Rajasthan Technical University, Kota
Teaching & Scheme of Examination for B.Tech. (Computer Engineering)
Session 2009-10 (Main Examination)

III Sem.

Subject Code	Name of Subject	Exam Hrs.	L	T	P	M.M. Sessional/ Mid term	M.M. End Term	Total M.M.	Common to CS, IT
3CS1	Mathematics III	3	3	1	-	20	80	100	Common to CS, IT
3CS2	Electronic Devices & Circuits	3	3	-	-	20	80	100	Common to CS, IT
3CS3	Data Structures and Algorithms	3	3	-	-	20	80	100	Common to CS, IT
3CS4	Object Oriented Programming	3	3	-		20	80	100	Common to CS, IT
3CS5	Digital Electronics	3	3	-	-	20	80	100	Common to CS, IT
Electives (Only One to be chosen by each student) 3CS6.1 Optical Communication 3CS6.2 Fundamentals of Linux & Shell Programming 3CS6.3 Management Information Systems		3	3	-	-	20	80	100	Common to CS, IT
3CS7	Programming in C++	4			3	60	40	100	Common to CS, IT
3CS8	Data Structure Lab	4			3	60	40	100	Common to CS, IT
3CS9	Analog Electronics Lab	4			3	60	40	100	Common to CS, IT
3CS10	Digital Electronics Lab	4			2	30	20	50	Common to CS, IT
3CSDC	Discipline & Extra Curricular Activities							50	
	TOTAL		18	1	11			1000	

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IV Sem.

Subject Code	Name of Subject	Exam Hrs.	L	T	P	M.M. Sessional/ Mid term	M.M. End Term	Total M.M.	Common to CS, IT
4CS1	Microprocessor and Interfaces	3	3	-		20	80	100	Common to CS, IT
4CS2	Principles of Programming Languages	3	3	-		20	80	100	Common to CS, IT
4CS3	Discrete Mathematical Structures	3	3	1		20	80	100	Common to CS, IT
4CS4	Statistics and Probability Theory	3	3	1		20	80	100	Common to CS, IT
4CS5	Software Engineering	3	3	-		20	80	100	Common to CS, IT
Electives (Only One to be chosen by each student) 4CS6.1 Analog & Digital Communication 4CS6.2 Linear Integrated Circuits 4CS6.3 Logic & Functional Programming		3	3	-	-	20	80	100	Common to CS, IT
4CS7	Microprocessor Lab	4			2	30	20	50	Common to CS, IT
4CS8	Communication Lab	4	-	-	2	30	20	50	Common to CS, IT
4CS9	Advance Object Oriented Programming Lab	4	-	-	3	60	40	100	Common to CS, IT
4CS10	Computer Aided Software Engg. Lab	4			3	60	40	100	Common to CS, IT
4CS11	Humanities & Social Sciences	4	-	-	2	30	20	50	Common to CS, IT
4CSDC	Discipline & Extra Curricular Activities							50	
	TOTAL		18	2	12			1000	

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V Sem.

Sub. Code	Name of Subject	Teaching Periods L	T	P	Duration of Exams (Hours)	Maximum Marks Allocation Internal	End Term	Sessional	Practical	Total
5CS1	Software Engineering	3	1	-	3	20	80	-	-	100
5CS2	Computer Architecture	3	-	-	3	20	80	-	-	100
5CS3	Database Management Systems	3	-	-	3	20	80	-	-	100
5CS4	Computer Graphics	3	-	-	3	20	80	-	-	100
5CS5	Telecommunication Fundamentals	3	1	-	3	20	80	-	-	100
5CS6.1 5CS6.2 5CS6.3	Logic & Functional Programming Information Theory and Coding Advanced Data Structure	3	-	-	3	20	80	-	-	100
Total		18	2	-	-	120	480	-	-	600
5CS7	Software Engineering Lab	-	-	2+2	3	-	-	60	40	100
5CS8	Computer Architecture Lab	-	-	2+2	3	-	-	60	40	100
5CS9	Database Management Lab	-	-	2	3	-	-	45	30	75
5CS10	Computer Graphics Lab	-	-	2	3	-	-	45	30	75
Discipline & Extra Curricular Activities		-	-	-	-	-	-	-	-	50
Total		-	-	12	-	-	-	210	140	400
Grand Total		**18**	**2**	**12**	-	**120**	**480**	**210**	**140**	**1,000**

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VI Sem.

Sub. Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				
		L	T	P		Internal	End Term	Sessional	Practical	Total
6CS1	Operating Systems	3	1	-	3	20	80	-	-	100
6CS2	Computer Networks	3	-	-	3	20	80	-	-	100
6CS3	Design & Analysis of Algorithms	3	-	-	3	20	80	-	-	100
6CS4	Embedded Systems	3	1	-	3	20	80	-	-	100
6CS5	Theory Of Computation	3	-	-	3	20	80	-	-	100
6CS6.1 6CS6.2 6CS6.3	Digital Signal Processing Advanced Software Engineering Microwave and Satellite Communication	3	-	-	3	20	80	-	-	100
Total		18	2	**-**	**-**	120	480	**-**	**-**	600
6CS7	Shell Programming Lab	-	-	2	3	-	-	45	30	75
6CS8	Network lab	-	-	2	3	-	-	60	40	100
6CS9	Web Programming lab	-	-	2+2	3	-	-	45	30	75
6CS10	Microcontroller lab	-	-	2+2	3	-	-	60	40	100
Discipline & Extra Curricular Activities		-	-	-	-	-	-	-	-	50
Total		**-**	**-**	12	**-**	**-**	**-**	210	140	400
Grand Total		**18**	**2**	**12**	**-**	**120**	**480**	**210**	**140**	**1,000**

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VII Sem.

Sub. Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				
		L	T	P		Internal	End Term	Sessional	Practical	Total
7CS1	Compiler Construction	3	-	-	3	20	80	-	-	100
7CS2	Data Mining And Ware Housing	3	1	-	3	20	80	-	-	100
7CS3	Logic Synthesis	3	-	-	3	20	80	-	-	100
7CS4	Artificial Intelligence	3	-	-	3	20	80	-	-	100
7CS5	Multimedia Systems	3	-	-	3	20	80	-	-	100
7CS6.1 7CS6.2 7CS6.3	Service Oriented Architectures Optical Communication Real Time Systems	3	-	-	3	20	80	-	-	100
Total		18		**-**	**-**	120	480	**-**	**-**	600
7CS7	Compiler Design Lab	-	-	2+2	**3**	-	-	**45**	**30**	**75**
7CS8	Data Mining And Ware Housing Lab	-	-	2+2	**3**	-	-	**45**	**30**	**75**
7CS9	Logic Synthesis Lab	-	-	**2**	**3**	-	-	**30**	**20**	**50**
7CS10	Project Stage I	-	-	2/2	-	-	-	**30**	**20**	**50**
7CS11	Practical Training Seminar	-	-	**2**	-	-	-	40+20	**40**	**100**
Discipline & Extra Curricular Activities		-	-	-	-	-	-	-	-	**50**
Total		**-**	**-**	13	**-**	**-**	**-**	210	140	400
Grand Total		**18**	**1**	**13**	**-**	**120**	**480**	**210**	**140**	**1,000**

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VIII Sem.

Sub. Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				
		L	T	P		Internal	End Term	Sessional	Practical	Total
8CS1	Information System and Securities	3	-	-	3	20	80	-	-	100
8CS2	CAD FOR VLSI Design	3	1	-	3	20	80	-	-	100
8CS3	Advanced computer Architectures	3	1	-	3	20	80	-	-	100
8CS4.1 8CS4.2 8CS4.3	Distributed Systems Image Processing Natural Language Processing	3	-	-	3	20	80	-	-	100
Total		12	2	-	-	120	480	-	-	400
8CS5	Information System and Securities Lab	-	-	2+2	3	-	-	60	40	100
8CS6	VLSI Design Lab	-	-	2+2	3	-	-	45	30	75
8CS7	X-Windows Programming Lab	-	-	2+2	3	-	-	45	30	75
8CS8	Project Stage II	-	-	2	-	-	-	120	80	200
8CS9	Seminar Presentation	-	-	2	-	-	-	-	-	100
Discipline & Extra Curricular Activities		-	-	-	-	-	-	-	-	50
Total		-	-	16	-	-	-	270	180	600
Grand Total		**12**	**2**	**16**	-	**120**	**480**	**270**	**180**	**1,000**

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Class: III Sem. B.Tech.	Evaluation
Branch: Computer Engg. Schedule per Week Lectures: 3, Tutorial: 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

3CS1 MATHEMATICS III (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	Introduction: Engineering application of optimization, Statement and classification of optimization problem, single variable and multivariable optimization with and without constraints.
II	Linear Programming: Formulation of Linear Programming problem, Graphical Approach, General Linear Programming problem, Simplex Method. Duality in Linear Programming and Transportation Problems.
III	Project Scheduling: Project Scheduling by PERT and CPM Network Analysis. Sequencing Theory: General Sequencing problem n-jobs through 2 machines & 3 machines and 2-jobs through m machines.
IV	LAPLACE TRANSFORM: Laplace transform with its simple properties. Inverse Laplace transform, convolution theorem (without proof), solution of ordinary differential equation with constant coefficient, solution of partial differential equation having constant coefficient with special reference to diffusion, Heat conduction and wave equation. Boundary value problems
V	NUMERICAL ANALYSIS: Difference operators forward, backward, central, shift and average operators and relation between them. Newton's and Gauss forward and backward interpolation formula for equal interval, Stirling's formula for central difference. Lagrange's Interpolation formula and Inverse Interpolation. Numerical differentiation by Newton's, Gauss and Sterling's formula. Numerical Integration by Simpson's one third and there eight rule. Numerical Integration of ordinary differential equation of first order by Picard's method, Euler's and modified Euler's method, Milne's method and Runga-Kutta fourth order method. Solution of difference equation.

