

1. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Toledo; Data base management systems;TMH
4. Panneeselvam "Database Management System" PHI
5. Date C J, "An Introduction To Database System", Addision Wesley
6. Ashutosh Kumar Dubey "Data Base Management Concepts" Katson Publication

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SSSUTMS SEHORE (M.P.)

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-501	Database Management Systems	0	0	2	1	2

LIST OF EXPERIMENTS:-

1. Study of DBMS, RDBMS and ORDBMS.
2. To study Data Definition language Statements.
3. To study Data Manipulation Statements.
4. Study of SELECT command with different clauses.
5. Study of SINGLE ROW functions (character, numeric, Data functions).
6. Study of GROUP functions (avg, count max, min, Sum).
7. Study of various type of SET OPERATORS (Union, Intersect, Minus).
8. Study of various type of Integrity Constraints.
9. Study of Various type of JOINS.
10. To study Views and Indices.

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SSSUTMS SEHORE (M.P.)

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-502	Computer Graphics	2	1	0	3	3

Objectives :-

This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application programming interface (OpenGL) by completing several programming projects.

Learning Outcomes:

At the end of this course students should:

Have a basic understanding of the core concepts of computer graphics.
Be capable of using OpenGL to create interactive computer graphics.
Understand a typical graphics pipeline.
Have made pictures with their computer

UNIT–I (9 Hr.)

Introduction and Overview of Graphics Systems:- Introduction to Computer Graphics, Application area of Computer Graphics, Introduction to Raster scan & Random scan displays, refreshing, flickering, interlacing, colour monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball, tablets and joysticks, graphical input techniques etc.

UNIT–II (7 Hr.)

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-spline Method.

UNIT–III (9 Hr.)

2-D Transformation: - Translation, Rotation, Scaling, Shearing, Reflection, Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping:- World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

UNIT–IV (7 Hr.)

3-D Transformations: - Translation, Rotation and Scaling, Parallel & Perspective Projection:- Types of Parallel & Perspective Projection, Hidden Surface elimination:- Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm, Curve generation.

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Bezier and Bspline methods. Basic Illumination Model:- Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading, Ray Tracing. Color models like RGB, YIQ, CMY, HSV.

UNIT–V (8 Hr.)

Multimedia :- Characteristics of a multimedia presentation, Uses of Multimedia, Text:- Types, Unicode Standard, text Compression, Text file formats, Audio Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats, Audio Processing software, Video: -Video color spaces, Digital Video, Digital Video processing, Video file formats, Animation:- Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation software's.

REFERENCES:-

1. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill

2. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-502	Computer Graphics	0	0	2	1	2

LIST OF EXPERIMENTS:-

1. To implement Bresenham"s algorithms for circle and ellipse drawing.
2. Program for Line Drawing using Bresenham"s algorithm using C and OpenGL.
3. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
4. To implement Cohen-Sutherland 2D clipping and window-viewport mapping.
5. To perform 3D Transformations such as translation, rotation and scaling.
6. To visualize projections of 3D images and Hidden Surface Elimination.
7. To convert between color models.
8. To implement text compression algorithm.
9. Program to implement basic graphics primitives in OpenGL.
10. Program for Line Drawing using DDA algorithm using C and OpenGL.

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-503	PHP TECHNOLOGY	2	1	0	3	3

Objectives: -

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

Learning Outcomes:

At the end of the course, students will have basic understanding of the web technology and be able to architect, write, debug, and run complete web applications using PHP and MySQL.

UNIT-I (8 Hr.)

Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression. Handling HTML Form With PHP: Capturing Form Data, Dealing with Multi-value filed, Generating File uploaded form , Redirecting a form after submission.

UNIT-II (8 Hr.)

Decisions and loop: Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html. Function: What is a function, Define a function, Call by value and Call by reference, Recursive function.

UNIT-III (8 Hr.)

String: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function. Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and for each(), Some useful Library function.

UNIT-IV (8 Hr.)

Working with file and Directories: Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading. State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session.

UNIT-V (8 Hr.)

String matching with regular expression: What is regular expression, Pattern matching in

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SSUTMS Sehore (M.P.)

Php, Replacing text, Splitting a string with a Regular Expression. Generating Images with PHP: Basics of computer Graphics, Creating Image, Manipulating Image, Using text in Image.

REFERENCES:

1. Learning PHP, MySQL, books by „ O" riley Press.

2. PHP & MySQL: Novice to Ninja by Kevin Yank.

3. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman.

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-503	PHP TECHNOLOGY	0	0	2	1	2

List of experiments:

1. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
2. Write a PHP program to display a digital clock which displays the current time of the server.
3. Write the PHP programs to do the following: a. Implement simple calculator operations. b. Find the transpose of a matrix. c. Multiplication of two matrices. d. Addition of two matrices.
4. Write a PHP program named states.py that declares a variable states with value "Mississippi Alabama Texas Massachusetts Kansas".
5. write a PHP program that does the following: a. Search for a word in variable states that ends in xas. Store this word in element 0 of a list named states List. b. Search for a word in states that begins with k and ends in s. Perform a case insensitive comparison. Store this word in element1 of statesList. c. Search for a word in states that begins with M and ends in s. Store this word in element 2 of the list. d. Search for a word in states that ends in a. Store this word in element 3 of the list.
6. Write a PHP program to sort the student records which are stored in the database using selection sort

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-504(A)	Formal Language & Automata Theory	3	1	0	4	4

Objectives: -

The main objective of this course is to introduce the major concept areas of language translation and and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

UNIT – I (8 Hr.)

Introduction of the theory of computation, Finite state automata– description of finite automata,properties of transition functions, Transition graph, designing finite automata, FSM, DFA, NFA, 2-way finite automata, equivalence of NFA and DFA, Mealy and Moore machines.

UNIT – II (8 Hr.)

Regular grammars, regular expressions, regular sets, closure properties of regular grammars, Arden's theorem, Myhill-Nerode theorem, pumping lemma for regular languages, Application of pumping lemma, applications of finite automata, minimization of FSA.

UNIT – III (8 Hr.)

Introduction of Context Free Grammar, derivation trees, ambiguity, simplification of CFGs, normal forms of CFGs, Chomsky Normal Form and Greibach Normal forms, Pumping lemma for CFLs, Decision algorithms for CFGs, Designing CFGs, Closure properties of CFL's.

UNIT – IV (8 Hr.)

Introduction of PDA, formal definition, closure property of PDA, examples of PDA, Deterministic Pushdown Automata, NPDA, conversion PDA to CFG, conversion CFG to PDA.

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UNIT – V (8 Hr.)

Turing machines: basics and formal definition, language acceptability by TM, examples of TM, variants of TMs: multitape TM, NDTM, Universal Turing Machine, offline TMs, equivalence of single tape and multitape TMs. Recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility. Introduction of P, NP, NP complete, NP hard problems and Examples of these problems.

REFERENCES:

1. Hopcroft & Ullman "Introduction to Automata theory, languages & Computation" , Narosha Publishing house.
2. Lewish Papadimitrou "Theory of Computation" , Prentice Hall of India, New Delhi.
3. Peter linz, "An Introduction to formal language and automata", Third edition, Narosa publication.
4. Marvin L. Minskay "Computation : Finite & Infinite Machines", PHI.
5. Mishra & Chander Shekhar "Theory of Computer Science (Automata, Language & Computations), PHI.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA- 504(B)	SIMULATION & MODELING	3	1	0	4	4

Objectives: -

The aim of this course is to introduce various system modelling and simulation techniques, and highlight their applications in different areas. It includes modelling, design, simulation, planning, verification and validation. After learning the simulation techniques, the students are expected to be able to solve real world problems which cannot be solved strictly by mathematical approaches. This course begins by demonstrating the usefulness of simulation as a tool for problem solving in business, industry, government, and society.

Learning Outcomes:

• Knowledge and understanding

Understand different methods for random number generation
Have a clear understanding of the need for the development process to initiate the real problem.
Have a clear understanding of principle and techniques of simulation methods informed by research direction.

• Cognitive skills (thinking and analysis)

(a) Be able to describe the components of continuous and discrete systems and simulate them.

(b) Be able to model any system from different fields

(c) Be able to implement numerical algorithm to meet simple requirements, expressed in English.

(d) Be able to discuss the simulation methods and select the suitable technique on the problems.

UNIT-I (9 Hr.)

Introduction to Modelling and Simulation: Nature of Simulation Systems, Models and Simulation, Continuous and Discrete Systems, system modelling, concept of simulation, Components of a simulation study, Principles used in modelling, Static and Dynamic physical

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models, Static and Dynamic Mathematical models, Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.

UNIT-II (8 Hr.)

System Simulation and Continuous System Simulation: Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model, Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages, Hybrid simulation, Real Time simulations.

UNIT –III (8 Hr.)

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT-IV (8 Hr.)

Simulation of Queueing Systems and Discrete System Simulation: Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue, Application of queuing theory in computer system, Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times.

UNIT-V (7 Hr.)

Introduction to Simulation languages and Analysis of Simulation output GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements, SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements, Estimation methods, Relication of Runs, Batch Means, Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes.

REFERENCES:

1. Gorden G., System simulation, Prentice Hall.

2. Seila, Simulation Modeling, Cengage Learning.

3. Law ,Simulation Modeling And Analysis, McGraw Hill.

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4. Deo, System Simulation with Digital Computer, PHI.

5. Harrington, Simulation Modeling methods, McGraw Hill.

6. Severance, " System Modeling & Simulation, Willey Pub.

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-505(A)	E-COMMERCE & GOVERNANCE	3	1	0	4	4

Objectives: -

The main objective of this course are to :-

Examine the different definitions of e-commerce and e-governance
Describe major players in e-commerce
Explain the key drivers of e-commerce
Attempt a classification of e-commerce
Mention the role played by governments in the development of e-commerce
Examine the prerequisites for e-governance
Identify the skills needed for the successful functioning of e-governance
Describe the different models of e-governance

Learning Outcomes:

On completing this module, you should know clearly the meaning of the terms E-commerce and E-governance. You should also be aware of the various e- governance initiatives in India. You also need to have an idea of the role libraries, especially public libraries, can play in such initiatives.

UNIT-I (8 Hr.)

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal, environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

UNIT-II (8 Hr.)

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

UNIT-III (8 Hr.)

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of egovernance, e-governance models broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

UNIT-IV (8 Hr.)

E-readiness, e-government readiness, E- Framework, step & issues, application of data.

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warehousing and data mining in e-government, Case studies: NICNET-role of nationwide networking in egovernance, e-seva.

UNIT-V (8 Hr.)

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

REFERENCES:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.

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SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Outcome based Curriculum for
Undergraduate Degree Courses in Engineering & Technology
Department of Computer Science & Engineering

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-505(B)	Signal & Systems	3	1	0	4	4

Objectives-

he main objectives of this course are :-

Understanding the fundamental characteristics of signals and systems.
Understanding the concepts of vector space, inner product space and orthogonal series.
Understanding signals and systems in terms of both the time and transform domains, taking advantage of the complementary insights and tools that these different perspectives provide.

Outcomes :-

Analyze system properties based on impulse response and Fourier analysis.
CO5: Apply the Laplace transform and Z- transform for analyze of continuous-time and discrete-time signals and systems.
CO6: Understand the process of sampling and the effects of under sampling.

Unit I- (8 Hr.)

Introduction to Signal & Systems: Signals, classification of signals, basic continuous time and discrete time signals, continuous LTI, discrete LTI systems , Impulse and step functions, Impulse response stability, linearity, stability, time invariance, Eigen values and Eigen functions, discrete convolution ,properties of discrete and continuous LTI systems ,systems described by difference and differential equations.

Unit II- (8 Hr.)

Fourier Analysis of Continuous Time Signals and Systems: Fourier series, Fourier series representation of continuous periodic signal & its properties, Fourier transform and its properties, parseval's theorem, frequency response of LTI systems.

Unit III- (8 Hr.)

Fourier Analysis of Discrete Time Signals & Systems: Discrete-time Fourier series, discrete time Fourier transform (including DFT) and properties, frequency response of discrete time LTI systems, continuous time fourier transform for periodic and non-periodic signals, properties of CTFT.

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Unit IV- (8 Hr.)

Laplace & Z-Transform Transform: Laplace transform and its inverse: definition, existence conditions, region of convergence and properties, application of Laplace transform for the analysis of continuous time LTI system, Z-Transform, properties of Z-transform inversion of Z-transform, two dimensional Z- transform, convergence of Z-transform, region of convergence and properties, application of Z-transform for the analysis of discrete time LTI systems, solving eq. using Z transform.

Unit V- (8 Hr.)

State Space Analysis: Concept of state, state space representation discrete time LTI systems , state space representation of continuous time LTI systems ,solutions of state equation for discrete time LTI systems , solutions of state equation for continuous time LTI systems ,FFT. Sampling: Sampling theorem, ideal & real sampling, reconstruction of signal from its samples, aliasing sampling in frequency domain, sampling of discrete-time signals.

References:

1. Alan V. Oppenheim, Alan S. Willsky and H. Nawab, Signals and Systems, Prentice Hall, 1997
2. Simon Haykin, Communication Systems, 3rd Edition, John Wiley, 1995.
3. Signals & Systems, 2nd Edition, by Alan Oppenheim, Alan Wilsky, S. Nawab. Prentice Hall, 1997.
4. Signals and Systems, by Simon Haykin and Barry Van Veen. Wiley, 1999.

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Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-506	Industrial Training-I	0	0	4	4	4

Course Outcomes:

At the end of this course students will gain the ability to

- Analyze the response application software used in industries
- Learn about various measures , and techniques for differen operation performed in application software
- Understand statistical data analysis
- Understand computerized data acquisition.
- Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
- Learn design, implement and test the prototype/algorithm in order to solve the conceived problem.
- Write comprehensive report on training work.

Guidelines:

- The industrial training is also a kind of team activity. Here development and design work with a focus on learning application environment.
- The software analysis in industries should be 50% of the total work.
- Industrial training cater a system required in laboratory or real life.
- Student is expected to learn out specifications, methodology, resources required, critical issues involved in design and implementation of software.
- The student is expected to exert on testing of the proposed results as per the industry.

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Department of Computer Science & Engineering

Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-601	Compiler Design	2	1	0	3	3

Objective:

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

Outcome

By the end of the course, the successful student will be able to do:

- To realize basics of compiler design and apply for real time applications.
- To introduce different translation languages –, To understand the importance of code optimization.
- To know about compiler generation tools and techniques.
- To learn working of compiler and non-compiler applications.
- Design a compiler for a simple programming language

UNIT–I (9 Hr.)

Introduction: Alphabets, Strings and Languages, Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.

UNIT–II (10 Hr.)

