5th Semester

SOFTWARE ENGINEERING (5 CS 1)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	SYSTEM ANALYSIS	System Analysis: Characteristics, Problems in system Development, System Level project Planning, SystemDevelopment Life cycle (SDLC), computer system engineering system analysis, modeling the architecture, system specification. **Lectures Req : 8**
II	S/W PROJECT DEVELOPMENT	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 **Lectures Req : 11**
III	REQUIREMENT & STRUCTURE ANALYSIS	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 **Lectures Req : 7**
IV	S/W DESIGN	Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation. **Lectures Req : 6**
V	OOA & OOD	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 **Lectures Req : 8**

Total Lectures Req :40

Reference Books:

1. Roger S. Pressman : A Practioners Approach, TMH
2. Somani & Kanawat : Software Engineering

SYSTEM SOFTWARE Engg. (5CS2)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Overview:**	Comparison of machine language, assembly language and high level languages, External and internal representation of instructions and data. Data allocation structures, search structures and addressing modes. Activities and system software for program generation, translation and execution. object code/executable code files. **Lectures Req : 7**
II	**Assemblers:**	Assembly language specification. Machine dependent and independent features of assembler. Classification of assemblers. Pass structure of assemblers **Lectures Req : 6**
III	**Loader and Linkers**	: Functions and classification. Machine dependent and independent features of loaders, Design of bootstrap, absolute and relocatable loaders, Design of linker. Case study of MS-DOS linker. **Lectures Req : 6**
IV	**Macro processors:**	Macro definition, call and expansion. Macro processor algorithm and data structure. Machine independent features (parameters, unique labels, conditional expansion, nesting and recursion).Pass structure and Design of microprocessor and macro assembler. **Lectures Req : 9**
V	**High level language processor:**	HLL specification: Grammars and parse trees, expression and precedence. Lexical analysis: Classification of tokens, scanning methods, character recognition, lexical ambiguity. Syntactic analysis: Operator precedence parsing, recursive descent parsing. Symbol Table Management: Data structure for symbol table, basic functions for symbols, overflow technique, block structure in symbol table. **Lectures Req : 8**

Total Lectures Req : 36

Reference Books:

1. D.M. Dhamdhere : System Programming & Operating Systems, Tata Mc Graw Hill

DATABASE MANAGEMENT SYSTEMS (5 CS 3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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. **Lectures Req : 5**
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. **Lectures Req : 10**
III	**RELATIONSHIP ALGEBRA AND CALCULUS:**	Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division, Relation Calculus. **Lectures Req : 8**
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. **Lectures Req : 8**
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. **Lectures Req : 8**

Total Lectures Req :39

Reference Books:

1. Silverschatz Korth and Sudarshan : Data Base Systems Concepts 4th ed. , TMH

COMPUTER GRAPHICS (5CS4)

Teaching hrs. **Exam Hrs.-3 Hrs.**
L-3 T-1 P-0 **Marks Theory Exam.-80 Term Test-20 Total 100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction to Computer Graphics:**	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. **Lectures Req: 6**
II	**Basic Raster Graphics:**	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, Bspline Method.Filled Area Primitives, Homogeneous Coordinates. **Lectures Req: 10**
III	**Geometric Transformations:**	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. **Lectures Req: 8**
IV	**Visibility and Rendering:**	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. **Lectures Req: 8**
V	**Introduction to Multimedia:**	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 **Lectures Req: 8**

Total lectures reqd: 40

Reference Books:

1. J.Foley, A. Van dam, S.Feiner,J.Hughes :Computer Graphics Principles and Practice. Addison Wesley.
2. D.Hearn and Baker: Computer Graphics PHI.
3. D.Rogers and Adams: Mathematical Elements of computer Graphics McGraw Hill.

TELECOMMUNICATION FUNDAMENTALS (5 CS 5)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P- **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Electromagnetic Spectrum**	. 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. **Lectures Req :6**
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 **Lectures Req :9**
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. **Lectures Req :6**
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. **Lectures Req :9**
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 **Lectures Req :6**

Total Lectures Req :36

Recommended Books:

1. William stallings – Data and Computer communication (PHI,5th ED.)
2. James Martin – Telecommunication and the computer (PHI,3rd ED.)
3. A.S. Tanenbaum – Computer Networks –(PHI,3rd ED.)