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Branch: Computer Engg. **Schedule per Week** **Lectures: 3**	**Examination Time = Three (3) Hours** **Maximum Marks = 100** **[Mid-term (20) & End-term (80)]**

3CS2 ELECTRONIC DEVICES & CIRCUITS (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	Mobility and conductivity, charge densities in a semiconductor, Fermi Dirac distribution, carrier concentrations and fermi levels in semiconductor, Generation and recombination of charges, diffusion and continuity equation, Mass action Law, Hall effect. Junction diodes, Diode as a ckt. element, load line concept, clipping and clamping circuits, Voltage multipliers.
II	Transistor characteristics, Current components, Current gains: alpha and beta. Operating point. Hybrid model, h-parameter equivalent circuits. CE, CB and CC configuration. DC and AC analysis of CE,CC and CB amplifiers. Ebers-Moll model. Biasing & stabilization techniques. Thermal runaway, Thermal stability.
III	SMALL SIGNAL AMPLIFIERS AT LOW FREQUENCY : Analysis of BJT and FET, RC coupled amplifiers. Frequency response, midband gain, gains at low and high frequency. Miller's Theorem. Cascading Transistor amplifiers, Emitter follower. JFET, MOSFET, Equivalent circuits and biasing of JFET's & MOSFET's. Low frequency CS and CD JFET amplifiers. FET as a voltage variable resistor. Source follower.
IV	FEEDBACK AMPLIFIERS : Classification, Feedback concept, Transfer gain with feedback, General characteristics of negative feedback amplifiers. Analysis of voltage-series, voltage-shunt, current- series and current-shunt feedback amplifier. Stability criterion.
V	OSCILLATORS : Classification. Criterion for oscillation. Tuned collector, Hartley, Colpitts, RC Phase shift, Wien bridge and crystal oscillators, Astable, monostable and bistable multivibrators. Schmitt trigger.

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Branch: Computer Engg. **Schedule per Week** **Lectures: 3**	**Examination Time = Three (3) Hours** **Maximum Marks = 100** **[Mid-term (20) & End-term (80)]**

3CS3 DATA STRUCTURES & ALGORITHMS (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	Definition & characteristics of algorithms, structures. Difficulties in estimating exact execution time of algorithms. Concept of complexity of program. Asymptotic notations: Big-Oh, theta, Omega- Definitions and examples, Determination of time and space complexity of simple algorithms without recursion. Representing a function in asymptotic notations viz $5n^2-6n=\theta(n^2)$ Arrays: Array as storage element, Row major & column major form of arrays, computation of address of elements of n dimensional array.
II	Arrays as storage elements for representing polynomial of one or more degrees for addition & multiplication, sparse matrices for transposing & multiplication, stack, queue, dequeue, circular queue for insertion and deletion with condition for over and underflow, transposition of sparse matrices with algorithms of varying complexity (Includes algorithms for operations as mentioned). Evaluation of Expression: Concept of precedence and associativity in expressions, difficulties in dealing with infix expressions, Resolving precedence of operators and association of operands, postfix & prefix expressions, conversion of expression from one form to other form using stack (with & without parenthesis), Evaluation of expression in infix, postfix & prefix forms using stack. Recursion.
III	Linear linked lists: singly, doubly and circularly connected linear linked lists-insertion, deletion at/ from beginning and any point in ordered or unordered lists. Comparison of arrays and linked lists as data structures. Linked implementation of stack, queue and dequeue. Algorithms for/of insertion, deletion of stack, queue, dequeue implemented using linked structures. Polynomial representation using linked lists for addition, Concepts of Head Node in linked lists. Searching: Sequential and binary search.
IV	Non-Linear Structures: Trees definition, characteristics concept of child, sibling, parent child relationship etc, binary tree: different types of binary trees based on distribution of nodes, binary tree (threaded and unthreaded) as data structure, insertion, deletion and traversal of binary trees, constructing binary tree from

	traversal results. Threaded binary Tree. Time complexity of insertion, deletion and traversal in threaded and ordinary binary trees. AVL tree: Concept of balanced trees, balance factor in AVL trees, insertion into and deletion from AVL tree, balancing AVL tree after insertion and deletion. Application of trees for representation of sets.
V	Graphs: Definition, Relation between tree & graph, directed and undirected graph, representation of graphs using adjacency matrix and list. Depth first and breadth first traversal of graphs, finding connected components and spanning tree. Single source single destination shortest path algorithms. Sorting: Insertion, quick, heap, topological and bubble sorting algorithms for different characteristics of input data. Comparison of sorting algorithms in term of time complexity. NOTE: 1. Algorithm for any operation mentioned with a data structure or required to implement the particular data structure is included in the curriculum.

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Branch: Computer Engg. **Schedule per Week** **Lectures: 3**	**Examination Time = Three (3) Hours** **Maximum Marks = 100** **[Mid-term (20) & End-term (80)]**

3CS4 OBJECT ORIENTED PROGRAMMING (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	Introduction: Review of structures in C, accessing members of structures using structure variables, pointer to structures, passing structures to functions, structures as user defined data types.
II	Introduction to programming paradigms- (Process oriented and Object oriented). Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public members of a class, data & function members. Characteristics of OOP- Data hiding, Encapsulation, data security. Basics of C++: Structure of C++ programs, introduction to defining member functions within and outside a class, keyword *using*, declaring class, creating objects, constructors & destructor functions, Initializing member values with and without use of constructors, simple programs to access & manipulate data members, *cin* and *cout* functions. Dangers of returning reference to a private data member, constant objects and members function, composition of classes, friend functions and classes, using *this* pointer, creating and destroying objects dynamically using *new* and *delete* operators. Static class members, container classes and iterators, proxy classes.
III	Operator overloading: Fundamentals, Restrictions, operator functions as class members v/s as friend functions. Overloading stream function, binary operators and unary operators. Converting between types.
IV	Inheritance: Base classes and derived classes, protected members, relationship between base class and derived classes, constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding, virtual destructors.
V	Multiple inheritance, virtual base classes, pointers to classes and class members, multiple class members. Templates, exception handling.

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3CS5 DIGITAL ELECTRONICS (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	NUMBER SYSTEMS, BASIC LOGIC GATES & BOOLEAN ALGEBRA: Binary Arithmetic & Radix representation of different numbers. Sign & magnitude representation, Fixed point representation, complement notation, various codes & arithmetic in different codes & their inter conversion. Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function. Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams and truth tables. Logic diagrams from Boolean expressions and vica-versa. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Logic gate conversion.
II	DIGITAL LOGIC GATE CHARACTERISTICS: TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS & CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to one another.
III	MINIMIZATION TECHNIQUES: Minterm, Maxterm, Karnaugh Map, K map upto 4 variables. Simplification of logic functions with K-map, conversion of truth tables in POS and SOP form. Incomplete specified functions. Variable mapping. Quinn-Mc Klusky minimization techniques.
IV	COMBINATIONAL SYSTEMS: Combinational logic circuit design, half and full adder, subtractor. Binary serial and parallel adders. BCD adder. Binary multiplier. Decoder: Binary to Gray decoder, BCD to decimal, BCD to 7-segment decoder. Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder. Diode switching matrix. Design of logic circuits by multiplexers, encoders, decoders and demultiplexers.
V	SEQUENTIAL SYSTEMS: Latches, flip-flops, R-S, D, J-K, Master Slave flip flops. Conversions of flip-flops. Counters : Asynchronous (ripple), synchronous andsynchronous decade counter, Modulus counter, skipping state counter, counter design. Ring counter. Counter applications. Registers: buffer register, shift register.

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3CS6.1 OPTICAL COMMUNICATION (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	OPTICAL FIBERS - Basic optical laws and definitions, Principles of light propagation in fibers, Ray theory, Optical fiber modes and configurations, Step index and graded index fibers, Monomode and multimode fibers, Fiber materials, fiber fabrication, Fiber optic cables. Attenuation, signal distortion in optical fibers, Dispersion-intra modal & inter modal, Dispersion shifted and flattened fiber.
II	OPTICAL SOURCES - LED's- Structure, Materials, Characteristics, Modulation, Power & efficiency, Laser Diodes - Basic concept, Hetro Structure, properties and modulation.
III	OPTICAL DETECTORS - PIN and Avalanche photo diodes, photo detector noise, detector response time, Avalanche multiplication noise. Photo diode materials. Fundamental of Optical Receiver Operation.
IV	OPTICAL FIBER COMMUNICATION SYSTEMS- Source to fiber coupling, fiber to fiber joints, fiber splicing, fiber connectors. Principle components. Link design calculation, Applications, Wavelength division multiplexing.
V	OPTICAL FIBER MEASUREMENTS: Measurements of Fiber attenuation, Dispersion, refractive index profile, Numerical aperture & diameter.

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3CS6.2 FUNDAMENTALS OF LINUX & SHELL PROGRAMMING (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	**Introduction**: Introduction to Open Source technology, different flavors of Linux (ex:- Red Hat , Fedora, Ubuntu), Files System hierarchy, Logging in, changing password (*passwd* command only), longname, man, xman, date, cal, time, banner, info commands to access on line help. **Simple commands like** ls, cp, mv, wc, sort, tsort, cat, cut, grep, dd, head, tail, uniq, diff, echo, touch, which, whereis, whatis, type, who, whoami, finger, w (option and variations included), tty, ,uname, printf, ps, pwd , history, exec, kill, pkill, clear, lpstate, cancel, compress, uncompress, exit. **Directory commands like**: Brief introduction to file system, mkdir, dir, cd, df, dfspace, du, ll, dirname, rmdir, dir access permission, changing access permission for files and directories like: chmod, chgrp, chown, hard & soft links. Environments and path setting. I/O redirection & piping commands
II	**vi editor**: General startup of vi editor and it modes , Creating and editing files, features of vi, screen movement , cursor movement, insertion, deletion, searching, submitting operations, yank, put, delete commands, reading & writing files, *exrc* file for setting parameters, advance editing techniques, vim (improved vi).
III	**Introduction to X-window system:** x-window as client/ server system, concept of window manager, remote computing & local displays, xinitrc file, customize X work environment and application, customizing the fvwm window manager. Introduction to package management using **yum** technology and **rpm** command, Browsing internet using **Mozilla Firefox** and **elinks** tool.
IV	**Shell**: meaning and purpose of shell, introduction to types of shell. The command line, standard input and standard output , redirection , pipes , filters special characters for searching files and pathnames. **Bourne Again SHell**: shell script-writing and executing, command separation & grouping, redirection, directory stack manipulation, processes, parameters & variables, keyword variables. **Introduction Korn Shell** and **C Shell**
V	**Shell Programming:** Control structures, the *Here* document, expanding *NULL* or *USET* variables, Bulitins , functions, history , aliases, job control, file substitution, source code management- RCS and CVS. *awk* utility.

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3CS6.3 MANAGEMENT INFORMATION SYSTEM (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	Introduction to MIS: concept, Definition, role, Impact and effectiveness of MIS. E-business enterprise: Introduction, E-business, E-commerce, E-communication, E-collaboration. Information Security Challenges: Security Threats controlling and management.
II	Basic of Management Information System: Decision Making, Information and knowledge, OO- Technology and MIS, Business process Re-engineering.
III	Application of Management Information system: Application in manufacturing sector using for personal management, financial management, Production Management, Material Management, Marketing Management Application in Service Sector.
IV	Enterprise Resource Planning (ERP): EMS, ERP, Benefits implementation, EMS & MIS. Case Studies: Application of SAP technologies in manufacturing sector
V	Database and client server architecture, Data Warehouse: architecture to implementation, E-business Technology: Electronic payment systems, Web enabled business management, MIS in web environment.