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Implementation of Lexical Analyzer. The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG, Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers.

UNIT–III (8 Hr.)

Bottom–Up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC, Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment,

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Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

UNIT–IV (8 Hr.)

Run Time Memory Management Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

UNIT–V(5 Hr.)

Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

REFERENCES:

1.Principles of compiler design -A.V. Aho , J.D.Ullman; Pearson Education.
2.Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
3.A. C. Holub, Compiler Design in C , Prentice-Hall Inc., 1993.
4.Raghavan, Compiler Design, TMH Pub.

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Outcome based Curriculum for

Undergraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering

Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-601	Compiler Design	0	0	2	1	2

List of Experiments:

1. Develop a lexical analyzer to recognize a few patterns.
2. Write a program to parse using Brute force technique of Topdown parsing.
3. Develop LL (1) parser (Construct parse table also).
4. Develop an operator precedence parser (Construct parse table also)
5. Develop a recursive descent parser
6. Write a program for generating for various intermediate code forms i) Three address code ii) Polish notation
7. Write a program to simulate Heap storage allocation strategy
8. Generate Lexical analyzer using LEX
9. Generate YACC specification for a few syntactic categories.
10. Given any intermediate code form implement code optimization techniques

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Department of Computer Science & Engineering

Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-602	Computer Network	2	1	0	3	3

Objective:

This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols.

Outcomes:

The students will be able to:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

UNIT–I (9 Hr.)

Introduction to computer networks and Internet, overview Advantages - network, Types- server based, peer, hybrid, Server types, Network Topology: Bus, Star, Ring, Star bus, Star ring, Mesh, Network Protocols Hardware Protocols, Software Protocols, Selecting and design the network for an organization.

UNIT-II (8 Hr.)

Signal Transmission: Digital signaling, Analog Signaling, Bit synchronization, Baseband and Broadband transmission, Network Media types- properties & specialties, Network adapters–working principals, configuration and selection.

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UNIT-III (8Hr.)

Network Layer: Network Layer Design issues, Store and Forward Packet Switching, connection less and connection oriented networks, routing algorithm's, optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT-IV (8 Hr.)

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP. Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Crash Recovery.

UNIT-V (7 Hr.)

UDP, RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP. Application Layer: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS; SSH.

REFERENCES:

1. Andrew & Tanenbaum, "Computer Network".
2. Prakash C Gupta, "Data Communication.
3. William Stallings, "Data and Computer Communication".
4. Computer Networking and the Internet (5th edition),Fred Halsall, Addison Wesley.
5. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill.

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Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-602	Computer Network	0	0	2	1	2

LIST OF EXPERIMENTS:

1. Establishment and configuration of LAN.
2. Study of WAN.
3. Case study of ARP AND RARP Protocols.
4. Study of basic networking commands like ping, ipconfig, etc.
5. Case study of various Routing Strategies.
6. Case studies of various Network Topologies.
7. Study of sliding window protocol.
8. Configuring routers, bridges and switches and gateways.
9. Case study of client-server application.
10. Study of IPv4, IPv6 Protocol.

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Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-603(A)	Advance Computer Architecture	3	1	0	4	4

Objective:

The objective of this course is to make students know about the Parallelism concepts in Programming, to give the students an elaborate idea about the different memory systems and buses, to introduce the advanced processor architectures to the students, to make the students know about the importance of multiprocessor and multicomputers, to study about data flow computer architectures.

Outcome:

Students will be able to:

- Demonstrate concepts of parallelism in hardware/software.
- Discuss memory organization and mapping techniques.
- Describe architectural features of advanced processors.
- Interpret performance of different pipelined processors.
- Explain data flow in arithmetic algorithms
- Development of software to solve computationally intensive problems

UNIT-I (9 Hr.)

Flynn"s Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and Multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and Software Parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, Data flow and Demand driven mechanisms. Static Interconnection networks, Dynamic interconnection Networks, Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

UNIT- II (9 Hr.)

Instruction set Architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning, Interleaved memory organization, Memory interleaving, Pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System, Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

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UNIT-III (8 Hr.)

Linear Pipeline Processor, Nonlinear Pipeline Processor, Instruction Pipeline design, Mechanisms for instruction Pipelining, Pipeline Hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic Pipeline, Multifunctional Arithmetic Pipelines. Superscaler Pipeline design, Super Pipeline Processor Design.

UNIT-IV (7 Hr.)

Cache Coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, Deadlock and virtual channel. Vector Processing Principles, Vector Instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD
organization, Distributed memory model and shared memory model. Principles of Multithreading, Multithreading Issues and Solutions, Multiple-Context Processors.

UNIT-V (7 Hr.)

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

REFERENCES:

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P. Hayes, "computer Architecture and organization"; MGH.
3.V.Rajaranam & C.S.R. Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning

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Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-603(B)	Advanced Data Structure	3	1	0	4	4

Objective:

The objective of this course is to impart the basic concepts of data structures and algorithms, to understand concepts about searching and sorting techniques, to Understand basic concepts about stacks, queues, lists, trees and graphs, to understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.

Outcome:

Students will be able to :

- Ability to analyze algorithms and algorithm correctness.
- Ability to summarize searching and sorting techniques
- Ability to describe stack, queue and linked list operation.
- Ability to have knowledge of tree and graphs concepts

UNIT-I (9 Hr.)

Introduction: Basic Terminology, Data types and its classification, Algorithm complexity notations like big Oh, Array Definition, Representation and Analysis of Arrays, Single and Multidimensional Arrays, Address calculation, Array as Parameters, Ordered List and operations, Sparse Matrices, Storage Pools, Garbage collection.

UNIT-II (9 Hr.)

Recursion: - Recursion- definition and processes, simulating recursion, Backtracking, Recursive algorithms, Tail recursion, Removal of recursion, Tower of Hanoi Problem. Linear Data Structure:- Stack, Array Implementation of stack, Linked Representation of Stack. Application of stack, Queue, Array and linked implementation of queues, Circular queues, D -queues and Priority Queues.

UNIT-III (8Hr.)

Introduction of Linked list. Implementation of Singly Linked List. Two-way Header List, Doubly linked List, Linked List in Array, Generalized linked list, Non Linear Data Structure :-Trees: Basic terminology, Binary Trees. , algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Binary Search Tree(BST), Height-balanced and weight-balanced trees, B-trees, B+ -trees.

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UNIT-IV (7 Hr.)

Searching, Sorting and Design Techniques:- Searching Techniques, Sorting-Internal Sorting, Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort, External Sorting, Merge Sort, Multi-way Merge Sort ,Design Techniques -Divide and Conquer, Dynamic Programming, Greedy Algorithm, Backtracking, Local Search Algorithms.

UNIT-V (7 Hr.)

Memory Management: -Issues -Managing Equal Sized Blocks, Garbage Collection Algorithms for Equal Sized Blocks, Storage Allocation for Objects with Mixed Sizes, Buddy Systems, Garbage collection and compaction.

Reference Books:

1. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education P
2. Lipschutz; Data structure (Schaum); TMH
3. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002

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Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-604(A)	Data Mining and Data Warehousing	3	0	0	3	3

Objectives:

The objective of this course is to familiar with mathematical foundations of data mining tools, Understand and implement classical models and algorithms in data warehouses and data mining, Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

Outcomes:

Students will be able to:

- Understand Data Warehouse fundamentals, Data Mining Principles
- Design data warehouse with dimensional modeling and apply OLAP operations.
- Identify appropriate data mining algorithms to solve real world problems
- Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
- Describe complex data types with respect to spatial and web mining

UNIT- I (9 Hr.)

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNIT-II (9 Hr.)

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT-III (7 Hr.)

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

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Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNIT-IV (8 Hr.)

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT-V (7 Hr.)

Data warehousing : Data warehouse, OLAP and Data mining, OLTP vs OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.

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SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Outcome based Curriculum for
Undergraduate Degree Courses in Engineering & Technology
Department of Computer Science & Engineering

Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-604(B)	Soft Computing	3	0	0	3	3

Objective:

The objective of this course is to develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory, introduce students to artificial neural networks and fuzzy theory from an engineering perspective.

Scope:

The students are expected to:

- Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
- Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
- To understand the fundamental theory and concepts of neural networks, identify different neural network architectures, algorithms, applications and their limitations
- Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
- Reveal different applications of these models to solve engineering and other problems

UNIT-I (9 Hr.)

Soft Computing:- Introduction of soft computing, soft computing vs hard computing, various types of soft computing techniques, applications of soft computing. Introduction to Neural Network:- Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervise & Unsupervised) and activation function, Models of ANN-Feed forward network and feedback network. Learning Rules Hebbian, Delta, Perceptron Learning and Windrow-Hoff, winner take all.

UNIT – II (9 Hr.)

Supervised Learning: Perceptron learning,- Single layer/multilayer, linear Separability.

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Adaline, Madaline, Back propagation network, RBFN. Application of Neural network in forecasting, data compression and image compression.

UNIT – III (7 Hr.)

Unsupervised learning: Kohonen SOM (Theory, Architecture, Flow Chart, Training Algorithm) Counter Propagation (Theory, Full Counter Propagation NET and Forward only counter propagation net), ART (Theory, ART1, ART2), Application of Neural networks in pattern and face recognition, intrusion detection, robotic vision.

UNIT – IV (7 Hr.)

Fuzzy Set: Basic Definition and Terminology, Set-theoretic Operations, Member Function, Formulation and Parameterization, Fuzzy rules and fuzzy Reasoning, Extension Principal and Fuzzy Relations, Fuzzy if-then Rules, Fuzzy Inference Systems. Hybrid system including neuro fuzzy hybrid, neuro genetic hybrid and fuzzy genetic hybrid, fuzzy logic controlled GA. Application of Fuzzy logic in solving engineering problems.

UNIT – V (7 Hr.)

Genetic Algorithm: Introduction to GA, Simple Genetic Algorithm, terminology and operators of GA (individual, gene, fitness, population, data structure, encoding, selection, crossover, mutation, convergence criteria). Reasons for working of GA and Schema theorem, GA optimization problems including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Network design routing, timetabling problem. GA implementation using MATLAB.

REFERENCES:

1. S.N. Shivnandam, "Principle of soft computing", Wiley
2. Rich E and Knight K. Artificial Intelligence, TMH, New Delhi.
3. Klir & Yuan, Fuzzy sets & Fuzzy Logic: Theory & Appli., PHI Pub.
4. S. Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.

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SCHOOL OF ENGINEERING

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Outcome based Curriculum for

Undergraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering

Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-605(A)	Information Theory & Coding	3	0	0	3	3

Objective:

The objectives of this course are to understand the fundamentals of Cryptography, to acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity, to understand the various key distribution and management schemes, to understand how to deploy encryption techniques to secure data in transit across data networks, to design security applications in the field of Information technology.

Outcome:

The students at the end of the course will be able to:

- Understand and explain the basic concepts of Information theory, source coding, channel and channel capacity, channel coding and relation among them.
- Describe the real life applications based on the fundamental theory.
- Calculate entropy, channel capacity, bit error rate, code rate, steady-state probability and so on.
- Implement the encoder and decoder of one block code or convolutional code using any program language

UNIT-I (9 Hr.)

Uncertainty, Information and Entropy Information Measures, Characteristics on Information
measure, Shannon's concept of information, Shannon's measure of information, Model for source coding theorem, Communication system, Source coding and line/channel coding, channel mutual information capacity (Bandwidth).

UNIT-II (8Hr.)

Channel coding, Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes, Types of codes, Block codes, Tree codes, Hamming Codes, Description of linear block codes by matrices, Description of linear tree code by matrices, Parity check codes, Parity check polynomials.

UNIT-III (9 Hr.)

Compression: Lossless and lossy, Huffman codes, Binary Image compression schemes, Run

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length Encoding, CCITT group-3 1D compression, CCITT group-3 2D compression, CCITT group-4 2D compression.

UNIT-IV (7 Hr.)

Video Image Compression: Requirement of full motion video compression, CCITT H 261 video coding algorithm, MPEG compression methodology, MPEG-2 compression, Audio (Speech)compression.

UNIT-V (7Hr.)

Cryptography: Encryption, Decryption, Cryptogram (cipher text), Concept of cipher, Cryptanalysis, Keys: Single key (Secret key), Cryptography, two-key (Public key) cryptography, Single key cryptography, Ciphers, Block Cipher code, Stream ciphers, Requirements for secrecy, The data Encryption Standard, Public Key Cryptography, Diffie-Hellmann public key distribution, The Rivest- Shamin Adelman(R-S-A) system for public key cryptography, Digital Signature.

REFERENCES:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. G A Jones | M Jones, "Information and Coding Theory", Springer Verlag, 2004.
3. Cole, "Network Security", Bible, Wiley INDIA, Second Addition.
4. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 2006.

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Department of Computer Science & Engineering

Subject Code	Subject	L	T	P	Credit	Hours/week
CSA-605(B)	Cyber Law & Ethics	3	0	0	3	3

Objective:

The Objectives Of This Course Is To Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Outcomes:

Student will be able to:

1. Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace.
2. Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace;
3. Develop The Understanding Of Relationship Between Commerce And Cyberspace; And
4. Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection.
5. Make Study On Various Case Studies On Real Time Crimes.

UNIT-I (9 Hr.)

Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II (9 Hr.)

Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws:

ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), e-taxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III (8 Hr.)

Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

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UNIT-IV (7 Hr.)

Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, Issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V (7 Hr.)

Copyright issues in cyberspace: linking, framing, protection of content on web site, International treaties, trademark issues in cyberspace: domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:

1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics", First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT, PHI Learning

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CSA-701
Ad-Hoc And Sensor Network

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-701	Ad-HOC AND SENSOR NETWORK	3	0	2	4

OBJECTIVE:-

To understand the state-of-the-art in network protocols, architectures and applications, Analyze existing network protocols and networks, Develop new protocols in networking, To understand how networking research is done, To investigate novel ideas in the area of Networking via term-long research projects

OUTCOME:-

After completion of the course the student will be able to

- Describe the unique issues in ad-hoc/sensor networks.
- Describe current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks.
- Discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks.
- Discuss the challenges in designing routing and transport protocols for wireless Ad-hoc/sensor networks.

UNIT-I (8 Hr.)

Introduction :Introduction-Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, GSM, GPRS, PCS, WLAN and UMTS, Components of Packet Radios, Routing in PRNETs, Ad Hoc Wireless Networks, Wireless Sensor Networks, Traffic Profiles, Types of Ad Hoc Mobile Communications, Types of Mobile Host Movements, Challenges Facing Ad Hoc Mobile Networks.

UNIT II (9 Hr.)