LOGICAL AND FUNCTIONAL PROGRAMMING (5 CS 6.1)

Teaching Hrs. **Exam Hrs. - 3**
L-3 T-0 P- 0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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. **Lectures Req 8**
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. **Lectures Req : 8**
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. **Lectures Req : 8**
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. **Lectures Req : 8**
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. **Lectures Req : 8**

Total Lectures Req :40

INFORMATION THEORY & CODING (5 CS 6.2)

Teaching Hrs. **Exam Hrs. - 3**
L-3 T-0 P- 0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Elements Of Information Theory**	Measure of information, average information, entropy, information rate. Communication channel, discrete and continuous channel. **Lectures Req 8**
II	**Shannon**	Hartley theorem and its implications. Channel capacity, Gaussian channel and bandwidth-S/N tradeoff. **Lectures Req : 8**
III	**Introduction of Coding**	types of efforts, types of codes, error control coding, methods of controlling errors. **Lectures Req : 8**
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. **Lectures Req : 8**
V	**Burst and Convolution Codes**	burst and random error correcting codes, encoders for convolution codes. Decoders for convolution codes. **Lectures Req : 8**

Total Lectures Req :40

Recommended Books:

1. K. Sam Shanmugam – "Digital and Analog Communication System", John Wiley Sons.
2. Herbort Taub, Donald L. Schilling – "Principal of Communication system", Tata McGraw Hill.

ADVANCED DATA STRUCTURES (5 CS 6.3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P- 0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**ADVANCED TREES**	: Definition**s** 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. **Lectures Req : 10**
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. **Lectures Req : 10**
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 **Lectures Req : 6**
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 **Lectures Req : 10**
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 **Lectures Req : 9**

Total Lectures Req :45

Reference Books:

1. Narsingh Deo : Graph Theory, PHI
2. Coreman : Tree Structure & Number Theoritic Algorithm
3. Advanced Algorithms : Goodrich

5 CS 7. SOFTWARE ENGINEERING LAB (CORE JAVA)

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.

5CS8. SYSTEM SOFTWARE LAB

In this lab we will practice how source code is processed by compiler/ assembler/ pre-processor.

All programs have to be written in C++

1. Write a class for file handling, having functions to open/ read/ write/ close/ reset.

Develop a program which take input a file of C language

2. Print Lines of Codes and print signature of all function (including main)
3. Print number of variables in every function (with type)
4. Generate a new file without the comments. (/* */ and //)
5. Process all #define (i.e. #define MAX 100, than replace every occurrence of MAX with 100).

(Macro value 100 can be an expression also.)

6. Write a program to create a symbol table.

7. Write a program which can parse a given C file and store all variables and functions in symbol table.

8. Write a program to convert given C program into RTL code.

Assumption

a. input C file will have only main function,

b. only two type of statements, either variable declaration statements

(int sub1=23;) OR mathematical expression (sub1=sub2-sub3;).

c. system have 16 registers (R1 to R16)

d. RTL opcode available are: ADD, LOAD, MOVE, SUB, MULTIPLY, DIVIDE

e. No control-flow (i.e. if-else, loop, jump etc.) expression is there in input code e.g.

```
int main()
{
int sub1=72, sub2=85, sub3=63;
float per;
per=(sub1+sub2+sub3)/(100+100+100);
}
```

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)

6th Semester

OPERATING SYSTEMS (6 CS 1)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction**	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. **Lectures Req : 4**
II	**Process & Threads**	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. **Lectures Req : 10**
III	**Memory Management**	Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation **Lectures Req : 6**
IV	**Virtual Memory**	Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system **Lectures Req : 14**
V	**File System**	Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, introduction to distributed systems and parallel processing case study **Lectures Req : 6**

Total Lectures Req :40

Reference Books:

1. Galvin / Silberschtz : Operating Systems Concepts, TMH

COMPUTER NETWORKS (6 CS 2)

Teaching Hrs. **Exam Hrs. - 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction**	Network, Network Protocols, Edge, Access Networks and Physical Media, Protocol Layers and their services models, Internet Backbones, NAP's and ISPs. **Lectures Req : 5**
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 **Lectures Req : 6**
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. **Lectures Req : 10**
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). **Lectures Req : 10**
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. **Lectures Req : 6**

Total Lectures Req :37

Reference Books:

1. J.F. Kurose & K.W. Rose : Computer Networking, Pearson Education Asia

DESIGN & ANALYSIS OF ALGORITHMS (6 CS 3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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. **Lectures Req : 9**
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. **Lectures Req : 9**
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. **Lectures Req : 9**
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 **Lectures Req : 9**
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 **Lectures Req : 9**

Total Lectures Req :45

Reference Books:

1. Robert & Cormen : Introduction to Algorithms, Prentice Hall of India

EMBEDDED SYSTEMS (6 CS 4)

Teaching Hrs. **Exam Hrs. - 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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. **Lectures Req :6**
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. **Lectures Req :9**
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 . **Lectures Req :6**
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. **Lectures Req :9**
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. **Lectures Req :6**

Total Lectures Req :36

Recommended Books:

1. Mazidi: Micro-controller & Embedded System
2. Neha Maheshwari: Embedded System

THEORY OF COMPUTATION (6 CS 5)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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 **Lectures Req : 8**
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 **Lectures Req : 8**
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 **Lectures Req : 10**
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. **Lectures Req : 10**
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. **Lectures Req : 8**

Total Lectures Req :44

Reference Books:

1. K.L.P. Mishra : Introduction to Language and Computation, Pearson Education Asia

DIGITAL SIGNAL PROCESSING (6 CS 6.1)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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. **Lectures Req : 8**
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. **Lectures Req : 8**
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). **Lectures Req : 10**
IV	**Discrete Random Signals**	Discrete time random process, averages spectrum representations of infinite energy signals, response of linear system to random signals. **Lectures Req : 10**
V	**Power Spectrum Estimation**	Basic principles of spectrum estimation, estimates of the auto covariance, power spectrum, cross covariance and cross spectrum. **Lectures Req : 8**

Total Lectures Req: 44

Reference Books:

1. Digital Signal Processing: by Shalivahenen & Vallavraj

MULTI MEDIA SYSTEMS (6 CS 6.2)

Teaching Hrs. **Exam Hrs.-3 Hrs.**
L-3 T-1 P-0 **Marks Theory Exam.-80 Term Test-20 Total 100**

Units	Topics	CONTENT OF SYLLABUS
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. **Lectures Req : 8**
II	**MUSIC:**	Multimedia Building Blocks Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture. **Lectures Req : 6**
III	**ANIMATIONS :**	Basic concepts, Computer-based Animation, H 261, DVI, CD - ROM Technology, Compact disk digital audio, Loss less compression of sound, loss compression & silence compression. **Lectures Req : 9**
IV	**IMAGES AND VIDEOS**:	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 **Lectures Req : 12**
V	**SYNCHRONIZATION:**	Intra and Inter object synchronization, Live and Synthetic synchronization, Lip synchronization requirements, pointer synchronization requirements, Elementary media synchronization **Lectures Req : 3**

Total Lectures Req : 38

Reference Books :

1. Ralf Steinmetz & Klara Nahrstedt - Multimedia : computing, Communication & Applications,Pearson Education Asia.
2. Prabhat K.Andleigh-Multimedia System Design,Prentice Hall,Kiran Thaukrar.

MICROWAVE AND SATELLITE COMMUNICATION (6 CS 6.3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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 **Lectures Req :6**
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. **Lectures Req :9**
III	**Space Craft: Satellite subsystems**	. Space Craft: Satellite subsystems, Altitude and Orbit Control (AOCS), Telemetry, Tracking and Command (TT&C). Communication subsystems, Transponders, Spacecraft antennas, Frequency re-use antennas. **Lectures Req :6**
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. **Lectures Req :9**
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. **Lectures Req :6**

Total Lectures Req :36

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

6CS9 Advanced Prog. Lab (Advanced JAVA)

1. Write a servlet program to display the contents of a text file residing on the server machine in the display window of yours browser.

2. An Ms- Access database is stored on yours server .the database has only one table with fields:

   S.no. Name Age Address
   write a servlet program to print the list of names with age less than 20 and greater than 10. the list appear on the client browser's display window.

3. Write a java program which perform addition,deletion and updation records from database using jdbc.

4. An image file is stored in the sever machine as a jpeg file . write a servlet program to display this image in the browers display window.

5. Write a servlet program to find out if any cookie are included in yours servlet request .if cookies are added printout thier names and values in the client brower's display window.

6. Write a servlet program to add records to the database .data is received into a data entry from created by HTML document.