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3CS7 PROGRAMMING IN C++ (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1	To write a simple program for understanding of C++ program structure without any CLASS declaration. Program may be based on simple input output, understanding of keyword using.
2	Write a C++ program to demonstrate concept of declaration of class with public & private member, constructors, object creation using constructors, access restrictions, defining member functions within and outside a class. Scope resolution operators, accessing an object's data members and functions through different type of object handle name of object, reference to object, pointer to object, assigning class objects to each other.
3	Program involving multiple classes (without inheritance) to accomplish a task. Demonstrate composition of class.
4	Demonstration Friend function friend classes and this pointer.
5	Demonstration dynamic memory management using new & delete & static class members.
6	Demonstration of restrictions an operator overloading, operator functions as member function and/ or friend function, overloading stream insertion and stream extraction, operators, overloading operators etc.
7	Demonstrator use of protected members, public & private protected classes, multi-level inheritance etc.
8	Demonstrating multiple inheritance, virtual functions, virtual base classes, abstract classes

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Branch: Computer Engg. **Schedule per Week** **Practical Hrs : 3**	**Examination Time = Three (4) Hours** **Maximum Marks = 100** **[Sessional/Mid-term (60) & End-term (40)]**

3CS8 DATA STRUCTURES LAB (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1	Write a simple C program on a 32 bit compiler to understand the concept of array storage, size of a word. The program shall be written illustrating the concept of row major and column major storage. Find the address of element and verify it with the theoretical value. Program may be written for arrays upto 4-dimensions.
2	Simulate a stack, queue, circular queue and dequeue using a one dimensional array as storage element. The program should implement the basic addition, deletion and traversal operations.
3	Represent a 2-variable polynomial using array. Use this representation to implement addition of polynomials.
4	Represent a sparse matrix using array. Implement addition and transposition operations using the representation.
5	Implement singly, doubly and circularly connected linked lists illustrating operations like addition at different locations, deletion from specified locations and traversal.
6	Repeat exercises 2, 3 & 4 with linked structures.
7	Implementation of binary tree with operations like addition, deletion, traversal.
8	Depth first and breadth first traversal of graphs represented using adjacency matrix and list.
9	Implementation of binary search in arrays and on linked Binary Search Tree.
10	Implementation of insertion, quick, heap, topological and bubble sorting algorithms.

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Session 2009-10 (Main Examination)

Class: III Sem. B.Tech.	Evaluation
Branch: Computer Engg. **Schedule per Week** **Practical Hrs : 3**	**Examination Time = Three (4) Hours** **Maximum Marks = 100** **[Sessional/Mid-term (60) & End-term (40)]**

3CS9 ANALOG ELECTRONICS LAB (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1	Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse Saturation current and static & dynamic resistances.
2	Plot V-I characteristic of zener diode and study of zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
3	Plot frequency response curve for single stage amplifier and to determine gain bandwidth product.
4	Plot drain current - drain voltage and drain current – gate bias characteristics of field effect transistor and measure of I_{dss} & V_p
5	Application of Diode as clipper & clamper
6	Plot gain- frequency characteristic of two stages RC coupled amplifier & calculate its bandwidth and compare it with theoretical value.
7	Plot gain- frequency characteristic of emitter follower & find out its input and output resistances.
8	Plot input and output characteristics of BJT in CB, CC and CE configurations. Find their h-parameters.
9	Plot gain-frequency characteristics of BJT amplifier with and without negative feedback in the emitter circuit and determine bandwidths, gain bandwidth products and gains at 1kHz with and without negative feedback.
10	Plot and study the characteristics of small signal amplifier using FET.
11	Study Wein bridge oscillator and observe the effect of variation in R & C on oscillator frequency
12	Study transistor phase shift oscillator and observe the effect of variation in R & C on oscillator frequency and compare with theoretical value.
13	To plot the characteristics of UJT and UJT as relaxation.
14	To plot the characteristics of MOSFET and CMOS.

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3CS10 DIGITAL ELECTRONICS LAB (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1	To verify the truth tables of basic logic gates: AND, OR, NOR, NAND, NOR. Also to verify the truth table of Ex-OR, Ex-NOR (For 2, 3, & 4 inputs using gates with 2, 3, & 4 inputs).
2	To verify the truth table of OR, AND, NOR, Ex-OR, Ex-NOR realized using NAND & NOR gates.
3	To realize an SOP and POS expression.
4	To realize Half adder/ Subtractor & Full Adder/ Subtractor using NAND & NOR gates and to verify their truth tables.
5	To realize a 4-bit ripple adder/ Subtractor using basic Half adder/ Subtractor & basic Full Adder/ Subtractor.
6	To verify the truth table of 4-to-1 multiplexer and 1-to-4 demultiplexer. Realize the multiplexer using basic gates only. Also to construct and 8-to-1 multiplexer and 1-to-8 demultiplexer using blocks of 4-to-1 multiplexer and 1-to-4 demultiplexer
7	Design & Realize a combinational circuit that will accept a 2421 BCD code and drive a TIL -312 seven-segment display.
8	Using basic logic gates, realize the R-S, J-K and D-flip flops with and without clock signal and verify their truth table
9	Construct a divide by 2,4 & 8 asynchronous counter. Construct a 4-bit binary counter and ring counter for a particular output pattern using D flip flop.
10	Perform input/output operations on parallel in/Parallel out and Serial in/Serial out registers using clock. Also exercise loading only one of multiple values into the register using multiplexer. Note: As far as possible, the experiments shall be performed on bread board. However, experiment Nos. 1-4 are to be performed on bread board only.

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4CS1 MICROPROCESSOR AND INTERFACES (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	Introduction to Microprocessors, microcontroller; 8085 Microprocessor Architecture, pin description, Bus concept and organization; concept of multiplexing and demultiplexing of buses; concept of static and dynamic RAM, type of ROM, memory map.
II	Software architecture registers and signals, Classification of instruction, Instruction set, addressing modes, Assembly Language Programming and Debugging, Programming Technique, instruction Format and timing.
III	Advance Assembly Language Programming, Counter and time delay; types of Interrupt and their uses, RST instructions and their uses, 8259 programmable interrupt controller; Macros, subroutine; Stack- implementation and uses with examples; Memory interfacing.
IV	8085 Microprocessor interfacing:, 8255 Programmable Peripheral Interface, 8254 programmable interval timer, interfacing of Input/output device, 8279 Key board/Display interface.
V	Microprocessor Application: Interfacing scanned multiplexed display and liquid crystal display, Interfacing and Matrix Keyboard, MPU Design; USART 8251, RS232C and RS422A, Parallel interface- Centronics and IEEE 488 .

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4CS2 PRINCIPLES OF PROGRAMMING LANGUAGES (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	Programming Language: Definition, History, Features. Issues in Language Design: Structure and Operation of computer, Programming Paradigms. Efficiency, Regularity. Issues in Language Translation: Syntax and Semantics.
II	Specifications and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Vectors and Arrays, Lists, Structures, Sets, Files.
III	Sequence control with Expressions, Conditional Statements, Loops, Exception handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment.
IV	Scope – Static and Dynamic, Block structures, Local Data and Shared Data, Parameters and Parameter Transmission. Local and Common Environments, Tasks and Shared Data.
V	Abstract Data type, information hiding, encapsulation, type definition. Static and Stack-Based Storage management. Fixed and Variable size heap storage management, Garbage Collection.

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4CS3 DISCRETE MATHEMATICAL STRUCTURES (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	Language of Logic: Proposition, Compound Proposition, Conjunction, Disjunction, Implication, Converse, Inverse & Contrpositive, Biconditional Statements, tautology, Contradiction & Contingency, Logical Equivalences, Quantifiers, Arguments.
II	Proof Methods: Vacuous, Trivial, Direct, Indirect by Contrapositive and Contradiction, Constructive & Non-constructive proof, Counterexample. The Division Algorithm, Divisibilty Properties (Prime Numbers & Composite Numbers), Principle of Mathematical Induction, The Second Principle of Mathematical Induction, Fundamental Theorem of Arithmetic. Algorithm Correctness: Partial Correctness, Loop Invariant. Testing the partial correctness of linear & binary search, bubble & selection sorting.
III	Graph Theory: Graphs – Directed, Undirected, Simple,. Adjacency & Incidence, Degre of Vertex, Subgraph, Complete graph, Cycle & Wheel Graph, Bipartite & Complete Bipartite Graph, Weighed Graph, Union of Simple Graphs. Complete Graphs. Isomorphic Graphs, Path, Cycles & Circuits Euclerian & Hamiltonian Graphs. Planar Graph: Kuratowski's Two Graphs, Euler's Formula, Kuratowski's Theorem. Trees: Spanning trees- Kruskal's Algo, Finding Spanning Tree using Depth First Search, Breadth First Search, Complexity of Graph, Minimal Spanning Tree.
IV	Sets: Definition and types, Set operations, Partition of set, Cardinality (Inclusion-Exclusion & Addition Principles), Recursive definition of set. Functions: Concept, Some Special Functions (Polynomial, Exponential & Logarithmic, Abslute Value, Floor & Ceiling, Mod & Div Functions), Properties of Functions, Cardinality of Infinite Set, Countable & Uncountable Sets, The Pigeonhole & Generalized Pigeonhole Principles, Composition of Functions.
V	Relations: Boolean Matrices, Binary Relation, Adjacency Matrix of Relation, Properties of Relations, Operations on Relations, The Connectivity Relations, Transitive Closure-Warshall's Algorithm, Equivalence relations- Congruence Relations, Equivalence Class, Number of Partitions of a Finite Set, Partial & Total Orderings.

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4CS4 STATISTICS & PROBABILITY THEORY (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	Introduction & Discrete random variables Sample space, events, algebra of events, Bernoulli's trials, Probability & Baye's theorem. Random variable & their event space, probability generating function, expectations, moments, computations of mean time to failure, Bernoulli & Poisson processes.
II	Discrete & continuous distributions Probability distribution & probability densities: Binomial, Poisson, normal rectangular and exponential distribution & their PDF's, moments and MGF's for above distributions.
III	Correlation & Regression Correlation & regression: Linear regression, Rank correlation, Method of least squares Fitting of straight lines & second degree parabola. Normal regression and correlation analysis.
IV	Queuing Theory Pure birth, pure death and birth-death processes. Mathematical models for M/M/1, M/M/N, M/M/S and M/M/S/N queues.
V	Discrete Parameter mark on chains: M/G/1 Queuing model, Discrete parameter birth-death process.