Ad Hoc wireless MAC protocols-Introduction, Synchronous and asynchronous MAC protocols, Problem in Ad Hoc channel access, Receiver-initiated and sender-initiated MAC protocols, Existing Ad Hoc MAC protocols, Ad Hoc Routing Protocols-Introduction, Classifications of Routing Protocols: Table-Driven Routing Protocols –Destination Sequenced

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Distance Vector (DSDV), Wireless Routing Protocol (WRP), Source-Initiated On-Demand Approaches -Ad Hoc On-Demand Distance Vector Routing (AODV), Dynamic Source Routing (DSR), Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) LocationAided Routing (LAR).

UNIT III (8 Hr.)

Multicast routing In Ad Hoc Networks : Introduction, Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols, An Architecture Reference Model for Multicast Routing Protocols, Classifications of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols, Mesh-Based Multicast Routing Protocols, Summary of Tree-and Mesh-Based Protocols -Energy-Efficient Multicasting.

UNIT IV (7 Hr.)

Transport Layer, Security Protocols : Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management.

UNIT V (8 Hr.)

QoS and Energy Management : Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classifications of QoS Solutions, MAC Layer Solutions, Network Layer Solutions,Energy Management in Ad Hoc Wireless Networks –Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Energy Management Schemes.

REFERENCES BOOKS:-

1. C. Siva Ram Murthy and B.S. Manoj "Ad Hoc Wireless Networks: Architectures and Protocols", Pearson Education.

2. C.K. Toh, "Ad Hoc Mobile Wireless Networks: Protocols and Systems", Pearson Education.

3. George Aggelou, "Mobile Wireless Networks", Tata McGraw-Hill.

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LIST OF EXPERIMENT:-

1. Introduction of Wireless sensor network applications and its simulation.
2. Network Simulator installation of wireless sensor network.
3. Write TCL script for transmission between mobile nodes.
4. Write TCL script for sensor nodes with different parameters.
5. Generate tcl script for udp and CBR traffic in WSN nodes.
6. Generate tcl script for TCP and CBR traffic in WSN nodes.
7. Implementation of routing protocol in NS2 for AODV protocol.
8. Implementation of routing protocol in NS2 for DSR protocol.
9. Implementation of routing protocol in NS2 for TORA protocol.
10. Study other wireless sensor network simulators (Mannasim, Contiki.)

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CSA-702
Digital Image Processing

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CRADIT
CSA-702	DIGITAL IMAGE PROCESSING	3	0	2	4

OBJECTIVE:-

- Describe and explain basic principles of digital image processing;
- Design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement);
- Design and implement algorithms for advanced image analysis (e.g., image compression, image segmentation & image representation);
- Assess the performance of image processing algorithms and systems.

OUTCOME:-

- Design and Implementation of different transforms like: Fourier Transform, Z Transform, Discrete Cosine Transform, Walsh Transform, Hadamard Transform,
- Design and Implementation of Digital Filters like: FIR, IIR.
- Design and Implementation of multi-rate and adaptive systems.
- Power spectrum estimation and analysis

UNIT-I (8 Hr.)

Digital Image Processing: Elements of a Digital Image Processing system, Structure of the Human eye, Image formation and contrast sensitivity, Sampling and Quantization, Neighbors of a pixel, Distance measures, Photographic file structure and exposure, File characteristics, Linear scanner, Video camera, Image processing applications.

UNIT-II (7 Hr.)

Image Transforms: Introduction to Fourier transform DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transform, Hadamard transform, Discrete Cosine transform.

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UNIT-III (8 Hr.)

Image Enhancement: Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Lowpass filtering, Averaging of multiple images, Image sharpening by differentiation and high pass filtering.

UNIT-IV (9 Hr.)

Image Restoration: Definition, Degradation model, Discrete formulation, Circulant matrices, Block circulant matrices, Effect of diagnolization of circulant and block circulant matrices, Unconstrained and constrained restorations, Inverse filtering, Wiener filter, Restoration in spatial domain.

UNIT-V (8 Hr.)

Image Encoding: Objective and subjective fidelity criteria, Basic encoding process, The mapping, The quantizer, The coder, Differential encoding, Contour encoding, Run length encoding, Image encoding relative to fidelity criterion, Differential pulse code modulation.

REFERENCES:

1. Rafael, C. Gonzlez., and Paul, Wintz, "Digital Image Processing", Addison-Wesley Publishing Company.
2. Jain Anil K., "Fundamentals of Digital Image Processing", Prentice Hall.
3. Sosenfeld, and Kak, A.C., "Digital Image Processing", Academic Press
4. William K. Pratt., "Digital Image Processing", John Wiley and Sons.

LIST OF EXPERIMENT:-

1. To study the Image Processing concept.
2. To obtain histogram equalization image.
3. To Implement smoothing or averaging filter in spatial domain.
4. Program for opening and closing of the image.
5. To fill the region of interest for the image.
6. Program for edge detection algorithm.
7. Program of sharpen image using gradient mask.
8. Program for morphological operation; erosion and dilation
9. Program for DCT/IDCT computation.

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CSA-703(A)
Artificial Intelligence

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-703(A)	ARTIFICIAL INTELLIGENCE	3	0	0	3

OBJECTIVE:-

It presents the concepts of Artificial Intelligence and the participants will get to work in the areas of Machine learning, Deep Learning, implement methods to solve problems using Artificial Intelligence and Natural Language Processing, etc.

OUTCOME:-

This course is designed in synchronization with the industry to provide the participants in-depth knowledge and skills required by AI fields around the globe. It provides comprehensive knowledge about the fundamental principles, methodologies and industry practices in AI.

- Fundamentals of neural networks and fuzzy logic.
- Supervised learning and unsupervised learning.
- Neuro dynamical models

UNIT-I (9 Hr.)

Introduction: Artificial Intelligence, AI Problems, AI Techniques, The Level of the Model, Criteria For Success. Defining the Problem as a State Space Search, Problem Characteristics, Production Systems, Search: Issues in The Design of Search Programs, Un-Informed Search, BFS, DFS; Heuristic Search Techniques: Generate-And-Test, Hill Climbing, Best-First Search, A*Algorithm, Problem Reduction, AO*Algorithm, Constraint Satisfaction, Means-Ends Analysis.

UNIT:-II (8 Hr.)

Knowledge Representation: Procedural Vs Declarative Knowledge, Representations & Approaches to Knowledge Representation, Forward Vs Backward Reasoning, Matching Techniques, Partial Matching, Fuzzy Matching Algorithms and RETE Matching Algorithms; Logic Based Programming-AI Programming languages: Overview of LISP, Search Strategies in LISP, Pattern matching in LISP , An Expert system Shell in LISP, Over view of Prolog, Production System using Prolog

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UNIT-III (8 Hr.)

Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning, Truth Maintenance Systems, Logics for Non-Monotonic Reasoning, Model and Temporal Logics; Statistical Reasoning: Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Probabilistic Inference, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic: Crisp Sets ,Fuzzy Sets, Fuzzy Logic Control, Fuzzy Inferences & Fuzzy Systems.

UNIT-IV (7 Hr.)

Overview of Computational Intelligence and Artificial Evolution , Artificial Neural Networks (ANNs), Introduction to ANNs, Learning in ANNs, Supervised Learning in ANNs, Unsupervised Learning in ANNs, Reinforcement Learning in ANNs, Deep Learning in ANNs, Performance of ANNs.

UNIT-V (8 Hr.)

Artificial Evolution, Fundamentals of Evolution, Introduction to Evolutionary Computation (EC), Common EC Methods, Genetic Algorithms, Genetic Programming, Evolutionary Programming, Evolution Strategies, Grammatical Evolution, Cultural Evolution, Introduction to Artificial Life (A Life), Artificial Neural Networks and Artificial Evolution, Introduction to Neuro evolution, Topology Evolution, Learning Rule Evolution, Deep Neuro evolution.

TEXTBOOKS:-

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence, Elaine Rich and Knight, Mcgraw-Hill Publications
3. Computational Intelligence: An Introduction, Second Edition, Andries P. Engelbrecht, 2007.
4. Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies, Dario Floreano and Claudio Mattiussi, 2008, The MIT Press
5. Writing for Computer Science, Third Edition, Justin Zobel, 2014, Springer

REFERANCES:-

1. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI
2. Multi Agent systems-a modern approach to Distributed Artificial Intelligence, Weiss.G, MIT Press.
3. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall

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CSA-703(B)
Neural Network

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CRADIT
CSA-703(B)	Neural Network	3	0	0	3

Objective:
Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.

Outcomes:

- Describe the structure and function of the most common artificial neural network (ANN) types, e.g. multi-layer perceptron, recurrent network, self-organizing maps, Boltzmann machine, deep belief network, auto encoder, and provide examples of their applications
- Explain mechanisms of supervised/unsupervised learning from data and information processing in different ANN architectures, and also account for derivations of the basic ANN algorithms discussed in the course
- Demonstrate when and how deep architectures lead to increased performance in pattern recognition and data mining problems
- Quantitatively analyse the process and outcomes of learning in ANNs, and account for their shortcomings, limitations
- Apply, validate and evaluate suggested types of ANNs in typical small problems in the realm of regression, prediction, pattern recognition, scheduling and optimisation
- Devise and implement ANN approaches to selected problems in pattern recognition, system identification or predictive analytics using commonly available development tools, and critically examine their applicability

Unit-I

Neural Network (NN): Introduction, benefits of neural network, models of a neuron, neural network as directed graph, network architectures, artificial intelligence and neural network. **Learning processes:** error correction learning, memory based learning, Hebbian learning, competitive learning, Boltzman learning, learning tasks, adaptation, statistical nature of learning process, statistical learning theory.

Unit-II

Perceptrons
Single layer perceptrons: adaptive filtering problem, unconstrained optimization technique, linear least squares filter, least mean square algorithm (LMS), perceptron convergence theorem

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Multilayer perceptron: architecture, back propagation algorithm, generalization, approximations of functions, network pruning techniques

Unit-III

Radial Basis Function (RBF) Networks: Cover's theorem on the separability of patterns, interpolation problem, supervised learning as an ill-posed hypersurface reconstruction problem, regularization theory, regularization network, generalized radial basis function networks (RBF), estimation of the regularization parameter, approximation properties of RBF networks, comparison of RBF networks and multilayer perceptrons, Kernel regression and its relation to RBF networks, learning strategies.

Unit-IV

Information-Theoretic Models: Entropy, maximum entropy principle, mutual information, Kullback-Leibler divergence, mutual information as an objective function to be optimized, maximum mutual information principle, infomax and redundancy reduction, spatially coherent and incoherent features, independent components analysis, maximum likelihood estimation, maximum entropy method.

Unit V

Dynamically Driven Recurrent Networks: Introduction, recurrent network architectures, state space model, non-linear autogressive with exogenous inputs model, computational power of recurrent networks, learning algorithms, back propagation through time, real time recurrent learning, Kalman filter, decoupled Kalman filter, vanishing gradients in recurrent networks, system identification, model reference adaptive control.

References:

1. S. Haykin: Neural Networks- A Comprehensive Foundation, PHI Learning.
2. S. N. Sivanandam, S. Sumathi and S. N. Deepa: Introduction to Neural Networks using Matlab 6.0, TMH, New Delhi.
3. J. A Freeman and D. M. Skapura: Fundamentals of Neural Networks- algorithms, applications and programming techniques, Pearson Education.
4. M. T. Hagan, H. B. Demuth and M. Beale: Neural Network Design, Cengage Learning.
5. J.A Anderson: An introduction ro Neural Networks, PHI Learning.
6. Satish Kumar: Neural Networks, TMH, New Delhi.

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CSA-704(A)
Information And Storage Management

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-704(A)	INFORMATION AND STORAGE MANAGEMENT	3	0	0	3

OBJECTIVE:-

ISM is very useful for efficient and effective planning and control functions of the management. Management is the art of getting things done through others. MIS will be instrumental in getting the things done by providing quick and timely information to the management. Reports give an idea about the performance of men, materials, machinery, money and management. Reports throw light on the utilization of resources employed in the organization.

OUTCOME:-

- Search, retrieve and synthesize information from a variety of systems and sources.
- Evaluate systems and technologies in terms of quality, functionality, cost-effectiveness and adherence to professional standards.
- Integrate emerging technologies into professional practice.
- Apply theory and principles to diverse information contexts

UNIT-I (0 Hr.)

Introduction:-Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components,Data creation and The value of data to a business,Information Lifecycle Management, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Center Infrastructure,Data categorization.

UNIT-II (0 Hr.)

Storage Systems Architecture:-Intelligent disk subsystems overview, Contrast of integrated vsmodular arrays, Compunent architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

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UNIT-III (9 Hr.)

Introduction To Networked Storage:-Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS,IP-SAN, Applications, Elements, connectivity, standards, management security and limitations of DAS, NAS, CAS & SAN.

Introduction to Information Availability: -Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques.

UNIT-IV (8 Hr.)

Managing & Monitoring:-Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management, Metric analysis methodologies & trend analysis, Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview.

UNIT-V (7 Hr.)

Securing Storage and Storage Virtualization:-Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes.

REFERENCE BOOKS:

1. EMC Corporation, Information Storage and Management. Wiley, India.
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne,
3. Marc Farley, "Building Storage Networks", Tata McGraw Hill ,Osborne, 2001.
4. Additional resource material on www.emc.com/resource-library/resource-library.esp

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Syllabus of Examination - AICTE Pattern

Undergraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering

CSA-704(B)
Optimization Techniques

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-704(B)	OPTIMIZATION TECHNIQUES	3	0	0	3

OBJECTIVE:-

The student should be made to:

- Be exposed to compiler writing tools.
- Learn to implement the different Phases of compiler
- Be familiar with control flow and data flow analysis
- Learn simple optimization techniques

OUTCOME:-

- Implement the different Phases of compiler using tools
- Analyze the control flow and data flow of a typical program
- Optimize a given program
- Generate an assembly language program equivalent to a source language program

UNIT-I (8 Hr.)

INTRODUCTION Non-linear programming. Mathematical fundamentals. Numerical evaluation of gradient. Unconstrained Optimization: One dimensional, single variable optimization. Maximum of a function. Unimodal-Fibonacci method. Polynomial based methods.

UNIT-II (7 Hr.)

UNCONSTRAINED MINIMIZATION Multivariable functions. Necessary and sufficient conditions for optimality. Convexity. Steepest Descent Method -Convergence Characteristics. Conjugate Gradient Method. Linear programming -Simplex Method.

UNIT-III (8 Hr.)

CONSTRAINED MINIMIZATION Non-linear programming. Gradient based methods. Rosens's gradient, Zoutendijk's method, Generalized reduced gradient, Sequential quadratic programming. Sufficient condition for optimality.