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4CS5 SOFTWARE ENGINEERING (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	System Analysis: Characteristics, Problems in system Development, System Level project Planning, System Development Life cycle (SDLC), computer system engineering & system analysis, modeling the architecture, system specification.
II	Software & its characteristics: Software Development, Process Model, Prescriptive model, The water fall model, Incremental Process Modes, Evolutionary process model, specialized process model.
III	Requirement Analysis: Requirement analysis tasks, Analysis principles, Software prototyping and specification data dictionary finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications.
IV	Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation, coding – Programming style, Program quality, quantifying program quality, complete programming example
V	Object Oriented Analysis: Object oriented Analysis Modeling, Data modeling Object Oriented Design: OOD concepts and methods class and object definitions, refining operations, Class and object relationships, object modularization, Introduction to Unified Modeling Language

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4CS6.1 ANALOG & DIGITAL COMMUNICATION (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	AMPLITUDE MODULATION: Frequency translation, Recovery of base band signal, Spectrum & power relations in AM systems. Methods of generation & demodulation of AM-DSB, AM-DSB/SC and AM-SSB signals. Modulation & detector circuits for AM systems. AM transmitters & receivers.
II	FREQUENCY MODULATION : Phase & freq. modulation & their relationship, Spectrum & band width of a sinusoidally modulated FM signal, phasor diagram, Narrow band & wide band FM. Generation & demodulation of FM signals. FM transmitters & receivers. Comparison of AM, FM & PM. Pre emphasis & de-emphasis. Threshold in FM, PLL demodulator.
III	PCM & DELTA MODULATION SYSTEMS : Uniform and Non-uniform quantization. PCM and delta modulation, Signal to quantization noise ratio in PCM and delta modulation. DPCM, ADM, T1 Carrier System, Matched filter detection. Error probability in PCM system.
IV	BASE BAND TRANSMISSION: Line coding(RZ,NRZ): Polar, Bipolar, Manchester, AMI. Inter symbol interference, Pulse shaping, Nyquist criterion, Raised cosine spectrum. PULSE ANALOG MODULATION: Practical aspects of sampling: Natural and flat top sampling. PAM, PWM, PPM modulation and demodulation methods, PAM-TDM.
V	DIGITAL MODULATION TECHNIQUES : Geometric interpretation of signals, Orthogonalization. ASK, BPSK, BFSK, QPSK, MSK modulation techniques and Coherent detection of these techniques. Calculation of error probabilities.

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4CS6.2 LINEAR INTEGRATED CIRCUITS (Common to Comp. Engg. & Info. Tech)

Units	Contents of the subject
I	OPERATIONAL AMPLIFIERS: Basic differential amplifier analysis, Single ended and double ended configurations ,Op-amp configurations with feedback, Op-amp parameters, Inverting and Non- Inverting configuration, Comparators, Adder.
II	OPERATIONAL AMPLIFIER APPLICATIONS: Integrator, Differentiator, Voltage to frequency & Frequency to voltage converters. Oscillators: Phase shift, Wien bridge, Quadrature, square wave, triangular wave, sawtooth oscillators. Voltage controlled oscillators.
III	ACTIVE FILTERS: Low pass, high pass, band pass and band reject filters,All pass filter, Switched capacitor filter, Butterworth filter design, Chebyshev Filter design.
IV	PHASE-LOCKED LOOPS: Operating Principles of PLL, Linear Model of PLL, Lock range, Capture range, Applications of PLL as FM detector, FSK demodulator, AM detector, frequency translator, phase shifter, tracking filter, signal synchronizer and frequency synthesizer, Building blocks of PLL, LM 565 PLL.
V	LINEAR IC's: Four quadrant multiplier & its applications, Basic blocks of linear IC voltage regulators, Three terminal voltage regulators, Positive and negative voltage regulators. The 555 timer as astable and monostable multivibrators. Zero crossing detector, Schmitt trigger.

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4CS6.3 LOGIC AND FUNCTIONAL PROGRAMMING (Common to Comp. Engg. & Info. Tech)

Units	**Contents of the subject**
I	PROPOSITIONS AND PREDICATES: Evaluation of constant propositions, Evaluation of proposition in a state. Precedence rules for operators, Tautologies, Propositions a sets of states and Transforming English to propositional form. Introduction to first-order predicate logic, Quantifiers and Reasoning.
II	LOGIC PROGRAMMING USING PROLOG: Constants, Goals and Clauses, Facts, Rules, Semantics, Rules and Conjunction, Rules and Disjunction, Search strategy, Queries.
III	ADVANCED LOGIC PROGRAMMING USING PROLOG: - Unification, Recursion, Lists, Cut operator, and Sorting. Data structures, Text strings, Searching state space, Operators and their precedence, and Parsing in Prolog.
IV	FUNCTIONAL PROGRAMMING: Introduction to lambda calculus-Syntax and semantics, Computability and correctness, Lazy and Eager Evaluation Strategies, comparison of functional and imperative languages.
V	FUNCTIONAL PROGRAMMING USING HASKELL: Introduction, lists, User-defined data types, type classes, and arrays in Haskell. Input/Ouput in Haskell - type classes IO and Monad, Simple applications/programs in Haskell.

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4CS7 MICROPROCESSOR LAB (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1	Add the contents of memory locations XX00 &XX01 & place the result in memory location XX02.
2	Add the 16 bit numbers stored in memory location & store the result in another memory location.
3	Transfer a block of data from memory location XX00 to another memory location XX00 in forward & reverse order.
4	Write a program to Swap two blocks of data stored in memory.
5	Write a program to find the square of a number.
6	Write a main program & a conversion subroutine to convert Binary to its equivalent BCD.
7	Write a program to find largest & smallest number from a given array.
8	Write a program to Sort an array in ascending & descending order.
9	Write a program to multiply two 8 bit numbers whose result is 16 bit.
10	Write a program of division of two 8 bit numbers.
11	Generate square wave from SOD pin of 8085 & observe on CRO.
12	Write a program to perform traffic light control operation.
13	Write a program to control the speed of a motor.

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4CS8 COMMUNICATION LAB (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1	Harmonic analysis of a square wave of modulated waveform Observe the amplitude modulated waveform and measures modulation index. Demodulation of the AM signal
2	To modulate a high frequency carrier with sinusoidal signal to obtain FM signal. Demodulation of the FM signal
3	To observe the following on a transmission line demonstrator kit : i. The propagation of pulse in non-reflecting Transmission line. ii. The effect of losses in Transmission line. iii. The resonance characteristics of al half wavelength long x-mission line.
4	To study and observe the operation of a super heterodyne receiver
5	To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it.
6	To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it.
7	To observe pulse amplitude modulated waveform and its demodulation.
8	To observe the operation of a PCM encoder and decoder. To consider reason for using digital signal x-missions of analog signals.
9	Produce ASK signals, with and without carrier suppression. Examine the different processes required for demodulation in the two cases
10	To observe the FSK wave forms and demodulate the FSK signals based on the properties of (a) tuned circuits (b) on PI.L.
11	To study & observe the amplitude response of automatic gain controller (AGC).

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4CS9 ADVANCE OBJECT ORIENTED PROGRAMMING. (Common to Comp. Engg. & Info. Tech)

S. No.	List of Experiments
1.	Write a C++ Object Oriented Code for Huffman Coding & Decoding. The code must have implementation of Binary tree, binary Search, Scanning of Input Stream, Generation of Code. The input Stream and codes may be stored in files.
2.	Write a C++ Object Oriented Code for representing a graph using adjacency list. Perform depth first and breadth first search starting from any node. Also find the shortest path between single sources all destinations. Also carry out topological sorting.
3.	Create a C++ template for matrix. Include procedures for multiplication of 2 matrices. Use the same class for multiplication of more than two matrices.
4.	Create a C++ class for implementation of AVL tree to store a symbol table.
5.	Create a new string class say NewString. Define functions as defined in the system string class.

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4CS10 COMPUTER AIDED SOFTWARE ENGINEERING LAB (Common to Comp. Engg. & Info. Tech)

For the instructor: Assign any two projects two a group of exactly two students covering all of the experiments from given experiment list. Each group is required to prepare the following documents for projects assigned to them and develop the software using software engineering methodology.

1. Problem Analysis and Project Planning Thorough study of the problem- identify project scope, infrastructure.
2. Software Requirement Analysis- Describe the individual Phases/modules of the project deliverables.
3. Data Modeling Use work products – data dictionary, use case diagrams and activity diagrams, build and test lass diagrams, sequence diagrams and add interface to class diagrams.
4. Software Developments and Debugging.
5. Software Testing – Prepare test plan, perform validation testing coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.
6. Describe: Relevance of CASE tools, high – end and low – end CASE tools, automated support for data dictionaries, DFD, ER diagrams.

S. No.	List of Experiments	Software Required:
1	Course Registration System	Case Tools: Rational Suite, Win runner, Empirix Languages: C/C++/JDK, JSDK, INTERNET EXPLORER UML Front End: VB, VC++, Developer 2000, .NET Back End: Oracle, MS – Access, SQL
2	Quiz System	
3	Online ticket reservation system	
4	Remote computer monitoring	
5	Students marks analyzing system	
6	Expert system to prescribe the medicines for the given symptoms	
7	Platform assignment system for the trains in a railway station	
8	Stock maintenance	
9	Student Marks Analyzing System	
10	Online Ticket Reservation System	
11	Payroll System	
12	Export System	

4CS11. HUMANITIES AND SOCIAL SCIENCES

1. **Form of Government:** Democracy, Dictatorship
2. **India:** Brief history of Indian Constitution, History of Indian National Movement, After Independence, Socio-economic growth.
3. **Society:** Social groups-concept and types socialization: concept and types, theory social control :concept and types means. Social problem: concept and types.
4. **The Fundamentals of Economics: The** logic of economics fundamentals definitions of economics, basic terminology.
5. **Micro Economics:** Consumer's behavior, utility, demand, supply, elasticity of demand and supply. Theory of production, production function, factors of production.
6. **Macro Economics: National** income, business cycles, aggregate term, inflation, economic growth, international Trade, exchange rates.
7. **Indian Economy:** Basic features, infrastructure, occupation, natural and human resources, unemployment (Industrial Sector, India and Globalization).

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Name of Subject : SOFTWARE ENGINEERING (5CS1)	
Unit	**Contents**
I	System Analysis: Characteristics, Problems in system Development, System Level project Planning, System Development Life cycle (SDLC), computer system engineering system analysis, modeling the architecture, system specification.
II	Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis, software project scheduling. Software Development : Life Cycle (SWDLC), SWDLC models software engineering approaches
III	Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications.
IV	Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation.
V	Object Oriented Analysis: Object oriented Analysis Modeling, Data modeling. Object Oriented Design: OOD concepts and methods class and object definitions, refining operations. Class and object relationships, object modularization. Introduction to Unified Modeling Language

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Name of Subject : COMPUTER ARCHITECTURE (5 CS 2)	
Unit	**Contents**
I	REGISTER TRANSFER LANGUAGE: Data movement around registers. Data movement from/to memory, arithmetic and logic micro operations. Concept of bus and timing in register transfer.
II	CPU ORGANISATION: Addressing Modes, Instruction Format. CPU organization with large registers, stacks and handling of interrupts & subroutines Instruction pipelining
III	ARITHMETIC ALGORITHM: Array multiplier, Booth's algorithm. Addition subtraction for signed unsigned numbers and 2's complement numbers.
IV	MICROPROGRAMMED CONTROL UNIT : Basic organization of micro-programmed controller, Horizontal & Vertical formats, Address sequencer
V	MEMORY ORGANISATION: Concept of RAM/ROM, basic cell of RAM, Associative memory, Cache memory organization, Vertical memory organization. I/O ORGANISATION: Introduction to Peripherals & their interfacing. Strobe based and handshake-based communication, DMA based data transfer, I/O processor.

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Name of Subject : DATABASE MANAGEMENT SYSTEMS (5 CS 3)	
Unit	**Contents**
I	INTRODUCTION TO DATABASE SYSTEMS: Overview and History of DBMS. File System vs DBMS .Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Transaction management and Structure of a DBMS.
II	ENTITY RELATIONSHIP MODEL: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model-Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base, Design with ER Model-Entity vs Attribute, Entity vs Relationship Binary vs Ternary Relationship and Aggregation vs ternary Relationship Conceptual Design for a Large Enterprise.
III	RELATIONSHIP ALGEBRA AND CALCULUS**: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division, Relation Calculus, Expressive Power of Algebra and Calculus.**
IV	SQL QUERIES PROGRAMMING AND TRIGGERS: The Forms of a Basic SQL Query, Union, Intersection and Except, Nested Queries ,Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases.
V	SCHEMA REFINEMENT AND NORMAL FORMS: Introductions to Schema Refinement, Functional Dependencies, Boyce-Codd Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into 3-NF.

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Name of Subject : COMPUTER GRAPHICS (5 CS 4)	
Unit	**Contents**
I	Introduction to Raster scan displays, Storage tube displays, refreshing, flicking, interlacing, color 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, positioning techniques, rubber band techniques, dragging etc.
II	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- sp-line Method.
III	2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen.
IV	Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.
V	Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation tools, Authoring tools, presentation.

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Name of Subject : TELECOMMUNICATION FUNDAMENTALS (5 CS 5)	
Unit	**Contents**
I	Electromagnetic Spectrum, Frequency Spectrum-Bandwidth-Allocation, Time domain and Frequency domain analysis, Transmission media, , Twisted pair, UTP cables, Coaxial and optical fiber cables, wireless, microwave and satellite transmission, Transmission impairments. Serial and parallel transmission, Simplex, half duplex or full duplex transmission mode. Network, LAN, MAN, WAN, Internet, Intranet, Extranet, Network Topology, Protocols, Layered Architecture, OSI and TCP/P protocol Architecture.
II	Physical Layer : Convention and terminology (bit rate, channel capacity, bandwidth, Signal strength, SNR) Physical transmission media interface(Mechanical, Electrical and Radio interface specification) Modulation (ASK, FSK and PSK, PCM, PAM, Delta Modulations), Line coding (NRZ-L, NRZ–I , Bipolar AMI, Manchester and differential Manchester), Multiplexing (FDM, Synchronous and Statistical TDM) Brief Introduction to Ethernet, SONET/SDH.
III	Data Link Layer: Channel allocation problem, pure and slotted ALOHA Protocols, Persisted And Non-Persisted CSMA, Collision Free Protocols, Digital Cellular Radio and CDMA. Logical Link Sub Layer, MAC Sub layer. Brief Introduction: Frame Relay, PPP.
IV	Switching Networks: Circuit switching Networks, Space and Time division switching, Routing circuit switched networks, control signaling packet switching principles, fixed, flooding and adaptive routing strategies, Brief Introduction: Broadband and Narrowband ISDN, ADSL.
V	Network Devices: Gateway, Router, Bridge, Switch, Hub, Repeater, Multilayer Switch, Protocol Converter, Router, Proxy, Firewall, Multiplexer, Network Card, Modem. Network Technology: DSL, GSM, Bluetooth, Infrared. Brief Introduction to Servers : File Server, Print Server, Mail Server, Proxy Server, Remote Access Server (RAS), Application Server, Web Server, Backup Server

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Name of Subject : LOGICAL AND FUNCTIONAL PROGRAMMING (5 CS 6.1)	
Unit	**Contents**
I	PROPOSITIONS: Fully parenthesized propositions, Evaluation of constant propositions, Evaluation of proposition in a state. Precedence rules for operators, Tautologies, Propositions a sets of states and Transforming English to prepositional form.
II	REASONING USING EQUIVALENCE TRANSFORMATIONS: The laws of equivalence, rules of substitution and transitivity, formal system of axioms and Inference rules. NATURAL DEDUCTION SYSTEM: Introduction to deductive proofs, Inference rules, proofs and sub-proofs, adding flexibility to the natural deduction system and developing natural deduction system proofs.
III	PREDICATES: Extending the range of a state, Quantification, Free and Bound Identifiers, Textual substitution, Quantification over other ranges and some theorems about textual substitution and states.
IV	LOGIC PROGRAMMING: Introduction to prepositional and predicate calculus, First-order predicate calculus, Format logical systems, PROLOG programming-Facts, Rules and queries, Implementations, Applications, Strengths and Weaknesses.
V	FUNCTIONAL PROGRAMMING: Introduction to lambda calculus-Syntax and semantics, Computability and correctness. Features of Functional Languages-Composition of functions, Functions as first-class Objects, no side effects and clean semantics, LISP Programming-Data types and structures, Scheme dialect, primitive functions, functions for constructing functions and functional forms. Applications of functional languages and comparison of functional and imperative languages.

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Name of Subject : INFORMATION THEORY & CODING (5 CS 6.2)	
Unit	**Contents**
I	Elements Of Information Theory: Measure of information, average information, entropy, information rate. Communication channel, discrete and continuous channel
II	Shannon-Hartley theorem and its implications. Channel capacity, Gaussian channel and bandwidth-S/N tradeoff.
III	Introduction of Coding: types of efforts, types of codes, error control coding, methods of controlling errors
IV	Linear Block and Binary Cyclic Codes: matrix decryption of linear block codes, error detection and error correction capabilities of linear block codes. Hamming codes, structure of cyclic codes, encoding using an (n-k) bit shift register syndrome calculation, its error detection & correction, special classes of cyclic codes bch.
V	Burst and Convolution Codes: burst and random error correcting codes, encoders for convolution codes. Decoders for convolution codes

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Name of Subject : ADVANCED DATA STRUCTURES (5 CS 6.3)	
Unit	**Contents**
I	ADVANCED TREES: Definitions Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red- Black Trees. Augmenting Red-Black Trees to Dynamic Order Statistics and Interval Tree Applications. Operations on Disjoint sets and its union-find problem Implementing Sets. Dictionaries, Priority Queues and Concatenable Queues using 2-3 Trees.
II	MERGEABLE HEAPS: Mergeable Heap Operations, Binomial Trees Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci Heap Implementing Fibonacci Heap. SORTING NETWORK**: Comparison network, zero-one principle, bitonic sorting and merging network sorter.**
III	GRAPH THEORY DEFINITIONS: Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets. Cut-Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs.
IV	GRAPH THEORY ALGORITHMS**:** Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing, Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms
V	NUMBER THEORITIC ALGORITHM: Number theoretic notation, Division theorem, GCD recursion, Modular arithmetic, Solving Linear equation, Chinese remainder theorem, power of an element, RSA public key Crypto system, primality Testing and Integer Factorization.

5 CS 7. SOFTWARE ENGINEERING LAB

In this lab first 8 experiments are to practice software engineering techniques. Use any open source CASE tool. Many of them are available at www.sourceforge.net. You can choose any other CASE tool, as per choice.

Language : C++ / JAVA

Design Approach : Object Oriented

These designing can be done on any automation system e.g. library management system, billing system, payroll system, bus reservation system, gas agency management system, book-shop management system, students management system.

1. Do a feasibility study
2. Document all the requirements as specified by customer in Software Requirement Specification
3. Design sequence diagrams for project
4. Design Collaboration diagram
5. Design Data Flow Diagram for the project
6. Design Entity Relation Diagram for the project
7. Design Class diagram
8. Design at least 10 test cases for each module.
9. -10: Code and test the project, which you have designed in last 8 labs.

5 CS 8. COMPUTER ARCHITECTURE LAB

This lab will be based on assembly programming on of RISC processor simulator SPIM. SPIM simulator is available at site http://pages.cs.wisc.edu/~larus/spim.html.

SPIM exercises

1. Read an integer from the keyboard and print it out if (n => n_min AND n <= n_max).
2. Read an integer from the keyboard and print out the following as per switch-case statement

Switch (n)
{ n <= 10 print "not a lot"
n == 12 print "a dozen"
n == 13 print "a baker's dozen"
n == 20 print "a score"
n >= 100 print "lots and lots"
n != 42 print "integer"
otherwise print "you have the answer!"
}

3. Read a string from the keyboard and count the number of letters. Use the equivalent of following for loop

for (s1=0; str[s1] != '\n'; ++s1)

4. Print out a line of characters using simple procedure call.
5. Print out a triangle of characters using recursive procedure call.
6. Print factorial of a number using recursion.
7. Print reverse string after reading from keyboard.
8. Print a string after swapping case of each letter.
9. Print an integer in binary and hex.
10. Implement bubble sort algorithm.
11. Print Pascal Triangle of base size 12.
12. Evaluate and print Ackerman function.

5 CS 9. DATABASE MANAGEMENT LAB

Student can use MySql (preferred open source DBMS) or any other Commercial DBMS tool (MS-Access / ORACLE) at backend and C++ (preferred) VB/JAVA at front end.

1. (a) Write a C++ program to store students records (roll no, name, father name) of a class using file handling. (Using C++ and File handling).