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UNIT-IV (9 Hr.)

DIRECT SEARCH METHODS : Direct search methods for nonlinear optimization. Cyclic coordinate search. Hooke and Jeeves Pattern search method. Generic algorithm. Discrete And Dynamic Programming: Integer and discrete programming. Branch and bound algorithm for mixed integers. General definition of dynamic programming problem. Problem modeling and computer implementation. Shortest path problem.

UNIT -V (8 Hr.)

OPTIMIZATION APPLICATION: Transportation problem. Transportation simplex method. Network problems. Maximum flow in networks. General definition of dynamic programming. Problem modeling and computer implementation. Finite Element Based Optimization: Parameter optimization using gradient methods -Derivative calculation. Shape optimization. Topology optimization of continuum structures

After Class Students should learn:

1. Implementation of Symbol Table
2. Develop a lexical analyzer to recognize a few patterns in C, (Ex. identifiers, constants, comments, operators etc.)
3. Implementation of Lexical Analyzer using LEX Tool
4. Convert the BNF rules into YACC form and write code to generate Abstract Syntax Tree.
5. Implement control flow analysis and Data flow Analysis
7. Implement any one storage allocation strategies (Heap, Stack, Static)
8. Implementation of Simple Code Optimization Techniques (Constant Folding., etc.)

TEXT BOOK

1. George Leitmann, Optimization Techniques, Volume 51st Edition, ISBN: 9780080955131, Academic Press

REFERENCES BOOK

1.Foulds, L. R, Optimization Techniques anintroduction, springer

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CSA-705
Project Stage-I

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-705	PROJECT STAGE-I	-	-	10	5

Students must observe following points to enrich their learning in electrical engineering during industrial training:

- **The training must be the advance/ different already done on minor training**
- **Industrial environment and work culture**
- **Organizational structure and inter personal communication**
- **Machines/ equipment/ instruments -their working and specifications.**
- **Product development procedures and phases.**
- **Project planning, monitoring and control.**
- **Quality control and assurance.-Maintenance system.**
- **Costing system.-Stores and purchase systems.-Roles and responsibilities of different categories of personnel.**
- **Customer services.**
- **Problems related to various areas of Work etc.**
- **Layout if any**

To be submitted :The students has to submit the power point presentation of minimum15 slides of the training performed (comprising of points stated above) along with the original certificate of training performed with proper seal and signature of the authorized person.

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CSA-706
Self-Study/GD/Seminar

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-706	SELF STUDY/GD/SEMINAR	-	-	2	1

Objective

To improve the mass communication and convincing / understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group discussion and power point presentation. A group discussion among students is being organized to see and evaluate their thinking skills, listening abilities and how they are communicating their thoughts. One should learn to control the conversation through listening attentively and then having the perseverance to mold it towards his/her own direction.

Outcomes:

- Analytical thinking
- Lateral thinking
- constructive argument
- Communication skill
- Presentation of views

Students will discuss the course related and interdisciplinary topics for problem solving. They will improve the mass communication and convincing / understanding skills about subject and their related problem in a group of students.

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CSA-801
Web Engineering

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-801	WEB ENGINEERING	3	0	2	4

OBJECTIVE:-

The goals of the course are as follows: To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents

OUTCOME:-

- Employ techniques to analyze and evaluate software architectures on a real-world large-scale web-based software systems.
- Create and document reference architecture for a non-trivial Web based technological product.
- Present findings of case study analysis of software architectures of a family of large-scale web-based software systems.
- Envision an innovative product for a wicked problem and develop an architecture for the product that utilizes service-oriented computing technologies.
- Write a research-in-progress paper on a Web engineering topic that utilizes Design Science Research methodology and adheres to appropriate academic standards.

UNIT-I (8 Hr.)

Web Engineering: Introduction, History, Evolution and Need, Time line, Motivation, Categories & Characteristics of Web Applications, Web Engineering Models, Software Engineering v/s Web Engineering. World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP. Browser and search engines: Introduction, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines. Web Servers: Introduction, Features, caching, case study-IIS, Apache.

UNIT II (9 Hr.)

Information Architecture: Role, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets Website Design: Development, Development phases, Design Issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content, Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems, Good & bad web design, Process of Web Publishing, Web-site enhancement, submission of website to search engines. Web security: issues,

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security audit. Web effort estimation, Productivity Measurement, Quality usability and reliability. Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, ,Notations Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application.

UNIT III (8 Hr.)

Technologies for Web Applications I: HTML and DHTML: Introduction, Structure of documents, Elements, Linking, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, CSS, Positioning with Style sheets, Forms Control, Form Elements. Introduction to CGI, PERL. JAVA SCRIPT, JSP,PHP, ASP & AJAX. Cookies: Creating and Reading

UNIT IV (7 Hr.)

Technologies for Web Applications II: XML: Introduction, HTML Vs XML, Validation of documents, DTD, Ways to use, XML for data files, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology

UNIT V (8 Hr.)

E-Commerce: Business Models, Infrastructure, Creating an E-commerce WebSite, Environment and Opportunities. Modes & Approaches, Marketing & Advertising Concepts. Electronic Publishing issues, approaches, legalities and technologies, Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act. Electronic Cash, Electronic Payment Systems: RTGS, NEFT, Internet Banking, Credit/Debit Card. Security: Digital Certificates & Signatures, SSL, SET, 3D Secure Protocol.

Recommended Books:

1. Roger S. Pressman, David Lowe, "Web Engineering", Tata Mc Graw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P , Akilandeswari, "Web Technology: A Developer s Perspective" , PHI
4. Neil Gray, "Web server Programming" Wiley
5. Chris Bates, "Web Programming: Building Internet applications" Wiley
6. Moller, "An Introduction to XML and Web Technologies", Pearson Education New Delhi, 2009
7. "Web Technologies: Black Book", Kogent, Dreamtech

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8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9. C. Xavier, "Web Technology & Design ", Tata McGraw Hill.
10. Ivan Bay Ross, "HTML, DHTML, Java Script, Perl CGI" , BPB

LIST OF EXPERIMENTS:

1. Program to show HTML Page Structure.
2. Program to show the Impact of HTML Headings.
3. Program to show the Id attribute in HTM page.
4. Program to show The HTML <style> Element
5. Create The IT Department website home page for various tags.
6. Program to Make a hyperlink of an image in HTML.
7. Program to implement table in HTML.
8. Program for HTML Document, which provides a form that collects names and phone numbers.
9. JavaScript program to show factorial of a number.
10. Design a Home Page for IT Department OIST using various HTML Tags.

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Syllabus of Examination - AICTE Pattern

Undergraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering

CSA-B02(A)
Distributed Computing

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CREDIT
CSA-802(A)	DISTRIBUTED COMPUTING	3	0	0	3

OBJECTIVE:

1. To learn the principles, architectures, algorithms and programming models used in distributed systems.
2. To examine state-of-the-art distributed systems, such as Google File System.
3. To design and implement sample distributed systems.

OUTCOME:

- Students will identify the core concepts of distributed systems: the way in which several machines orchestrate to correctly solve problems in an efficient, reliable and scalable way.
- Students will examine how existing systems have applied the concepts of distributed systems in designing large systems, and will additionally apply these concepts to develop sample systems.

UNIT-I (7 Hr.)

Introduction to distributed systems Architecture: for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System.

UNIT-II (9 Hr.)

Distributed Share Memory And Distributed File System :Basic Concept of Distributed Share Memory (DSM), DSM Architecture & Its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing, Desirable features of good Distributed File System, File Model ,File Service Architecture ,File Accessing Model ,File Sharing Semantics, File Catching Scheme ,File Application & Fault tolerance, Naming: Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

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UNIT-III (8 Hr.)

Inter Process Communication And Synchronization API for Internet Protocol :Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages ,Synchronization :Clock Synchronization, Mutual Exclusion, Election Algorithms: Bully & Ring Algorithms

UNIT-IV (8 Hr.)

Distributed Scheduling And Dead lock Distributed Scheduling: Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues, Deadlock-Issues indead lock detection & Resolutions ,Deadlock Handling Strategy, Distributed Deadlock Algorithms.

UNIT-V (8 Hr.)

Distributed Multimedia &Database system: Distributed Data Base Management System(DDBMS), Types of Distributed Database, Distributed Multimedia: Characteristics of multimedia Data, Quality of Service Managements.

REFERENCES:

1.Sinha,Distributed Operating System Concept & Design, PHI.
2. Coulouris & Dollimore, Distributed System Concepts and Design, Pearson Pub
3. Singhal & Shivratari, Advance Concept in Operating System, McGraw Hill.
4. Attiya &Welch, Distributed Computing, Wiley Pub

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CSA-802(B)
Network Management

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CRADIT
CSA-802(B)	NETWORK MANAGEMENT	3	0	0	3

OBJECTIVE:-

Network management and security are essential factors in the reliable, efficient, and secure operation of networks. As businesses become increasingly dependent on networking services, keeping these services running and secure becomes synonymous with keeping the business running. This course provides a thorough introduction to network management technologies and standards as well as to a wide variety of techniques for evaluating, monitoring, and defending the security of computer networks and systems.

OUTCOME:-

On the successful completion of the course, students will be able to

- Examine the need of security for the given network scenario.
- Criticize the preventive measures to secure routing and switching.
- Design of firewall, VPN and IDS / IPS for the given network.
-

UNIT-I (8 Hr.)

Network Management Framework, Network Based Managements, Evolution of Network Management: SGMP, CMIP, SNMP, Network Implementation and Management Strategies, Network Management Categories: Performance Management, Fault Management, Configuration Management, Security Managements, Accounting Managements. Network Management Configuration: Centralized Configuration, Distributed Configuration, Selected Management Strategy

UNIT:-II (8 Hr.)

Management Information Base (MIB), Structure of Management Information, NMS Presentation of the SMI, NMS Meter-ware Network View, Remote Monitoring (RMON), RMON Group. Desktop Management: Desktop Management Interface (DMI), DMI Architecture, DMI Browser, DMI/SNMP Mapping, Desktop SNMP Extension Agents, Setting up LAN Access, SNMP Configuration.

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UNIT-III (9 Hr.)

Introduction, layering, OSI Layering, TCP/IP Layering, Protocols & Standards, Internet standards, Internet administration, Internet Addresses, Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask, special case of IP addresses, Comparative Study of IPV4 & IPV6, port numbers Address Resolution Protocol, ARP packet format, Proxy ARP, ARP command, ARP Example, Reverse Address Resolution Protocol (RARP): Introduction, RARP Packet format, RARP Examples, RARP server design

UNIT-IV (8 Hr.)

Delivery and Routing of IP Packets, Routing Methods, Static versus Dynamic Routing, Routing table and Routing Module, Classless Addressing: CIDR. Internet Protocol (IP), Datagram, Fragmentation, Options, IP Package, Interior and Exterior Routing, Routing Information protocol (RIP), Open shortest path first protocol (OSPF), BGP, GGP, Private Networks, Virtual Private Network (VPN), Network Address Translation (NAT).

UNIT-V (7 Hr.)

Internet Control Message Protocols (ICMP):-Types of message, message format, error reporting, query, checksum, ICMP Package. IGMP, IGMP Message and its Operation, IGMP Package. Transmission control protocol, Process-to-Process Communication, TCP Services Flow Control, TCP Timers, TCP Operation, TCP Package, Application layers protocol, Telnet Protocol, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), X-Window system protocol, Remote procedure call, and Network file system.

REFERENCES:

1. Forouzan, TCP/IP Protocol Suite 4th edition, TMH
2. Stevens, TCP/IP Illustrated Volume-I, Pearson
3. J.Richard Burkey, Network Management Concept and Practice, PHI

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CSA-803(A)
Internet Of Things

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CRADIT
CSA-803(A)	INTERNET OF THINGS	3	0	0	3

OBJECTIVE:
Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices.

OUTCOME:
- Able to understand the application areas of IOT
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics.

UNIT –I (7 Hr.)

Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

UNIT–II (8 Hr.)

Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

UNIT–III (9 Hr.)

Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles, Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

UNIT–IV (8 Hr.)

Sensor Technology, Participatory Sensing, Industrial IOT and Automotive IOT, Actuator, Sensor data Communication Protocols, Radio Frequency Identification Technology, Wireless Sensor Network Technology.

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UNIT–V (8 Hr.)

IOT Design methodology: Specification requirement, process, model, service, functional & operational view, IOT Privacy and security solutions, Raspberry PI & Arduino Devices. IOT Case studies, smart city streedlights control & monitoring.

REFERENCES:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition , Universal Press.
3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
4. Charless Bell "MySQL for the Internet of things", A press publications

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CSA-B03(B)
Mobile Computing

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CRADIT
CSA-B03(B)	MOBILE COMPUTING	3	0	0	3

OBJECTIVE:-

The objective of this course is to learn about the concepts and principles of mobile computing; to explore both theoretical and practical issues of mobile computing; to develop skills of finding solutions and building software for mobile computing applications

OUTCOME:-

- Describe the basic concepts and principles in mobile computing
- Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
- Explain the structure and components for Mobile IP and Mobility Management
- Understand positioning techniques and location-based services and applications
- Describe the important issues and concerns on security and privacy Professional Skill
- Design and implement mobile applications to realize location-aware computing
- Design algorithms for location estimations based on different positioning techniques and platforms
- Acquire the knowledge to administrate and to maintain a Wireless LAN Attitude
- Recognize the important issues and concerns on security and privacy

UNIT-I (7 Hr.)

INTRODUCTION: Introduction to Mobile Computing –Applications of Mobile Computing-Generations of Mobile Communication Technologies-Multiplexing –Spread spectrum -MAC Protocols –SDMA-TDMA-FDMA-CDMA

UNIT-II (9 Hr.)

MOBILE TELECOMMUNICATION SYSTEM: Introduction to Cellular Systems –GSM –Services & Architecture –Protocols –Connection Establishment –Frequency Allocation –Routing – Mobility Management –Security –GPRS-UMTS –Architecture –Handover –Security

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UNIT-III (8 Hr.)

MOBILE NETWORK LAYER: Mobile IP –DHCP –AdHoc–Proactive protocol-DSDV, Reactive Routing Protocols –DSR, AODV , Hybrid routing –ZRP, Multicast Routing-ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET –Security.

UNIT-IV (8 Hr.)

MOBILE TRANSPORT AND APPLICATION LAYER: Mobile TCP–WAP –Architecture –WDP - WTLS –WTP –WSP –WAE –WTA Architecture –WML

UNIT-V (8 Hr.)