(b) Re-write program 1, using any DBMS and any compatible language.(C++/MySQL) (VB and MS-Access)

2. Database creation/ deletion, table creation/ deletion.

(a) Write a program to take a string as input from user. Create a database of same name. Now ask user to input two more string, create two tables of these names in above database.

(b) Write a program, which ask user to enter database name and table name to delete. If database exist and table exist then delete that table.

3. Write a program, which ask user to enter a valid SQL query and display the result of that query.

4. Write a program in C++ to parse the user entered query and check the validity of query. (Only SELECT query with WHERE clause)

5 - 6. Create a database db1, having two tables t1 (id, name, age) and t2 (id, subject, marks).

(a) Write a query to display name and age of given id (id should be asked as input).

(b) Write a query to display average age of all students.

(c) Write a query to display mark-sheet of any student (whose id is given as input).

(d) Display list of all students sorted by the total marks in all subjects.

7 - 8. Design a Loan Approval and Repayment System to handle Customer's Application for Loan and handle loan repayments by depositing installments and reducing balances.

9 -10. Design a Video Library Management System for managing issue and return of Video tapes/CD and manage customer's queries.

5 CS 10. COMPUTER GRAPHICS LAB

1. Implementation of line generation using slope's method, DDA and Bresenham's algorithms.
2. Implementation of circle generation using Mid-point method and Bresenham's algorithm.
3. Implementation of ellipse generation using Mid-point method.
4. Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.
5. Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing (write a menu driven program).
6. Implementation of Line Clipping using Cohen-Sutherland algorithm and Bisection Method.
7. Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.
8. Implementation of 3D geometric transformations: Translation, Scalind and rotation.
9. Implementation of Curve generation using Interpolation methods.
10. Implementation of Curve generation using B-spline and Bezier curves.
11. Implementation of any one of Back face removal algorithms such as Depth-Buffer algorithm, Painter's algorithm, Warnock's algorithm, Scan-line algorithm)

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Name of Subject : OPERATING SYSTEMS (6 CS 1)	
Unit	**Contents**
I	Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/0 devices organization, I/0 devices organization, I/0 devices organization, I/0 buffering.
II	Process concept, process scheduling, operations on processes, threads, inter-process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.
III	Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation.
IV	Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system.
V	Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, introduction to distributed systems and parallel processing case study.

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Name of Subject: COMPUTER NETWORKS (6 CS 2)	
Unit	**Contents**
I	Network, Network Protocols, Edge, Access Networks and Physical Media, Protocol Layers and their services models, Internet Backbones, NAP's and ISPs.
II	Application Layer: Protocol and Service Provided by application layer, transport protocols. The world wide web. HTTP, Message formats, User Server Interaction and Web caches. FTP commands and replies. Electronic Mail, SMTP, Mail Message Formats and MIME and Mail Access Protocols DNS The internet's directory service DNS records and Message.
III	Transport Layer: Transport Layer Service and Principles, Multiplexing and Demultiplexing applications, connectionless Transport. UDP Segment structure and UDP Checksum. Principles of Reliable Data Transfer-Go back to N and Selective Repeat. Connection Oriented Transport TCP Connection and Segment Structure, Sequence Numbers and acknowledgement numbers, Telnet, Round trip time and timeout. TCP connection management.
IV	Network Layer and Routing: Network service model, Routing principles. Link State routing Algorithm, A distant Vector routing & OSPF algorithm. Router Components; Input Prot, Switching fabric and output port. IPV6 Packet format. Point To Point Protocol (PPP), transition States, PPP Layers-Physical Layer and Data Link Layer, Link Control Protocols. LCP Packets and options. Authentication PAP and CHAP, Network Control Protocol (NCP).
V	Sonet/SDH:Synchronous Transport Signals. Physical configuration-SONET Devices, Sections, Lines and Paths. SONET Layers-Photonic Layer, section layer, line layer, path layer and device layer relationship. Sonet Frame format. Section overhead, Line overhead and path overhead. Virtual Tributaries and types of VTs.

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Name of Subject: DESIGN & ANALYSIS OF ALGORITHMS (6 CS 3)	
Unit	**Contents**
I	BACKGROUND: Review of Algorithm Complexity and Order Notations and Sorting Methods. DIVIDE AND CONQUER METHOD: Binary Search, Merge Sort, Quick sort and strassen's matrix multiplication algorithms. GREEDY METHOD: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees.
II	DYNAMIC PROGRAMMING: Matrix Chain Multiplication. Longest Common Subsequence and 0/1 Knapsack Problem. BRANCH AND BOUND: Traveling Salesman Problem and Lower Bound Theory. Backtracking Algorithms and queens problem.
III	PATTERN MATCHING ALGORITHMS: Naïve and Rabin Karp string matching algorithms, KMP Matcher and Boyer Moore Algorithms. ASSIGNMENT PROBLEMS: Formulation of Assignment and Quadratic Assignment Problem.
IV	RANDOMIZED ALGORITHMS. Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-Cut, randomized algorithm for 2-SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems.
V	PROBLEM CLASSES NP, NP-HARD AND NP-COMPLETE: Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem. Approximation Algorithms for Vertex Cover and Set Cover Problem.
	PROBLEM CLASSES NP, NP-HARD AND NP-COMPLETE: Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem. Approximation Algorithms for Vertex Cover and Set Cover Problem.

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Name of Subject : EMBEDDED SYSTEMS (6 CS 4)	
Unit	**Contents**
I	Overview of Embedded System: Embedded System, Categories and Requirements of Embedded Systems, Challenges and Issues in Embedded Software Development, Applications of Embedded Systems in Consumer Electronics, Control System, Biomedical Systems, Handheld computers, Communication devices.
II	Embedded Hardware & Software Development Environment: Hardware Architecture, Micro- Controller Architecture, Communication Interface Standards, Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems.
III	Design quality and Microcontroller: Quality matrix, software and hardware, Estimation , 8 Bit microcontrollers Architecture, on chip peripherals, instruction set/programming of Intel MCS51 family (8 bit) Inter facing of 8051 with LCD, ADC, sensors, stepper motor, key board, DAC, memory .
IV	Real Time & Database Applications: Real- Time Embedded Software Development, Sending a Message over a Serial Link, Simulation of a Process Control System, Controlling an Appliance from the RTLinux System, Embedded Database Applications using examples like Salary Survey, Energy Meter Readings.
V	Programming Languages for Embedded Systems: Tools for building embedded systems - with case studies. Microchip PIC16 family PIC16F873 processor features architecture memory organization register file map I/O ports PORTA - PORTB PORTC Data EEPROM and flash program memory Asynchronous serial port SPI mode I2C mode.

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Name of Subject : THEORY OF COMPUTATION (6 CS 5)	
Unit	**Content**
I	Finite Automata & Regular Expression: Basic Concepts of finite state system, Deterministic and non-deterministic finite automation and designing regular expressions, relationship between regular expression & Finite automata minimization of finite automation mealy & Moore Machines.
II	Regular Sets of Regular Grammars**: Basic Definition of Formal Language and Grammars. Regular Sets and Regular** Grammars, closure proportion of regular sets, Pumping lemma for regular sets, decision Algorithms for regular sets, Myhell_Nerod Theory & Organization of Finite Automata.
III	Context Free Languages& Pushdown Automata: Context Free Grammars – Derivations and Languages – Relationship between derivation and derivation trees – ambiguity – simplification of CEG – Greiback Normal form – Chomsky normal forms – Problems related to CNF and GNF Pushdown Automata: Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Pushdown automata and CFL - pumping lemma for CFL - Applications of pumping Lemma.
IV	Turing Machines: Turing machines – Computable Languages and functions – Turing Machine constructions – Storage in finite control – multiple tracks – checking of symbols – subroutines – two way infinite tape. Undecidability: Properties of recursive and Recursively enumerable languages – Universal Turing Machines as an undecidable problem – Universal Languages – Rice's Theorems.
V	Linear bounded Automata Context Sensitive Language: Chomsky Hierarchy of Languages and automata, Basic Definition & descriptions of Theory & Organization of Linear bounded Automata Properties of context-sensitive languages.

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Name of Subject : DIGITAL SIGNAL PROCESSING (6 CS 6.1)	
Unit	**Contents**
I	Flow Graph and Matrix Representation of Digital Filters: Signal flow graph representation of digital network, matrix representation, basic network structures for IIR and FIR systems, Telligen's theorem for digital filters and its applications.
II	Digital filter Design Techniques: Design of IIR and FIR digital filters, computer aided design of IIR and FIR filters, comparison of IIR and FIR digital filters.
III	Computation of the Discrete Fourier Transform: Goertzel algorithm, FT algorithms, decimation in time and frequency, FFFT algorithm for N a composite number, Chirp Z transforms (CZT).
IV	Discrete Random Signals: Discrete time random process ,averages spectrum representations of infinite energy signals, response of linear system to random signals
V	Power Spectrum Estimation: Basic principles of spectrum estimation, estimates of the auto covariance, power spectrum, cross covariance and cross spectrum.

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Name of Subject : ADVANCED SOFTWARE ENGINEERING (6 CS 6.2)	
Unit	**Contents**
I	SOFTWARE CONFIGURATION MANAGEMENT: SCM Process, Objects in Software configuration, Version control, Change control, Configuration audit, Status reporting, SCM standards .SOFTWARE QUALITY ASSURANCE: Quality Concepts, Quality Movement, SQA Activities and Formal Approaches to SQA.
II	SOFTWARE TESTING AND DEBUGGING: Software Testing Fundamentals .Text Case Design ,White -Box Testing, Basis Path testing, Control Structure Testing, Black Box Testing and Testing for Specialized Environments, Architectures and Applications. Program Error, Debugging Process (Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault, Testing) Debugging Example.
III	MANAGING TEAM: Understanding behavior and selecting right person for the job, Motivation, working in groups, decision making, leadership and organizational structures. INTERNATIONAL STANDARDS: Importance and defining software quality, ISO 9126, BS 6079 planning steps, ISO 12207 approach to software lifecycle data.
IV	WEB ENGINEERING**: Attributes of Web-Based Applications. Process, Modeling activity, Analysis modeling for WebApps, Design- functional, information & interaction, testing WebApps- content, navigation, configuration, and performance testing.**
V	PROJECT MANAGEMENT FOR SPECIAL CLASSES OF SOFTWARE PROJECTS: Using CASE tools, CBSE, Re-engineering, forward engineering, client/server software engineering, outsourcing, Software project management standards. Change and Content Management of Web Engineering.