MOBILE TRANSPORT AND APPLICATION LAYER: Mobile Device Operating Systems –Special Constraints & Requirements –Commercial Mobile Operating Systems –Software Development Kit: iOS, Android, BlackBerry, Windows Phone –M Commerce –Structure –Pros & Cons –Mobile Payment System –Security Issues

TEXT BOOKS:

1. JochenSchiller, —Mobile Communications, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile Computing, PHI Learning Pvt Ltd, New Delhi –2012

REFERENCES:

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile Computing||, Springer, 2003.
3. William, C. Y. Lee,—Mobile Cellular Telecommunications-Analog and Digital Systems||, Second Edition, Tata McGraw Hill Edition ,2006.
4. C. K. Toh, —AdHoc Mobile Wireless Networks||, First Edition, Pearson Education, 2002.
5. Android Developers : http://developer.android.com/index.html
6. Apple Developer : https://developer.apple.com/
7. Windows Phone Dev. Center : http://developer.windowsphone.com
8. BlackBerry Developer : http://developer.blackberry.com

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CSA-804

Project Stage -II

SUBJECT CODE	SUBJECT NAME	L	T	P	TOTAL CRADIT
CSA-804	PROJECT STAGE -II	-	-	16	8

Project -II should be the outcome of the training done/performed during after 7th semester . It should be submitted in hardware form (prototype)or simulation form along with proper data and certificates issued during project training. It should cover the electrical engineering aspects learned during training. A Power point presentation should also be submitted at the time of submission. It can be in the form of major project.

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Ref. No.: SSUTMS/CSE/01 Date: 14/06/2017

Name of Faculty: School of Engineering

Name of Department: Computer Science and Engineering

Minutes of Board of Studies Committee Meeting Dated on 14-06-2017

The Board of Studies Committee was held in room of Department of Computer Science and Engineering at 2:00 PM. on 14-06-2017, Following members were present.

1. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
2. Dr. Tryambak Hiwarkar, Prof., Chairman
3. Mr. Jitendra Sheetlani, Asst. Prof., Member
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap Singh, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

Agenda:

Modification in Scheme and Syllabus of M Tech.(CSE/SE/CTA) III Sem.

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Bhopal-Indore Road, Opp. Pachama oilfed plant, Pachama, Dist.-Sehore M.P.PIN-466001 Ph. 07562-223647, Fax : 07562-223644, Web: www.ssutms.co.in, info@ssutms.co.in

Sri Satya Sai
University of Technology and Medical Sciences

(Established under Govt. of M.P. Registered under UGC 2(F) 1956)

Ref. No.: SSSUTMS/CSE/01 Date: 14/06/2017

Discussion Scheme & Syllabus

Scheme and Syllabus was put before the members as per AICTE guidelines met the current demand in industry, it was discussed in details by the members and some modifications were suggested.

Resolution of the Discussion:

It was resolved that new Scheme and Syllabus of M Tech.(CSE/SE/CTA) III Sem follow the AICTE guidelines and which also met the current demand in industry, should be modified and may be accepted.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
2. Dr. Tryambak Hiwarkar, Prof., Chairman
3. Mr. Jitendra Sheetlani, Assi. Prof., Member
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

Chairman

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Scheme of Examination

Third Semester – Master of Technology (Computer Science and Engineering)

S.No.	Subject Code	Subject Name	Periods per week			Credit	Maximum marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments/Quiz	End Sem. Practical / Viva	Practical Record / assignment/ Quiz/ Presentation	
1.	MCSE 301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MCSE 302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MCSE 303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MCSE 304	Dissertation Part- I	-	-	8	8	-	-		120	80	200
		Total	6	2	12	20	140	40	20	120	100	500

L: Lecture- T: Tutorial- P: Practical

w.e.f. July- 2015

Elective –I (MCSE- 301)

(A) Data Mining and Warehousing
(B) Simulation and Modeling
(C) High Performance Computing
(D) Cyber Law & Forensic

Elective-II (MCSE- 302)

(A) Wireless LAN and Mobile Computing
(B) Ad. Distributed System
(C) Parallel Computation and Applications
(D) Real Time Systems

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MCSE 301 (A):DataMiningandWarehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining. KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNITII

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms. STIRR, ROCK, CACTUS.

UNITIII

Data mining techniques: Exploration of data mining methodologies. decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNITIV

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm. knowledge discovery.

UNIT V

Data warehousing : Data ware house, OLAP and Data mining. OLTP vs. OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference/Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.

2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

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MCSE 301(B):SimulationandModeling

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III

Simulation of Queueing System: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT IV

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models , Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform ContinuouslyDistributed Random Numbers, Rejection Method.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :

1. Gorden G., System simulation, Printice Hall.

2. Payer T., Introduction to system simulation, McGraw Hill.

3. Seila, Applied Simulation Modeling, Cengage

4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

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MCSE 301(C): HighPerformanceComputing

UNIT-I

Introduction to high performance computing: cluster, grid, meta-computing, middleware etc., examples of representative applications. Programming models: shared memory, message passing, peer-to-peer, broker-based. Introduction to PVM and MPI. Architecture of cluster-based systems, Issues in cluster design: performance, single-sysuem-image, fault tolerance, manageability, programmability, load balancing, security, storage..

UNIT-II

High performance sequential computing: Effects of the memory hierarchy, Out-of-order execution, superscalar processors, Vector processing, Shared-memory processing: Architectures (extensions of the memory hierarchy), Programming paradigms, OpenMP Distributed-memory processing: Architectural issues(networks and interconnects), Programming paradigms, MPI (+MPI2)

UNIT-III

Grids: Computational grids. Data grids .Architecture of Grid systems, Grid security infrastructure. Examples of Grids: Globus etc

UNIT-IV

Performance issues and measurement: Profiling and development tools, Sustained versus peak performance, Performance libraries and packages

UNIT-

The productivity crisis & future directions: Development overheads, Petaflops programming. New parallel languages: UPC. Titanium, Co-Array FORTRAN

BOOKS:

1. Charles Severance, Kevin Dowd "High Performance Computing", Second Edition by, O'reilly, Second Edition July 1998
2. David j. Kuck "High Performance Computing" Oxford Univ Pr, 1996
3. Gary W. Sabot "High Performance Computing " Add ison-Wesley, 1995

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MCSE- 301 (D) CYBER LAW & FORENSIC

UNIT-I

Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II

Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws: ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), etaxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III

Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism: computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

UNIT-IV

Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V

Copyright issues in cyberspace: linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace; domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:

1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics", First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT, PHI Learning.

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MCSE 302(A): WirelessLANandMobileComputing

UNIT-I

Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth. Modern Wireless Communication Systems 2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS Cellular Concepts.

Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

UNIT-II

Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, cell-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT-III

Co channel Interference reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an Omni directional antenna system, Design of a directional antenna system,. Lowering the antenna height, reduction of co channel interference by mean of a notech in the tilted antenna Pattern, Power control.

UNIT-IV

Frequency management & channel Assignment: Frequency management, Frequency spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT-V

Handoffs and Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

Reference Books:

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH

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MCSE 302(B): ADVANCEDISTRIBUTEDSYSTEM

UNIT-I

Introduction to distributed System: comparison of distributed and centralized systems, Characterization of Distributed Systems , Resource Sharing and the Web -Challenges ,System Models . Architectural and Fundamental Models , Networking :– Types of Networks , Network Principles - Internet Protocols – Case Studies.

UNIT-II

Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication- Case Study – Distributed Objects and Remote Invocation - Communication Between Distributed Objects , RPC, RPC Architecture, Events and Notifications - Java RMI -Case Study.

UNIT-III

Operating System Issues – I: The OS Layer - Protection - Processes and Threads - Communication and Invocation –OS Architecture, Security: introduction, security techniques, cryptographic algorithms, authentication and access control. File Systems :- File Service Architecture , Sun Network File System , The Andrew File System.

UNIT-IV

Operating System Issues – II: Name Services -Domain Name System - Directory and Discovery Services – Global Name Service - X.500 Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT-V

Distributed Transaction Processing: Transactions, Nested Transactions, Locks, Optimistic Concurrency Control , Timestamp Ordering. Comparison, Flat and Nested Distributed Transactions , Atomic Commit Protocols - Concurrency Control in Distributed Transactions , Distributed Deadlocks , Transaction Recovery - Overview of Replication And Distributed Multimedia Systems

Reference Books:

1. G Coulouris, J Dollimore, T Kindberg, Distributed Sys Concepi- Design, Pearson
2. Sape Mullender, Distributed Systems. Addison Wesley,
3. A Fleishman, Distributed Systems- Software Design and Implementation, S Verlag
4. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education
5. AS Tanenbaum, Maartenvan, ,Distibuted System Principles Paradigms, Pearson
6. M Singhal, Niranjan, Shivaratri, Advanced Concept in Operating System, TMH

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MCSE 302(C): ParallelComputationandApplications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamentals Of Parallel Processing", Pearson Education, 2003
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.

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MCSE- 302 (D) REAL TIME SYSTEMS

UNIT I

Introduction to real time systems, structure, issues, task classes, performance measures for real time systems-their properties, traditional measures, cost functions and hard deadlines. Estimation of program run time-source code analysis, accounting for pipelining and caches.

UNIT II

Task Assignment and Scheduling-Rate monotonic scheduling algorithm, Preemptive earliest deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions.

UNIT III

Programming Languages & Tools- Desired language characteristics, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and generics, Multitasking, Low level programming, Fox, Euclid, Run time support.

UNIT IV

Real time Communication-Communication media, network topologies, Protocols Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

UNIT V

Fault Tolerance Techniques- Fault, fault types, fault detection, fault and error containment, hardware and software redundancy, time redundancy, information redundancy. Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

REFERENCES:-

1. C.M Krishna and Kang G. Shin, Real Time Systems, TMH
2. Stuart Bennett, Real time computer control and introduction, Pearson education, 2003
3. Jane W.S Liu, Real time systems, Mc-Graw Hill

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& Medical Sciences Sehore (M.P.)

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Scheme of Examination

Third Semester –Master of Technology (Computer Tech. & Applications)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Term (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ assignment/Quiz/Presentation	
1.	MCTA 301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MCTA 302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MCTA 303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MCTA 304	Dissertation Part-I	-	-	8	8	-	-		120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L: Lecture- T: Tutorial- P: Practical

w.e.f. July- 2015

Elective –I (MCTA- 301)

(A) Data Mining and ware housing
(B) Web Engineering
(C) Simulation & Modeling
(D) Ad-hoc Networks

Elective-II (MCTA- 302)

(A) Software testing and quality assurance
(B) Analysis Design & Embedded Systems
(C) Parallel Computation & Applications
(D) Real Time Systems

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MCTA 301(A)DataMiningandWarehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining. KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNITII

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNITIII

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNITIV

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNITV

Data warehousing : Data ware house, OLAP and Data mining, OLTP vs. OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection, OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, meta data. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books :

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2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

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MCTA 301(B)Web Engineering

UNIT I

Introduction to Web Engineering : History, Web Applications, layering, DNS - encapsulation, de-multiplexing, client /server model, port numbers, standardization process, the Internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.

Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet Mask special case of IP addresses, a subnet example.

UNIT II

Binding Protocol Address- Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation, Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super-netting- special case of IP addresses, Ipv6-Motivation, frame format and addressing, comparison of Ipv4 and Ipv6.

UNIT III

ICMP: Introduction, ICMP Header, ICMP message types , ICMP timestamp request and reply, trace route, ping program, Intra & inter domain routing-distance vector routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP, Unicast Routing protocols, IGMP-IGMP message, operation, encapsulation.

UNIT IV

UDP: introduction,UDP Operation , header, checksum, IP Fragmentation, UDP Server design. DNS Introduction-basics, message format, simple example, pointer quires, resource records, caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router.

UNIT V

TCP: Introduction, TCP services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design. SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification.

Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books :

1. W. Richard Stevens, TCP/IP Illustrated Volume-1 "The Protocols ", Addison W 2

2. Jaiswal .S, TCP/IP Principles, Architecture, Protocols And Implementation, First Edition, Galgotia Publications Pvt Ltd.

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MCTA 301(C)Simulation and Modeling

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III

Simulation of Queueing System: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT IV

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models , Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform ContinuouslyDistributed Random Numbers, Rejection Method.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :

1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

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MCTA 301(D)Ad-hoc Networks

UNIT I

Ad Hoc Wireless : An introduction, Cellular vs Adhoc wireless Networks, Applications of Adhoc wireless Networks, Issues in Adhoc wireless N/WS. Heterogeneity in Mobile devices, Wireless Sensor N/WS, traffic Profiles, Types of Adhoc Mobile Communications, Types of Mobile Host movements, Challenges facing Ad hoc mobile N/WS. Model of operation, symmetric Links, Layer-2 Ad Hoc solutions, Proactive versus reactive protocols, multicast, commercial Applications of Ad Hoc networking, conferencing, Home Networking, Emergency services, personal Area Networks and Bluetooth. Embedded Computing Applications, Sensor Dust, Automotive/PC Interaction. Factors Affecting Ad Hoc Networks, Scalability, Wireless Data Rates, DARPA packet Radio network, Survivable Radio Networks.

UNIT II

Adhoc Protocols :- Adhoc Wireless Media Access Protocols, Introduction Synchronous MAC Protocol &asynchronous MAC protocol, Problems in Adhoc channel Access Receiver Initiated MAC protocols, Sender Initiated MAC Protocol, Existing Adhoc MAC Protocol.

UNIT III

Ad Hoc Routing Protocols: Table-Driven Approaches, DSDV, WRP ,CSGR, Source, Initiated On demand Approaches : AODV, DSR, TORA, SSR, LAR, PAR, ZRP, RDMAR., Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.

UNIT IV

Transport Layer for Ad Hoc Wireless Network : Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.

UNIT V

Quality of service in Ad-hoc wireless networks: Issues and challenges in providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, MAC Layer Solutions, Network Layer Solutions, Qos Frameworks for Ad Hoc Wireless Networks. Security issues in Ad Hoc Network: Security in Ad Hoc Wireless Network, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, and Secure Routing in Ad Hoc Wireless Networks.

Books Suggested

1. **Ad Hoc Mobile Wireless Networks** : Protocols and Systems, C. K. Toh, Springer.
2. **Ad Hoc Network**, C E Perkins, Pearson Education.
3. Ad Hoc Wireless Networks : Architectures and protocols, C, Siva Ram Murthy and B.S. Manoj, Pearson Education.

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MCTA 302(A)Software Testing & Quality Assurance

Unit I

Introduction to software testing, concepts, issues and techniques, test activities, management and automation, Coverage and usage testing based on checklist, input domain portioning and boundary testing.

UNIT II

Object oriented testing: testing OOA and OOD models, object oriented testing strategies, test case design for OO software, testing methods applicable at the class level, interclass test case design, Web application testing, debugging, security & reliability.