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Name of Subject : MICROWAVE AND SATELLITE COMMUNICATION (6 CS 6.3)	
Unit	**Contents**
I	Microwave Transmission System: General representation of E M field in terms of TEM, TE and TM components, Uniform guide structures, rectangular wave guides, Circular Wave guides, Solution in terms of various modes, Properties of propagating and evanescent modes, Dominant modes, Normalized model voltages and currents, Power flow and energy storage in modes frequency range of operation for single mode working, effect of higher order modes, Strip line and micro strip lines-general properties, Comparison of coaxial, Micro strip and rectangular wave guides in terms of band width, power handling capacity, economical consideration etc.
II	Origin and brief history of satellite communication; Elements of a satellite communication link; Current status of satellite communication. Orbital Mechanism and Launching of Satellite*:* Equation of orbit, Describing the orbit, Location the satellite in the orbit, Locating the satellite with respect to earth, Orbital elements, Look angle determination, Elevation and Azimuth calculation, Geostationary and other orbits, Orbital perturbations, Orbit determination, Mechanics of launching a synchronous satellite, Selecting a launch vehicle.
III	Space Craft: Satellite subsystems, Altitude and Orbit Control (AOCS), Telemetry, Tracking and Command (TT&C). Communication subsystems, Transponders, Spacecraft antennas, Frequency re-use antennas.
IV	Satellite Channel and Link Design: Basic transmission theory, Noise temperature, Calculation of system noise temperature, Noise figure, G/T ratio of earth stations, Design of down links and uplinks using C/N ratio, FM improvement factor for multi-channel signals, Link Design for FDM/FM, TV signals and Digital Signals.
V	Earth Station Technology: Earth station design, Basic antenna theory, antenna noise temperature; Tracking; Design of small earth station antennas, Low noise amplifiers, High power amplifiers, FDM and TDM systems.

6 CS 7. SHELL PROGRAMMING LAB

1. Practice commands: cp, mv, rm, ln, ls, who, echo, cat, mkdir, rmdir. Wildcards (?, *) ,
I/O redirection (<, >, >>), pipelines (|)
2. Practice commands: xargs, alias, set-unset, setenv-unsetenv, export, source, ps, job, kill.
3. Practice commands: head, tail, cut, paste, sed, grep, sort, uniq, find , locate, chmod.
4. Writing a simple shell script to echo who is logged in.
5. Write a shell script to display only executable files in a given directory.
6. Write a shell script to sort a list of file either in alphabetic order or largest file first according to user response.
7. Write a shell script to count the lines. Words and characters in its input (Note : Don't use wc).
8. Write a shell script to print end of a glossary file in reverse order using array. (Hint: use awk tail).
9. Modify cal command to accept more than one month (e.g. $cal Oct, Nov,)(Hint : use alias too)
10. Write a shell script to check whether Ram logged in, continue checking every 60 seconds until success.

6 CS 8. NETWORK LAB

1. The lab is to be conducted in Perl programming language, Perl works on all platforms (including windows)
2. Write few basic programs of Perl.

a. A Hello World Program
b. Write a program to add to 10 numbers.
c. Write a program of reading input from the keyboard and displaying them on monitor.
d. Write a program to take two strings as input and compare them

3. To understand advance constructs of Perl

e. Write a program to create a list of your course (all theory courses in current semester) using array and print them.
f. Write a program to accept ten number, store it into a hash table (Perl have itself) and when asked by user tell him that number exists or not. (do not store duplicate numbers)
g. Write a program to compute the number of lines in a file.

4. Find the IP address of a host or turn an IP address into a name.
5. Connect to an FTP server and get or put files. Automate the one-time transfer of many files to download the file everyday, which have changed since yesterday. (use Net:FTP)
6. Write a program to send mail. The programs should monitor system resources like disk space and notify admin by mail when disk space becomes dangerously low. (use Net:mail)
7. Fetch mail from a POP3 server (use Net:pop3)
8. Find out who owns a domain (use Net:whois , Whois is a service provided by domain name registration authorities to identify owners of domain names)
9. Test whether a machine is alive. machine can be specified using IP address or domain name of machine.
10. You have a URL that fetch its content from a Perl script, convert it to ASCII text (by stripping html tags) and display it.
11. Writing a TCP Client, Writing a TCP Server and Communicate some data over TCP

6 CS 9. WEB PROGRAMING LAB

1. Develop a static html page using style sheet to show your own profile.
Add a page to show 5 photos and
Add a page to show your academics in a table
Add a page containing 5 links to your favorite website
Add navigational links to all above pages (add menu).
2. Update your homepage, by creating few html file (e.g. header, footer, left-sidebar, right), in these file you will put all html code to be shown on every page.
3. Use Cascading Style Sheets to format your all pages in a common format.
4. Basic Php programs:
Write a simple "hello word" program using php.
Write a program to accept two strings (name and age) from user. Print welcome statement e.g. " Hi Ram, your age is 24."
Write a program to create a calculator, which can support add, subtraction and multiply and division operation.
Write a program to take input parameters for a table (no. of rows and no. of columns), and create the desired table.
Create a "Contact Me" page -
Ask user to enter his name, email ID,
Use Java-Script to verify entered email address.
Store submitted value in a MySql database.
Display latest 5 submitted records in contact me page.
Display above record with navigation support. e.g. (next, previous, first, last).

6 CS 10. MICROCONTROLLER LAB

1. Write a program to add two 2-byte numbers with a 3-byte sum.
2. Write a program to add an array of 8 numbers using loop.
3. Write a program to convert temperature from Fahrenheit to Centigrade.
4. Implement a sequencer traffic light controller.
5-6. Implement real time interrupt.
7-8. Interface microcontroller with stepper motor and move motor by given steps.
9-10. Interface, test and control LED display with Microcontroller.
11-12. Implement a watchdog timer and test the same to check infinite loop.

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Name of Subject : COMPILER CONSTRUCTION (7 CS 1)	
Unit	**Contents**
I	Compiler, Translator, Interpreter definition, Phase of compiler introduction to one pass & Multipass compilers, Bootstrapping, Review of Finite automata lexical analyzer, Input, buffering, Recognition of tokens, Idea about LEX: A lexical analyzer generator, Error handling.
II	Review of CFG Ambiguity of grammars, Introduction to parsing. Bottom up parsing Top down parsing techniques, Shift reduce parsing, Operator precedence parsing, Recursive descent parsing predictive parsers. LL grammars & passers error handling of LL parser. LR parsers, Construction of SLR, Conical LR & LALR parsing tables, parsing with ambiguous grammar. Introduction of automatic parser generator: YACC error handling in LR parsers.
III	Syntax directed definitions; Construction of syntax trees, L-attributed definitions, Top down translation. Specification of a type checker, Intermediate code forms using postfix notation and three address code, Representing TAC using triples and quadruples, Translation of assignment statement. Boolean expression and control structures.
IV	Storage organization, Storage allocation, Strategies, Activation records, Accessing local and non local names in a block structured language, Parameters passing, Symbol table organization, Data structures used in symbol tables.
V	Definition of basic block control flow graphs, DAG representation of basic block, Advantages of DAG, Sources of optimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peephole optimization, Issues in design of code generator, A simple code generator, Code generation from DAG.

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Name of Subject : DATA MININIG AND WAREHOUSING (7 CS 2)	
Unit	**Contents**
I	Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data, (Binning, Clustering, Regression, Computer and Human inspection), Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.
II	Concept Description:- Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi- Dimensional Association rules from Relational Databases.
III	What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbor classifiers, Genetic Algorithm. Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis
IV	Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.
V	Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

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Name of Subject : LOGIC SYNTHESIS (7 CS 3)	
Unit	**Contents**
I	Introduction to VLSI, circuits Asics and Moore's Law. Microelectronic Design, Styles, four phases in creating Microelectronics chips computer Aided Synthesis and Optimization. Algorithms Review of Graph Definitions and Notations Decision and Optimization Problems, Shortest and Longest Path Problems, Vertex Cover, Graph, Coloring, Clique covering and partitioning Algorithms Boolean Algebra and Representation of Boolean Functions, binary Decision diagrams. Satisfiability and cover problems.
II	Hardware Modeling: Introduction to Hardware Modeling Language, State Diagrams. Data flow and Sequencing Graphs. Compilation and Behavioral Optimization Techniques. Circuits Specifications for Architectural Synthesis Resources and constraints. Fundamental Architectural Synthesis Problems Temporal Domain Scheduling Spatial Domain Binding Hierarchical Models and Synchronization Problem. Area and performance estimation-Resource Dominated circuits and General Circuits.
III	Scheduling Algorithms: Model for Scheduling Problems, Scheduling without Resource, Constraints-Unconstrained Scheduling ASAP Scheduling Algorithms Latency. Constrained Scheduling. ALAP scheduling. Under Timing Constraints and Relative Scheduling with Resource Constraints Integer Linear Programming Model, Multiprocessor Scheduling, Heuristic Scheduling Algorithms (List Scheduling). Force Directed Scheduling.
IV	Two Level Combination Logic Optimization: Logic Optimization Principles-Definitions, Exact Logic Minimization, Heuristic, Logic Minimization, and Testability Properties Operations on Two level logic Cover-positional Cube Notation, Functions with Multivolume inputs and list oriented manipulation. Algorithms for logic minimization.
V	Sequential logic optimization: Introduction, Sequential circuit optimization using state based models- state minimization, state encoding. Sequential circuit optimization using network models. Implicit finite state machine traversal methods. Testability consideration for synchronous circuits.

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Name of Subject : ARTIFICIAL INTELLIGENCE (7 CS 4)	
Unit	**Contents**
I	Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.
II	Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning.
III	Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning.
IV	Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.
V	Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

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Name of Subject : MULTIMEDIA SYSTEMS (7 CS 5)	
Unit	**Contents**
I	Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products and Stages of Multimedia Projects, Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.
II	Multimedia Building Blocks Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture.
III	Data Compression Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modeling. Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.
IV	Speech Compression & Synthesis Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression.
V	Images: Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database. Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in Multimedia

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Name of Subject : SERVICE ORIENTED ARCHITECHURE (7 CS 6.1)	
Unit	**Contents**
I	SOA Fundamentals: Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB), SOA Enterprise Software models, IBM On Demand operating environment.
II	Web services Technologies: XML technologies – XML, DTD, XSD, XSLT, XQuery, XPath Web services technologies - Web services and SOA, WSDL, SOAP, UDDI WS Standards (WS-*) - Web services and Service- oriented enterprise (SOE), WS-Coordination and WS-Transaction, Business Process Execution Language for Web Services (BPEL4WS), WS-Security and the Web services security specifications, WS-Reliable Messaging, WS- Policy, WS-Attachments.
III	SOA Planning and Analysis: Stages of the SOA lifecycle, SOA Delivery Strategies, service-oriented analysis, Capture and assess business and IT issues and drivers, determining non-functional requirements (e.g., technical constraints, business constraints, runtime qualities, non-runtime qualities), business centric SOA and its benefits, Service modeling, Basic modeling building blocks, service models for legacy application integration and enterprise integration, Enterprise solution assets(ESA) .
IV	SOA Design and implementation: service-oriented design process, design activities, determine services and tasks based on business process model, choosing appropriate standards, articulate architecture, mapping business processes to technology, designing service integration environment (e.g., ESB, registry), Tools available for appropriate designing, implementing SOA, security implementation, implementation of integration patterns, services enablement, quality assurance.
V	Managing SOA Environment: Distributing service management and monitoring concepts, operational management challenges, Service-level agreement considerations, SOA governance (SLA, roles and responsibilities, policies, critical success factors, and metrics), QoS compliance in SOA governance, role of ESB in SOA governance, impact of changes to services in the SOA lifecycle.