UNIT III

The Software Quality Challenge - Software Quality Factors - Components of the Software Quality Assurance System, Pre-Project Software Quality Components -Contract Review - Development and Quality Plans.

UNIT IV

Programming style and program quality: simple style rules, comment statements, program quality, quantifying program quality, Software quality and quality Assurance: Principle of Software Quality Assurance (SQA), Applying SQA to software project, proven factors for SQA success, SQA during software requirements, SQA during software design phase, SQA during software code and test, Advance quality engineering topics.

UNIT V

Human factors in software engineering: Human factors history, HCL requirements and design process, HCL testing.

Reference Books:

1. Ali Behforooz and Frederick J. Hudson, Software Engineering Fundamentals, Oxford University Press

2. Jeff Tian, Software Quality Engineering: Testing, Quality Assurance and Quantifiable improvement, Wily Pub.

3. Aditya Mathur, Foundation of Software Testing 1/e, Pearson Education

4. Paul C. Jorgensen, Software Testing, A Craftsman's Approach, Second Edition, CRC Press

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MCTA 302(B)Analysis and Design of Embedded Systems

Unit I

Embedded systems and their characteristics, challenges and issues in embedded software development, Hardware and electronics fundamentals for software engineers, categories of different processor microprocessor and micro controller, CPU, memory, peripherals, timers, communication interfaces.

Unit II

Software tool chains used for development and testing of programs, project manager editor, assembler, compiler, linker, locator, loader debugger, monitor and profiler, use of integrated development environment, GNU, command line tools, build process in embedded systems

Unit III

Operating system services: different categories of operating system, kernel architecture, root file system contents, storage device manipulate ions, setting up boot loader , Software architecture for implementing various tasks, round robin with and without interrupts, function queue scheduling architecture, real-time operating systems. Hardware and software development methodology and use of hardware debugging aids like in circuit emulators and logic analyzers.

Unit IV

Architecture of simple RTOS, definition of tasks, task controller, task information, scheduling priority, shared data problems and mutual exclusion critical section implementation. Intertask communication, semaphores, message queues, buffers pipes, reentrance issues, timer functions, interrupts and I/O, designing a real time application using a RTOS like Vworks, µ COS II or embedded linux.

Unit V

Power optimization strategies for processes, ACPI, design case studies, Networked embedded system, distributed embedded architecture, HW and SW architecture, IIC bus, CAN bus, Myrinet network based design, communication analysis, system performance analysis, HW platform design, allocation and scheduling, internet embedded systems. System design techniques.

Reference Books:

1. Simon DE; an embedded software primer; Pearson
2. Ayala K; 8051 programming and interfacing; Peram
3. Vahid F and Givargis T; Embedded system design...; John Wiley
4. Heath Steve; Embedded system designs; Oxford newness

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MCTA 302(C)Parallel Computation and Applications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamemals Of Parallel Processing", Pearson Education, 2003
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.

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MCTA- 302 (D) REAL TIME SYSTEMS

UNIT I

Introduction to real time systems, structure, issues, task classes, performance measures for real time systems-their properties, traditional measures, cost functions and hard deadlines. Estimation of program run time-source code analysis, accounting for pipelining and caches.

UNIT II

Task Assignment and Scheduling-Rate monotonic scheduling algorithm, Preemptive earliest deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions.

UNIT III

Programming Languages & Tools- Desired language characteristics, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and generics, Multitasking, Low level programming, Fex, Euclid, Run time support.

UNIT IV

Real time Communication-Communication media, network topologies, Protocols Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

UNIT V

Fault Tolerance Techniques- Fault, fault types, fault detection, fault and error containment, hardware and software redundancy, time redundancy, information redundancy. Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

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1. C.M Krishna and Kang G. Shin, Real Time Systems, TMH
2. Stuart Bennett, Real time computer control and introduction, Pearson education, 2003
3. Jane W.S Liu, Real time systems, Mc-Graw Hill

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Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Scheme of Examination

Third Semester –Master of Technology (Software Engineering)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ assignments/ Mini project/ Presentation	
1.	MSE 301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MSE 302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MSE 303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MSE 304	Dissertation Part- I	-	-	8	8	-	-		120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L: Lecture- T: Tutorial- P: Practical

w.e.f. July- 2015

Elective –I (MSE 301)

(A) Web Engineering

(B) Parallel Computation and Applications

(C) Wireless LAN and Mobile Computing

(D) Cloud Computing

Elective-II (MSE 302)

(A) Data Mining and Warehousing

(B)Software Configuration Management

(C) Cyber Law & Forensic

(D) Real Time Systems

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MSE 301(A)Web Engineering

UNIT I

Introduction to Web Engineering : History, Web Applications, layering, DNS - encapsulation, de-multiplexing, client /server model, port numbers, standardization process, the Internet, Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.

Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet Mask special case of IP addresses, a subnet example.

UNIT II

Binding Protocol Address- Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation, Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super-netting- special case of IP addresses, Ipv6-Motivation, frame format and addressing, comparison of Ipv4 and Ipv6.

UNIT III

ICMP: Introduction, ICMP Header, ICMP message types , ICMP timestamp request and reply, trace route, ping program, Intra & inter domain routing-distance vector routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP, Unicast Routing protocols, IGMP-IGMP message, operation, encapsulation.

UNIT IV

UDP: introduction,UDP Operation , header, checksum, IP Fragmentation, UDP Server design, DNS Introduction-basics, message format, simple example, pointer quires, resource records, caching, UDP, TFTP: introduction, protocol, security, BOOTP: introduction, packet format, server design, through router.

UNIT V

TCP: Introduction, TCP services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design. SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification.

Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books:

1. W. Richard Stevens, TCP/IP Illustrated Volume-1 "The Protocols ", Addison W 2
2. Jaiswal ,S. TCP/IP Principles, Architecture, Protocols And Implementation, First Edition, Galgotia Publications Pvt Ltd.

MSE 301(B)Parallel Computation and Applications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

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2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.

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MSE 301(C)Wireless LAN and Mobile Computing

UNIT-I

Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth, Modern Wireless Communication Systems 2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS Cellular Concepts.

Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

UNIT-II

Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT-III

Co channel Interference reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an Omni directional antenna system, Design of a directional antenna system,, Lowering the antenna height, reduction of co channel interference by meun of a notech in the tilted antenna Pattern, Power control.

UNIT-IV

Frequency management & channel Assignment: Frequency management, Frequency spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT-V

Handoffs and Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

Reference Books:

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH

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MSE 301(D)CLOUD COMPUTING

UNIT-I

Introduction: Historical development, Vision of Cloud Computing, Characteristics of cloud computing as per NIST, Cloud computing reference model, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments.

UNIT-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance. **Cloud Solutions:** Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. **Cloud Offerings:** Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

UNIT –III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization ,Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

UNIT-IV

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

UNIT-V

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services. Case study: Google App Engine, Microsoft Azure, Hadoop, Amazon, Aneka

Reference Books:

1. Krutz, Vines, "Cloud Security ", Wiley Pub
2. Velte, "Cloud Computing- A Practical Approach" TMH Pub
3. Sosinsky, "Cloud Computing", Wiley Pub
4. Kumar Saurabh, "Cloud Computing", Wiley Pub

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MSE 302(A)Data Mining and Warehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining. KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNIT II

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT III

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis, E-Metrics.

UNIT IV

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT V

Data warehousing : Data ware house, OLAP and Data mining. OLTP vs. OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, aming the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.

2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

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MSE 302(B) Software Configuration Management

UNIT I

Overview To Software Configuration Management: SCM: Concepts and definitions – SCM Plan – Software development life cycle models – SDLC Phases – Need and importance of Software configuration management – Increased complexity and demand – Changing nature of software and need for change management – Lower maintenance costs and better quality assurance – Faster problem identification and bug fixes -SCM: Basic concepts – Baselines - Check-in and Check-out-Versions and Variants –System Building- Releases.

UNIT II

Different Phases Of Software Configuration Management: Different Phases Of Scm – SCM System design - SCM Plan preparation-SCM Team organization – SCM Infrastructure organization – SCM Team training – Project team training – Configuration identification – Configuration Control – Configuration status accounting – Configuration and its.

UNIT III

Configuration Audits And Management Plans: When, what and who of auditing- Functional Configuration audit – Physical Configuration audit – Auditing the SCM System – Role of SCM Team in configuration audits – SCM plan and the incremental approach – SCM Plan and SCM Tools – SCM Organization.

UNIT IV

Software Configuration Management Tools And Implementation Advantages of SCM tools - Reasons for the increasing popularity of SCM tools – SCM Tools and SCM Functions – SCM tool selection – Role of Technology – Selection criteria – Tool implementation – SCM implementation plan – implementation strategy – SCM Implementation team.

UNIT V

Trends In Scm: FUTURE DIRECTIONS SCM in different scenarios - SCM and project size –SCM in integrated development environments – SCM in distributed environments – SCM and CASE Tools - Trends in SCM - Hardware and Software Management – Better integration with IDE'S and CASE environments – Customization – Better decision making capabilities – Reduction in SCM Team size – Market snapshot.

References

1.Jessica Keyes,Software Configuration Management,Auerbach Publications, 2008.

2.Alexis Leon,Software Configuration Management Handbook,Anech Print on Demand; 2 edition,2009.

3.Robert Aiello and Leslie SachsConfiguration Management Best Practices: Practical Methods that work in Real World, , Addison(Wesley Professional; 1 edition, 2010.

4.Stephen P. Berczuk, Brad Appleton and Kyle Brown , "Software Configuration Management Patterns: Effective Teamwork and Practical Integration", Addison(Wesley , 2003)

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MSE- 302 (C) CYBER LAW & FORENSIC

UNIT-I

Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II

Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws; ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), taxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III

Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

UNIT-IV

Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V

Copyright issues in cyberspace: linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace: domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:

1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics", First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT, PHI Learning.

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MSE- 302 (D) REAL TIME SYSTEMS

UNIT I

Introduction to real time systems, structure, issues, task classes, performance measures for real time systems-their properties, traditional measures, cost functions and hard deadlines. Estimation of program run time-source code analysis, accounting for pipelining and caches.

UNIT II

Task Assignment and Scheduling-Rate monotonic scheduling algorithm, Preemptive earliest deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions.

UNIT III

Programming Languages & Tools- Desired language characteristics, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and generics, Multitasking, Low level programming, Fox, Euclid, Run time support.

UNIT IV

Real time Communication-Communication media, network topologies, Protocols Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

UNIT V

Fault Tolerance Techniques- Fault, fault types, fault detection, fault and error containment, hardware and software redundancy, time redundancy, information redundancy. Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

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Sri Satya Sai
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Ref. No.: SSSUTMS/CSE/2020/04 Date: 09/06/2020

Name of Faculty: School of Engineering

Name of Department: Computer Science and Engineering

Minutes of Board of Studies Committee Meeting Dated on 08-06-2020

The Board of Studies Committee of Computer Science and Engineering was conducted a meeting in online mode via google meet at 2:00 PM. on 08-06-2020, Following members were present.

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
3. Mr. Arif Hakeem, Asst. Prof., Chairman
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

Agenda:

Modification in Scheme and Syllabus of M Tech.(CSE/SE/CTA) III Sem.

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Ref. No.: SSSUTMS/SOE/CSE/04 Date: 08/04/2020

Discussion Scheme & Syllabus

Scheme and Syllabus was put before the members as per AICTE guidelines met the current demand in industry, it was discussed in details by the members and some modifications were suggested.

Resolution of the Discussion:

It was resolved that new Scheme and Syllabus of M Tech.(CSE/SE/CTA) III Sem follow the AICTE guidelines and which also met the current demand in industry, should be modified and may be accepted.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
3. Mr. Arif Hakeem, Asst. Prof., Chairman
4. Mr. Manoj Verma, Asst. Prof., Member
5. Mr. Harsh Lohiya, Asst. Prof. Member
6. Mr Gaurav Saxena, Asst. Prof., Member
7. Mr. Rishi Khushwah, Asst. Prof., Member
8. Mr. Kailash Patidar, Asst. Prof., Member
9. Mr. Manoj Yadav, Asst. Prof., Member
10. Mr. Harsh Pratap, Asst. Prof., Member
11. Mr. Sudeesh Chouhan, Asst. Prof., Member
12. Mr. Narendra Sharma, Asst. Prof., Member

Chairman

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Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Scheme of Examination

Third Semester – Master of Technology (Computer Science and Engineering)

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L: Lecture- T: Tutorial- P: Practical

w.e.f. July- 2015

Elective –I (MCSE- 301)

(A) Data Mining and Warehousing
(B) Simulation and Modeling
(C) High Performance Computing
(D) Cyber Law & Forensic
(E) Image Processing

Elective-II (MCSE- 302)

(A) Wireless LAN and Mobile Computing
(B) Ad. Distributed System
(C) Parallel Computation and Applications
(D) Real Time Systems
(E) Bioinformatics

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S.S.S.U.T.M.S. SEHORE (M.P.)

MCSE 301 (A):DataMiningandWarehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

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Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

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2. Data Mining: Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

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MCSE 301(B):SimulationandModeling

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disalvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III

Simulation of Queueing Systems: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT IV

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models , Representation of Time Delays, Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of n Random numbers, Generating Discrete distributions, Non-Uniform Continuouslyl Distributed Random Numbers, Rejection Method.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :

1. Gorden G., System simulation, Printice Hall.

2. Payer T., Introduction to system simulation, McGraw Hill.

3. Seila, Applied Simulation Modeling, Cengage

4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

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MCSE 301(C): HighPerformanceComputing

UNIT-I

Introduction to high performance computing: cluster, grid, meta-computing, middleware etc., examples of representative applications. Programming models: shared memory, message passing, peer-to-peer, broker-based. Introduction to PVM and MPI. Architecture of cluster-based systems, Issues in cluster design: performance, single-system-image, fault tolerance, manageability, programmability, load balancing, security, storage..

UNIT-II

High performance sequential computing: Effects of the memory hierarchy, Out-of-order execution, superscalar processors, Vector processing. Shared-memory processing: Architectures (extensions of the memory hierarchy), Programming paradigms, OpenMP Distributed-memory processing: Architectural issues(networks and interconnects), Programming paradigms, MPI (+MPI2)

UNIT-III

Grids: Computational grids, Data grids ,Architecture of Grid systems, Grid security infrastructure. Examples of Grids: Globus etc

UNIT-IV

Performance issues and measurement: Profiling and development tools, Summited versus peak performance, Performance libraries and packages

UNIT-

The productivity crisis & future directions: Development overheads, Petaflops programming, New parallel languages: UPC, Titanium, Co-Array FORTRAN

BOOKS:

1. Charles Severance, Kevin Dowd "High Performance Computing", Second Edition by, O'reilly, Second Edition July 1998
2. David j. Kuck "High Performance Computing" Oxford Univ Pr, 1996
3. Gary W. Sabot "High Performance Computing " Add ison-Wesley, 1995

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MCSE- 301 (D) CYBER LAW & FORENSIC

UNIT-I

Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II

Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws: ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), etaxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III

Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

UNIT-IV

Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V

Copyright issues in cyberspace: linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace: domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:

1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics", First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT, PHI Learning.

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MCSE-301 (E) IMAGE PROCESSING

UNIT I

Image representation, fundamental steps in image processing, image model. Sampling & quantization. Neighbors of a pixel, connectivity and distance measures. Basic transformations and perspective transformations. Two dimensional Fourier transform, Discrete Fourier transform and their properties. Fast Fourier transform, Walsh Transform, Hadamard transform and Discrete Cosine transform.

UNIT II

Image Enhancement:- Intensity transformations, histogram processing, Image subtraction, image averaging, Spatial filtering-smoothing and sharpening filters, frequency domain filtering methods-low pass filtering, high pass filtering, median filtering.

UNIT III

Image compression:- Redundancy and its types. Image compression model, variable length coding, bit plane coding, constant area coding, run length coding, lossless and lossy predictive coding, transform coding.

UNIT IV

Image restoration and Segmentation:- Degradation model, effect of diagonalisation on degradation, algebraic approach. Detection of discontinuities by point, line and edge detection. Edge linking, graph theoretic techniques, thresholding techniques, region oriented segmentation.

UNIT V

Representation & Description: Chain codes, polygonal approximations, signatures, boundary segments, skeleton, boundary descriptors, shape descriptors regional descriptors, image morphology-dilation, erosion, opening, closing, thickening, thinning, skeleton, pruning, hit or miss transform.

References:-

1. R.C Gonzalez & Richard E Wood, "Digital Image Processing" ,Addison Wesley Publishing
2. Anil K Jain, "Fundamentals of Digital image processing".
3. Sonka, Hlavac, Boyle, "Digital image processing and computer vision", cengage learning, India Edition.
4. B Chanda, D. Dutta Majumder, "Digital image Processing and Analysis", PHI.

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MCSE 302(A): WirelessLANandMobileComputing

UNIT-I

Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth, Modern Wireless Communication Systems 2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS Cellular Concepts.

Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

UNIT-II

Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT-III

Co channel Interference reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an Omni directional antenna system, Design of a directional antenna system,. Lowering the antenna height, reduction of co channel interference by mean of a notech in the tilted antenna Pattern, Power control.

UNIT-IV

Frequency management & channel Assignment: Frequency management, Frequency spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT-V

Handoffs and Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

Reference Books:

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Nerwork, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH

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MCSE 302(B): ADVANCEDISTRIBUTEDSYSTEM

UNIT-I

Introduction to distributed System: comparison of distributed and centralized systems, Characterization of Distributed Systems , Resource Sharing and the Web -Challenges ,System Models , Architectural and Fundamental Models , Networking :– Types of Networks , Network Principles - Internet Protocols – Case Studies.

UNIT-II

Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication- Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects , RPC, RPC Architecture, Events and Notifications - Java RMI -Case Study.

UNIT-III

Operating System Issues – I: The OS Layer - Protection - Processes and Threads - Communication and Invocation -OS Architecture, Security: introduction, security techniques, cryptographic algorithms, authentication and access control, File Systems :- File Service Architecture , Sun Network File System , The Andrew File System.

UNIT-IV

Operating System Issues – II: Name Services -Domain Name System - Directory and Discovery Services – Global Name Service - X.500 Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT-V

Distributed Transaction Processing: Transactions, Nested Transactions, Locks, Optimistic Concurrency Control , Timestamp Ordering, Comparison, Flat and Nested Distributed Transactions , Atomic Commit Protocols - Concurrency Control in Distributed Transactions , Distributed Deadlocks , Transaction Recovery - Overview of Replication And Distributed Multimedia Systems

Reference Books:

1. G Coulouris, J Dollimore, T Kindberg, Distributed Sys Concept- Design, Pearson
2. Sape Mullender, Distributed Systems, Addison Wesley,
3. A Fleishman, Distributed Systems- Software Design and Implementation, S Verlag
4. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education
5. AS Tanenbaum, Maartenvan, ,Distibuted System Principles Paradigms, Pearson
6. M Singhal, Niranjan, Shivaratri, Advanced Concept in Operating System, TMH

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MCSE 302(C): ParallelComputationandApplications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors. Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamentals Of Parallel Processing", Pearson Education, 2003
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.

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MCSE- 302 (D) REAL TIME SYSTEMS

UNIT I

Introduction to real time systems, structure, issues, task classes, performance measures for real time systems-their properties, traditional measures, cost functions and hard deadlines. Estimation of program run time-source code analysis, accounting for pipelining and caches.

UNIT II

Task Assignment and Scheduling-Rate monotonic scheduling algorithm, Preemptive earliest deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions.

UNIT III

Programming Languages & Tools- Desired language characteristics, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and genetics, Multitasking, Low level programming, Fex, Euclid, Run time support.

UNIT IV

Real time Communication-Communication media, network topologies. Protocols Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

UNIT V

Fault Tolerance Techniques- Fault, fault types, fault detection, fault and error containment, hardware and software redundancy, time redundancy, information redundancy. Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

REFERENCES:-

1. C.M Krishna and Kang G. Shin, Real Time Systems, TMH
2. Stuart Bennett, Real time computer control and introduction, Pearson education. 2003
3. Jane W.S Liu, Real time systems, Mc-Graw Hill

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MCSE-302 (E) BIOINFORMATICS

UNIT-I

Introduction:-Introduction to bioinformatics, objectives of bioinformatics, Basic chemistry of nucleic acids, structure of DNA & RNA, Genes, structure of bacterial chromosome, cloning methodology, Data maintenance and Integrity Tasks.

UNIT-II

Bioinformatics Databases & Image Processing :- Types of databases, Nucleotide sequence databases, Protein sequence databases, Protein structure databases, Normalization, Data cleaning and transformation, Protein folding, protein function, protein purification and characterization, Introduction to Java clients, CORBA, Using MYSQL, Feature Extraction.

UNIT-III

Sequence Alignment and database searching:- Introduction to sequence analysis, Models for sequence analysis, Methods of optimal alignment, Tools for sequence alignment, Dynamics Programming, Heuristic Methods, Multiple sequence Alignment

UNIT-IV

Gene Finding and Expression:- Cracking the Genome, Biological decoder ring, finding genes through mathematics & learning, Genes prediction tools, Gene Mapping, Application of Mapping, Modes of Gene Expression data, Mining the Gene Expression Data.

UNIT-V

Proteomics & Problem solving in Bioinformatics:- Proteome analysis, tools for proteome analysis, Genetic networks, Network properties and analysis, complete pathway simulation: E-cell, Genomic analysis for DNA & Protein sequences, Strategies and options for similarity search, flowcharts for protein structure prediction .

References:-

1.Gopal & Jones, BIOINFORMATICS with fundamentals of Genomics & Proteomics, TMH Pub
2.Rastogi, Bioinformatics –Concepts, skills & Applications, CBS Pub
3.Bergeron, Bioinformatics computing, PHI
4.Claverie, Bioinformatics, Wiley pub

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Scheme of Examination

Third Semester –Master of Technology (Computer Tech. & Applications)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ Assignments/Quiz/Presentation	
1.	MCTA 301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MCTA 302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MCTA 303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MCTA 304	Dissertation Part- I	-	-	8	8	-	-		120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L: Lecture- T: Tutorial- P: Practical

w.e.f. July- 2015

Elective –I (MCTA- 301)

(A) Data Mining and ware housing
(B) Web Engineering
(C) Simulation & Modeling
(D) Ad-hoc Networks
(E) Image Processing

Elective-II (MCTA- 302)

(A) Software testing and quality assurance
(B) Analysis Design & Embedded Systems
(C) Parallel Computation & Applications
(D) Real Time Systems
(E) Bioinformatics

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MCTA 301(A)DataMiningandWarehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNITII

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNITIII

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis, E-Metrics.

UNITIV

Data Mining of Image and Video : A case study, Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNITV

Data warehousing :Data ware house, OLAP and Data mining, OLTP vs. OLAP, Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection, OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata, Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.

2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

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MCTA 301(B)Web Engineering

UNIT I

Introduction to Web Engineering : History, Web Applications, layering, DNS - encapsulation, de-multiplexing. client /server model, port numbers, standardization process, the Internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.

Internet protocol: Introduction, IP header, IP routing, subnet addressing, subnet Mask special case of IP addresses, a subnet example.

UNIT II

Binding Protocol Address- Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation, Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super-netting- special case of IP addresses, Ipv6-Motivation, frame format and addressing, comparison of Ipv4 and Ipv6.

UNIT III

ICMP: Introduction, ICMP Header, ICMP message types , ICMP timestamp request and reply, trace route, ping program, Intra & inter domain routing-distance vector routing, RIP. Link State Routing, OSPF, Path Vector Routing, BGP, Unicast Routing protocols, IGMP-IGMP message, operation, encapsulation.

UNIT IV

UDP: introduction,UDP Operation , header, checksum, IP Fragmentation, UDP Server design. DNS Introduction-basics, message format, simple example, pointer quires, resource records, caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router.

UNIT V

TCP: Introduction, TCP services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design. SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification.

Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books :

1. W. Richard Stevens, TCP/IP Illustrated Volume-1 "The Protocols ", Addison W 2

2. Jaiswal .S. TCP/IP Principles, Architecture, Protocols And Implementation. First Edition, Galgotia Publications Pvt Ltd.

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MCTA 301(C)Simulation and Modeling

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III

Simulation of Queueing System: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in compurer system like operating systems, computer networks etc.

UNIT IV

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models , Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform ContinuouslyDistributed Random Numbers, Rejection Method.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :

1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

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MCTA 301(D)Ad-hoc Networks

UNIT I

Ad Hoc Wireless : An introduction, Cellular vs Adhoc wireless Networks, Applications of Adhoc wireless Networks, Issues in Adhoc wireless N/WS. Heterogeneity in Mobile devices, Wireless Sensor N/WS, traffic Profiles, Types of Adhoc Mobile Communications, Types of Mobile Host movements, Challenges facing Ad hoc mobile N/WS. Model of operation, symmetric Links, Layer-2 Ad Hoc solutions, Proactive versus reactive protocols, multicast, commercial Applications of Ad Hoc networking, conferencing, Home Networking, Emergency services, personal Area Networks and Bluetooth, Embedded Computing Applications, Sensor Dust, Automotive/PC Interaction. Factors Affecting Ad Hoc Networks, Scalability, Wireless Data Rates, DARPA packet Radio network, Survivable Radio Networks.

UNIT II

Adhoc Protocols :- Adhoc Wireless Media Access Protocols, Introduction Synchronous MAC Protocol Asynchronous MAC protocol, Problems in Adhoc channel Access Receiver Initiated MAC protocols, Sender Initiated MAC Protocol, Existing Adhoc MAC Protocol.

UNIT III

Ad Hoc Routing Protocols: Table-Driven Approaches, DSDV, WRP ,CSGR, Source, Initiated On demand Approaches : AODV, DSR, TORA, SSR, LAR, PAR, ZRP, RDMAR., Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.

UNIT IV

Transport Layer for Ad Hoc Wireless Network : Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.

UNIT V

Quality of service in Ad-hoc wireless networks: Issues and challenges in providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, MAC Layer Solutions, Network Layer Solutions, Qos Frameworks for Ad Hoc Wireless Networks. Security issues in Ad Hoc Network: Security in Ad Hoc Wireless Network, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, and Secure Routing in Ad Hoc Wireless Networks.

Books Suggested

1. Ad Hoc Mobile Wireless Networks : Protocols and Systems, C. K. Toh, Springer.
2. Ad Hoc Network, C E Perkins, Pearson Education.
3. Ad Hoc Wireless Networks : Architectures and protocols, C, Siva Ram Murthy and B.S. Manoj, Pearson Education.

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MCTA-301 (E) IMAGE PROCESSING

UNIT I

Image representation, fundamental steps in image processing, image model. Sampling & quantization. Neighbors of a pixel, connectivity and distance measures. Basic transformations and perspective transformations. Two dimensional Fourier transform, Discrete Fourier transform and their properties. Fast Fourier transform, Walsh Transform, Hadamard transform and Discrete Cosine transform.

UNIT II

Image Enhancement:- Intensity transformations, histogram processing, Image subtraction, image averaging, Spatial filtering-smoothing and sharpening filters, frequency domain filtering methods-low pass filtering, high pass filtering, median filtering.

UNIT III

Image compression:- Redundancy and its types. Image compression model, variable length coding, bit plane coding, constant area coding, run length coding, lossless and lossy predictive coding, transform coding.

UNIT IV

Image restoration and Segmentation:- Degradation model, effect of diagonalisation on degradation, algebraic approach. Detection of discontinuities by point, line and edge detection. Edge linking, graph theoretic techniques, thresholding techniques, region oriented segmentation.

UNIT V

Representation & Description: Chain codes, polygonal approximations, signatures, boundary segments, skeleton, boundary descriptors, shape descriptors regional descriptors, image morphology-dilation, erosion, opening, closing, thickening, thinning, skeleton, pruning, hit or miss transform.

References:-

1. R.C Gonzalez & Richard E Wood, "Digital Image Processing" ,Addison Wesley Publishing
2. Anil K Jain, "Fundamentals of Digital image processing".
3. Sonka, Hlavac, Boyle, "Digital image processing and computer vision", cengage learning, India Edition.
4. B Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI.

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MCTA 302(A)Software Testing & Quality Assurance

Unit I

Introduction to software testing, concepts, issues and techniques. test activities, management and automation, Coverage and usage testing based on checklist, input domain portioning and boundary testing.

UNIT II

Object oriented testing: testing OOA and OOD models, object oriented testing strategies, test case design for OO software, testing methods applicable at the class level, interclass test case design, Web application testing, debugging, security & reliability.

UNIT III

The Software Quality Challenge - Software Quality Factors - Components of the Software Quality Assurance System. Pre-Project Software Quality Components -Contract Review - Development and Quality Plans.

UNIT IV

Programming style and program quality: simple style rules, comment statements, program quality, quantifying program quality, Software quality and quality Assurance: Principle of Software Quality Assurance (SQA), Applying SQA to software project, proven factors for SQA success, SQA during software requirements, SQA during software design phase, SQA during software code and test, Advance quality engineering topics.

UNIT V

Human factors in software engineering: Human factors history, HCL requirements and design process, HCL testing.