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Name of Subject : OPTICAL COMMUNICATION (7 CS 6.2)	
Unit	**Contents**
I	Introduction to optical communication principles of light transmission optical fiber modes and configurations, Mode theory for circular wave-guides, Single-mode fibers, Multimode fibers, Numerical aperture, Mode field diameter, V- number, fiber materials, Fiber fabrication techniques.
II	Optical sources, LED'S, LASER diodes, Model reflection noise, Power launching and coupling, population inversion, fiber splicing, optical connectors, Photo-detectors, PIN, Avalanche detector, Response time, Avalanche multiplication noise.
III	Signal degradation in optical fibers, Attenuation losses, Signal distortion in optical wave guides, Material dispersion, Wave guide dispersion, Chromatic dispersion, Inter-modal distortion, Pulse broadening in Graded index fibers, Mode coupling, Advance fiber designs: dispersion shifted, Dispersion flattened, Dispersion compensating fibers, Design optimization of single mode fibers.
IV	Coherent optical fiber communication, Modulation techniques for Homodyne and Heterodyne systems, Optical filter link design. Rise time budget and link power budget, Long haul systems bit error rate, line coding, NRZ, RZ, Block Codes eye pattern.
V	Advance system and techniques, wavelength division multiplexing, optical amplifiers semiconductor amplifier, EDFA, Comparison between semiconductor and optical amplifier, Gain band width, Photonic switching, Optical Networks. Optical fiber bus, Ring topology, Star architectures, FDDI, SON-ET.

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Name of Subject : REAL TIME SYSTEMS (7 CS 6.3)	
Unit	**Contents**
I	Introduction: Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.
II	Real Time Scheduling: Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.
III	Resources Access Control: Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.
IV	Multiprocessor System Environment: Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.
V	Real Time Communication: Model of Real Time Communication, Priority-Based Service and Weighted Round- Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

7 CS 7. COMPILER DESIGN LAB

1. Develop a lexical analyzer to recognize a few patterns in PASCAL and C.
a. (ex: identifiers, constants, comments, operators etc.)
2. Write a program to parse using Brute force technique of Top down parsing.
3. Develop on 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
a. 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

7 CS 8. DATA MINING AND WAREHOUSING LAB

The objective of the lab exercises is to use data mining techniques to use standard databases available to understand DM processes using any DM tool)

1. **Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.**
2. **Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.**
3. **Using Teradata Warehouse Miner – Create mining models that are executed in SQL.** (Portal work : The objective of this lab exercises is to integrate pre-built reports into a portal application)
4. **Publish and analyze a business intelligence portal.**
   Metadata & ETL Lab: The objective of this lab exercises is to implement metadata import agents to pull metadata from leading business intelligence tools and populate a metadata repository. To understand ETL processes
5. **Import metadata from specific business intelligence tools and populate a meta data repository.**
6. **Publish metadata stored in the repository.**
7. **Load data from heterogeneous sources including text files into a pre-defined warehouse schema.**

Case study

8. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.
9. Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'.

7 CS 9. LOGIC SYNTHESIS LAB

1. Write a program which reads simple digital circuit (of size up to 10 gates) in blif / Boolean equation and display schematic in graphics format.
2. Write a program to convert Blif format into Boolean equation.
3. Write a program that estimate area of circuit (specified as Blif or Boolean equation) using library binding technique of simple circuit (up to 10 gates).
4. Write a program to implement state machine up to 5 states.
5. Write a program to count 4-input lookup table in a simple circuit (up to 10 gates specified as Blif or Boolean equation).
6. Write a program to obtain sequencing graph for a given set of arithmetic expression (up to 10 nodes)
7. Write VHDL Codes for all gates with all Modeling.
8. Write VHDL Codes & Test bench for half adder and full adder.

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Name of Subject : INFORMATION SYSTEM AND SECURITIES (8 CS 1)	
Unit	**Contents**
I	Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption: Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution, random number generation.
II	Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat's and Euler's theorem, primality testing, Euclid's Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffle-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, Elganel encryption.
III	Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS), proof of digital signature algorithm.
IV	Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.
V	IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, secure electronic transaction (SET). System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems.

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Name of Subject : CAD FOR VLSI DESIGN (8 CS 2)	
Unit	**Contents**
I	Modern digital systems, complexity and diversity of digital systems, productivity gap and need for CAD tools. Introduction to steps and CAD flow for designing with ASIC and FPGA.
II	Introduction to VHDL, background, VHDL requirement, Elements of VHDL, top down design, convention and syntax, basic concepts in VHDL i.e. characterizing H/W languages, objects, classes, and signal assignments.
III	Structural specification of H/W- Parts library, Wiring, modeling, binding alternatives, top down wiring. Design organization and parameterization. Type declaration, VHDL operators.
IV	VHDL subprogram parameters, overloading, predefined attributes, user defined attributes, packaging basic utilities. VHDL as a modeling language- bi-directional component modeling, multi mode component modeling,
V	Examples of VHDL synthesis subsets- combinational logic synthesis, sequential circuit synthesis, state machine synthesis. VHDL language grammar. Introduction to synthetic circuits and circuit repositories.

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Name of Subject : ADVANCED COMPUTER ARCHITECTURES (8 CS 3)	
Unit	**Contents**
I	INTRODUCTION**: Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel** Architectural Classification Schemes, Flynn's & Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Canceling the Threads.
II	PIPELINING AND MEMORY HIERARCHY: Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super Pipeline Design; Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.
III	THREAD AND PROCESS LEVEL PARALLEL ARCHITECTURE: Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMD Architectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.
IV	Parallel Algorithms: PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quicksort, Hyper Quick sort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.
V	Developing Parallel Computing Applications: OpenMP Implementation in 'C': Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs, Combined Parallel Work-Sharing Constructs, Master and Synchronization Constructs; Run-Time Library Routines: Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in 'C'. Basics of MPI.

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Name of Subject : DISTRIBUTED SYSTEMS (8 CS 4.1)	
Unit	**Contents**
I	CHARACTERIZATION OF DISTRIBUTED SYSTEMS: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.
II	DISTRIBUTED DEADLOCK DETECTION: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.
III	DISTRIBUTED OBJECTS AND REMOTE INVOCATION: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. SECURITY: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent. DISTRIBUTED FILE SYSTEMS: File service architecture, Sun Network File System, The Andrew File System, Recent advances.
IV	TRANSACTIONS AND CONCURRENCY CONTROL: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. DISTRIBUTED TRANSACTIONS: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.
V	DISTRIBUTED ALGORITHMS: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm. CORBA CASE STUDY: CORBA RMI, CORBA services.

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Name of Subject : IMAGE PROCESSING (8 CS 4.2)	
Unit	**Contents**
I	Introduction and Fundamentals: Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization. Image Enhancement in Spatial Domain: Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.
II	Image Enhancement in Frequency Domain: Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Low pass Filters; Sharpening Frequency Domain Filters – Gaussian High pass Filters; Homomorphic Filtering. Image Restoration: A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Band pass Filters; Minimum Mean- square Error Restoration.
III	Color Image Processing: Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation. Morphological Image Processing: Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening.
IV	Registration: Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth. Segmentation: Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.
V	Feature Extraction: Representation, Topological Attributes, Geometric Attributes. Description: Boundary-based Description, Region-based Description, Relationship. Object Recognition: Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching.

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Name of Subject : NATURAL LANGUAGE PROCESSING (8 CS 4.3)	
Unit	**Contents**
I	Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax.
II	Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.
III	Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top-Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.
IV	Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.
V	Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of- Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form

8CS5. INFORMATION SYSTEM AND SECURITIES LAB

List of Projects are as follows (Implement any one)

1. Shopping cart project using ADO.NET: This sample project has all basic features required for a shopping cart web site including Login, Registration, Add to Cart, Checkout etc. A good ASP.NET learning project using C#, ASP.NET, SQL Server.
2. Personal Assistant: This is a small project for managing personal details. Current version of this project support Address Book feature - Add, Edit and Manage contacts and addresses using VB.NET.
3. Address Book: This is a small project for managing contact details. This is a C# version of the 'Personal Assistant' project.
4. School Management System: This is a project for managing education institutes using C#.
5. Library Management System: This is an academic project for students using Java.
6. spider Alerts & Web services: This project communicates with web services and downloads Alerts from the web server using Java & XML.
7. Patient Information System: This software can be used to keep track of the patients' information and treatment details in a hospital or clinic. Some of the advanced features include patient consulting, lab information, billing etc using JSP, Servlet & JDBC.
8. Web based Address Book: This application can be used to keep track of your contacts/addresses. N Tier architecture is used to separate data layer, business layer and UI layers.

8CS 6 VLSI DESIGN LAB

Simple Design exercises:

1. Half adder, Full adder, Subtractor Flip Flops, 4bit comparator.
2. Parity generator
3. Bit up/down counter with load able count
4. Decoder and encoder
5. 8 bit shift register
6. 8:1 multiplexer
7. Test bench for a full adder
8. Barrel shifter
9. N by m binary multiplier
10. RISC CPU (3bit opcode, 5bit address)

TOOLS :

Xilinx Tools/ Synopsis Tools/ Cadence Tools/ Model SIM/ Leonardo Spectrum Tools/VIS/SIS Tools to be used.

8CS7. X-WINDOWS LAB

1. To understand x-windows, x-lib, x-toolkit and x network protocol and learn it's commend line argument.

Programs in C/C++ language.

2. Write a program to establish connection with x server and get the sender and protocol information.
3. Using X library of the server, write a program to create a new window of a given size, title, border, foreground and background colors.
4-5 To implement keyboard event handling/marking using x library.
6-7 To implement mouse event handling/marking using x library and interface with windows managers and drawing applications.
8. To implement a multiple windows application.
9-10 To implement various drag and drop based GUI components in Visual Basic.
11-12 To implement various drag and drop based GUI components in Motif and Lesstif.

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