Reference Books:

1. Ali Behforooz and Frederick J. Hudson, Software Engineering Fundamentals, Oxford University Press

2. JeffTian. Software Quality Engineering: Testing, Quality Assurance and Quantifiable improvement, Willy Pub.

3. Aditya Mathur, Foundation of Software Testing 1/e, Pearson Education

4. Paul C. Jorgensen, Software Testing, A Craftsman's Approach, Second Edition, CRC Press

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MCTA 302(B)Analysis and Design of Embedded Systems

Unit I

Embedded systems and their characteristics, challenges and issues in embedded software development, Hardware and electronics fundamentals for software engineers, categories of different processor microprocessor and micro controller, CPU, memory, peripherals, timers, communication interfaces,

Unit II

Software tool chains used for development and testing of programs, project manager editor, assembler, compiler, linker, locator, loader debugger, monitor and profiler, use of integrated development environment, GNU, command line tools, build process in embedded systems

Unit III

Operating system services: different categories of operating system, kernel architecture, root file system contents, storage device manipulations, setting up boot loader , Software architecture for implementing various tasks, round robin with and without interrupts, function queue scheduling architecture, real-time operating systems. Hardware and software development methodology and use of hardware debugging aids like in circuit emulators and logic analyzers.

Unit IV

Architecture of simple RTOS, definition of tasks, task controller, task information, scheduling priority, shared data problems and mutual exclusion critical section implementation. Intertask communication, semaphores, message queues, buffers pipes, reentrance issues, timer functions, interrupts and I/O, designing a real time application using a RTOS like Vworks, µ COS II or embedded linux.

Unit V

Power optimization strategies for processes, ACPI, design case studies, Networked embedded system, distributed embedded architecture, HW and SW architecture, IIC bus, CAN bus, Myrinet network based design, communication analysis, system performance analysis, HW platform design, allocation and scheduling, internet embedded systems. System design techniques.

Reference Books:

1. Simon DE; an embedded software primer; Pearson
2. Ayala K; 8051 programming and interfacing; Peram
3. Vahid F and Givargis T; Embedded system design...; John Wiley
4. Heath Steve; Embedded system designs; Oxford newness

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MCTA 302(C)Parallel Computation and Applications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- **Implementing Synchronization and Data Sharing:** The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamentals Of Parallel Processing", Pearson Education, 2003
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.

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MCTA- 302 (D) REAL TIME SYSTEMS

UNIT I

Introduction to real time systems, structure, issues, task classes, performance measures for real time systems-their properties, traditional measures, cost functions and hard deadlines. Estimation of program run time-source code analysis, accounting for pipelining and caches.

UNIT II

Task Assignment and Scheduling-Rate monotonic scheduling algorithm, Preemptive earliest deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions.

UNIT III

Programming Languages & Tools- Desired language characteristics, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and genetics, Multitasking, Low level programming, Fex, Euclid, Run time support.

UNIT IV

Real time Communication-Communication media, network topologies, Protocols Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

UNIT V

Fault Tolerance Techniques- Fault, fault types, fault detection, fault and error containment, hardware and software redundancy, time redundancy, information redundancy, Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

REFERENCES:-

1. C.M Krishna and Kang G. Shin, Real Time Systems, TMH
2. Stuart Bennett, Real time computer control and introduction, Pearson education, 2003
3. Jane W.S Liu, Real time systems, Mc-Graw Hill

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MCTA-302 (E) BIOINFORMATICS

UNIT-I

Introduction:-Introduction to bioinformatics, objectives of bioinformatics, Basic chemistry of nucleic acids, structure of DNA & RNA, Genes, structure of bacterial chromosome, cloning methodology, Data maintenance and Integrity Tasks.

UNIT-II

Bioinformatics Databases & Image Processing :- Types of databases, Nucleotide sequence databases, Protein sequence databases, Protein structure databases, Normalization, Data cleaning and transformation, Protein folding, protein function, protein purification and characterization, Introduction to Java clients, CORBA, Using MYSQL, Feature Extraction.

UNIT-III

Sequence Alignment and database searching:- Introduction to sequence analysis, Models for sequence analysis, Methods of optimal alignment, Tools for sequence alignment, Dynamics Programming, Heuristic Methods, Multiple sequence Alignment

UNIT-IV

Gene Finding and Expression:- Cracking the Genome, Biological decoder ring, finding genes through mathematics & learning, Genes prediction tools, Gene Mapping, Application of Mapping, Modes of Gene Expression data, Mining the Gene Expression Data.

UNIT-V

Proteomics & Problem solving in Bioinformatics:- Proteome analysis, tools for proteome analysis, Genetic networks, Network properties and analysis, complete pathway simulation: E-cell, Genomic analysis for DNA & Protein sequences, Strategies and options for similarity search, flowcharts for protein structure prediction .

References:-

1.Gopal & Jones, BIOINFORMATICS with fundamentals of Genomics & Proteomics, TMH Pub
2.Rastogi, Bioinformatics –Concepts, skills & Applications, CBS Pub
3.Bergeron, Bioinformatics computing, PHI
4.Claverie, Bioinformatics, Wiley pub

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Scheme of Examination

Third Semester –Master of Technology (Software Engineering)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory Sub)			Minimum Marks (Practical Sub)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ assignments/Quiz/Presentation	
1.	MSE 301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MSE 302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MSE 303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MSE 304	Dissertation Part- I	-	-	8	8	-	-		120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L: Lecture- T: Tutorial- P: Practical

w.e.f. July- 2015

Elective –I (MSE 301)

(A) Web Engineering
(B) Parallel Computation and Applications
(C) Wireless LAN and Mobile Computing
(D) Cloud Computing
(E) Image Processing

Elective-II (MSE 302)

(A) Data Mining and Warehousing
(B)Software Configuration Management
(C) Cyber Law & Forensic
(D) Real Time Systems
(E) Bioinformatics

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MSE 301(A)Web Engineering

UNIT I

Introduction to Web Engineering : History, Web Applications. layering, DNS - encapsulation, de-multiplexing, client /server model, port numbers, standardization process, the Internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.

Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet Mask special case of IP addresses, a subnet example.

UNIT II

Binding Protocol Address- Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation, Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super-netting- special case of IP addresses, Ipv6-Motivation, frame format and addressing, comparison of Ipv4 and Ipv6.

UNIT III

ICMP: Introduction, ICMP Header, ICMP message types , ICMP timestamp request and reply, trace route, ping program, Intra & inter domain routing-distance vector routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP, Unicast Routing protocols, IGMP-IGMP message, operation, encapsulation.

UNIT IV

UDP: introduction,UDP Operation , header, checksum, IP Fragmentation, UDP Server design. DNS Introduction-basics, message format, simple example, pointer quires, resource records, caching. UDP, TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design. through router.

UNIT V

TCP: Introduction, TCP services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design. SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification.

Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books :

1. W. Richard Stevens, TCP/IP Illustrated Volume-I "The Protocols ", Addison W 2
2. Jaiswal .S. TCP/IP Principles, Architecture, Protocols And Implementation, First Edition, Galgotia Publications Pvt Ltd.

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MSE 301(B)Parallel Computation and Applications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamentals Of Parallel Processing", Pearson Education, 2003.
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.

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MSE 301(C)Wireless LAN and Mobile Computing

UNIT-I

Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth, Modern Wireless Communication Systems 2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS Cellular Concepts.

Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

UNIT-II

Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT-III

Co channel Interference reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an Omni directional antenna system, Design of a directional antenna system,. Lowering the antenna height, reduction of co channel interference by mean of a notech in the tilted antenna Pattern, Power control.

UNIT-IV

Frequency management & channel Assignment: Frequency management, Frequency spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT-V

Handoffs and Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

Reference Books:

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH

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MSE 301(D)CLOUD COMPUTING

UNIT-I

Introduction: Historical development, Vision of Cloud Computing, Characteristics of cloud computing as per NIST, Cloud computing reference model, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments.

UNIT-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, **Cloud Solutions:** Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. **Cloud Offerings**: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

UNIT –III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization ,Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

UNIT-IV

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

UNIT-V

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services. Case study: Google App Engine, Microsoft Azure, Hadoop, Amazon, Aneka

Reference Books:

1. Kruz, Vines, "Cloud Security ", Wiley Pub
2. Velte, "Cloud Computing- A Practical Approach" TMH Pub
3. Sosinsky, "Cloud Computing", Wiley Pub
4. Kumar Saurabh, "Cloud Computing", Wiley Pub

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MSE-301 (E) IMAGE PROCESSING

UNIT I

Image representation, fundamental steps in image processing, image model. Sampling & quantization. Neighbors of a pixel, connectivity and distance measures. Basic transformations and perspective transformations. Two dimensional Fourier transform, Discrete Fourier transform and their properties. Fast Fourier transform, Walsh Transform, Hadamard transform and Discrete Cosine transform.

UNIT II

Image Enhancement:- Intensity transformations, histogram processing, Image subtraction, image averaging, Spatial filtering-smoothing and sharpening filters, frequency domain filtering methods-low pass filtering, high pass filtering, median filtering.

UNIT III

Image compression:- Redundancy and its types. Image compression model, variable length coding, bit plane coding, constant area coding, run length coding, lossless and lossy predictive coding, transform coding.

UNIT IV

Image restoration and Segmentation:- Degradation model, effect of diagonalisation on degradation, algebraic approach. Detection of discontinuities by point, line and edge detection. Edge linking, graph theoretic techniques, thresholding techniques, region oriented segmentation.

UNIT V

Representation & Description: Chain codes, polygonal approximations, signatures, boundary segments, skeleton, boundary descriptors, shape descriptors regional descriptors, image morphology-dilation, erosion, opening, closing, thickening, thinning, skeleton, pruning, hit or miss transform.

References:-

1. R.C Gonzalez & Richard E Wood, "Digital Image Processing" ,Addison Wesley Publishing
2. Anil K Jain, "Fundamentals of Digital image processing".
3. Sonka, Hlavac, Boyle, "Digital image processing and computer vision", cengage learning, India Edition.
4. B Chanda, D. Dutta Majumder, "Digital image Processing and Analysis", PHI.

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MSE 302(A)Data Mining and Warehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNIT II

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules, Clustering paradigms: Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT III

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis, E-Metrics.

UNIT IV

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT V

Data warehousing : Data ware house, OLAP and Data mining, OLTP vs. OLAP, Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection, OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:I partitioning strategy, aggregation, data marting, metadata, Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books:

1. Data Mining Techniques ; Arun K.Pujari ; University Press.

2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

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MSE 302(B) Software Configuration Management

UNIT I

Overview To Software Configuration Management: SCM: Concepts and definitions – SCM Plan – Software development life cycle models – SDLC Phases – Need and importance of Software configuration management – Increased complexity and demand – Changing nature of software and need for change management – Lower maintenance costs and better quality assurance – Faster problem identification and bug fixes -SCM: Basic concepts – Baselines – Check-in and Check-out-Versions and Variants –System Building- Releases.

UNIT II

Different Phases Of Software Configuration Management: Different Phases Of Scm – SCM System design - SCM Plan preparation-SCM Team organization – SCM Infrastructure organization – SCM Team training – Project team training – Configuration identification – Configuration Control – Configuration status accounting – Configuration and its.

UNIT III

Configuration Audits And Management Plans When, what and who of auditing- Functional Configuration audit – Physical Configuration audit – Auditing the SCM System – Role of SCM Team in configuration audits – SCM plan and the incremental approach – SCM Plan and SCM Tools – SCM Organization.

UNIT IV

Software Configuration Management Tools And Implementation Advantages of SCM tools – Reasons for the increasing popularity of SCM tools – SCM Tools and SCM Functions – SCM tool selection – Role of Technology – Selection criteria – Tool implementation – SCM implementation plan – implementation strategy – SCM Implementation team.

UNIT V

Trends In Scm: FUTURE DIRECTIONS SCM in different scenarios – SCM and project size –SCM in integrated development environments – SCM in distributed environments – SCM and CASE Tools - Trends in SCM - Hardware and Software Management – Better integration with IDE'S and CASE environments – Customization – Better decision making capabilities – Reduction in SCM Team size – Market snapshot.

References

1.Jessica Keyes,Software Configuration Management,Aucrbach Publications, 2008.
2.Alexis Leon,Software Configuration Management Handbook,Artech Print on Demand; 2 edition,2009.
3.Robert Aiello and Leslie SachsConfiguration Management Best Practices: Practical Methods that work in Real World, , Addison(Wesley Professional; 1 edition, 2010.
4.Stephen P. Berczuk, Brad Appleton and Kyle Brown , "Software Configuration Management Patterns: Effective Teamwork and Practical Integration", Addison(Wesley , 2003)

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MSE- 302 (C) CYBER LAW & FORENSIC

UNIT-I

Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II

Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws: ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), etaxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III

Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking: cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

UNIT-IV

Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V

Copyright issues in cyberspace: linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace: domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:

1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics", First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT. PHI Learning.

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MSE- 302 (D) REAL TIME SYSTEMS

UNIT I

Introduction to real time systems, structure, issues, task classes, performance measures for real time systems-their properties, traditional measures, cost functions and hard deadlines. Estimation of program run time-source code analysis, accounting for pipelining and caches.

UNIT II

Task Assignment and Scheduling-Rate monotonic scheduling algorithm, Preemptive earliest deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions.

UNIT III

Programming Languages & Tools- Desired language characteristics, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and generics, Mulitasking, Low level programming, Fex, Euclid, Run time support.

UNIT IV

Real time Communication-Communication media, network topologies, Protocols Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

UNIT V

Fault Tolerance Techniques- Fault, fault types, fault detection, fault and error containment, hardware and software redundancy, time redundancy, information redundancy, Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

REFERENCES:-

1. C.M Krishna and Kang G. Shin, Real Time Systems, TMH
2. Stuart Bennett, Real time computer control and introduction, Pearson education, 2003
3. Jane W.S Liu, Real time systems, Mc-Graw Hill

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MSE-302 (E) BIOINFORMATICS

UNIT-I

Introduction:-Introduction to bioinformatics, objectives of bioinformatics, Basic chemistry of nucleic acids, structure of DNA & RNA, Genes, structure of bacterial chromosome, cloning methodology, Data maintenance and Integrity Tasks.

UNIT-II

Bioinformatics Databases & Image Processing :- Types of databases, Nucleotide sequence databases, Protein sequence databases, Protein structure databases, Normalization, Data cleaning and transformation, Protein folding, protein function, protein purification and characterization, Introduction to Java clients, CORBA, Using MYSQL, Feature Extraction.

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UNIT-V

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1.Gopal & Jones, BIOINFORMATICS with fundamentals of Genomics & Proteomics, TMH Pub
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