7. Write a jsp program which show the include and forward directives using any example.

8. Write a jsp program which maintane the database using HTML document(also include add ,delete and update option).

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.

7th Semester

COMPILER CONSTRUCTION (7 CS 1)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction**	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 **Lectures Req : 8**
II	**Parsing Techniques**	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 **Lectures Req : 8**
III	**Syntax & Type checker**	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 **Lectures Req : 9**
IV	**Storage & Symbol Tables**	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. **Lectures Req : 5**
V	**DAG**	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 **Lectures Req : 8**

Total Lectures Req :38

Reference Books:

1. D.M. Dhamadhere : Compiler Construction, Macmillan
2. Alfred. V Aho Jeffry D. Alhman : Principle of Complier Design. Narosa Publishing House

DATA MININIG AND WAREHOUSING (7 CS 2)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction**	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 **Lectures Req : 8**
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 **Lectures Req : 9**
III	**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 **Lectures Req : 9**
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. **Lectures Req : 8**
V	**Left overs**	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. **Lectures Req : 8**

Total Lectures Req: 42

Reference Books:

1. Rob Mattison : Web Warehousing and Knowledge Management, TMH

ADVANCED LOGIC SYSTEM (7 CS 3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction to VLSI**	. 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. **Lectures Req :6**
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. **Lectures Req :9**
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 **Lectures Req :6**
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. **Lectures Req :9**
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. **Lectures Req :6**

Total Lectures Req :36

Reference Books:

1. Viovanni-De-Michelli: Synthesis & Optimization of Digital Circuit.

ARTIFICIAL INTELLIGENCE (7CS4)

Teaching hrs. **Exam Hrs.-3 Hrs.**
L-3 T-0 P-0 **Marks Theory Exam.-80 Term Test-20 Total 100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction to Artificial Intelligence:**	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. **Lectures Req: 10**
II	**Knowledge:**	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. **Lectures Req: 10**
III	**Reasoning:**	Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning **Lectures Req: 6**
IV	**Game Playing:**	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. **Lectures Req: 8**
V	**Learning:**	Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems. **Lectures Req: 6**

Total lectures req: 40

Reference Books :

1. E.Rich,K Knight-Artificial Intelligence,Tata McGraw Hills.
2. S.Russell,P.Norving-Artificial Intelligence-A Modern Approach,Pearson Education,Asia.
3. Thomas Dean-Artificial Intelligence-Theory & Practice,Pearson Education,Asia.
4. Alison Caursey - The Essence of Artificial Intelligence, Pearson Education, Asia.

ADVANCED SOFTWARE ENGINEERING (7 CS 5)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**SCM & SQA**	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 **Lectures Req : 8**
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 **Lectures Req : 12**
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. **Lectures Req : 8**
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. **Lectures Req : 6**
V	**PROJECT MANAGEMENT**	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 **Lectures Req : 6**

Total Lectures Req :40

Reference Books:

1. Roger S. Pressman : A Practioners Approach, TMH
2. Somani & Kanawat : Software Engineering

SERVICE ORIENTED ARCHITECHURE (7 CS 6.1)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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 **Lectures Req : 8**
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 Serviceoriented 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, WSPolicy, WS-Attachments **Lectures Req : 8**
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) **Lectures Req : 8**
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 **Lectures Req : 8**
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. **Lectures Req : 8**

Total Lectures Req :40

SOFT COMPUTING (7 CS 6.2)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-0 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Introduction to intelligent systems and soft computing**	Introduction Intelligent systems, Machine intelligence meaning of intelligence Dynamics of Intelligence Intelligent machines Knowledge-based systems Architectures of knowledge-based Systems Production systems Reasoning strategies Conflict resolution methods Frame-based systems Blackboard systems Object-oriented programming Expert systems Development of an expert system Knowledge engineering Applications Knowledge representation and processing Semantic networks Crisp logic Crisp sets Correspondence between sets and logic, Logic processing (reasoning and inference Laws of logic Rules of inference Propositional calculus and predicate calculus Soft computing Fuzzy logic Neural networks Genetic algorithms Probabilistic reasoning Approximation and intelligence Technology needs **Lectures Req : 8**
II	**Fundamentals of fuzzy logic systems**	Introduction Background Evolution of fuzzy logic Popular applications Stages of development of an intelligent product Use of fuzzy logic in expert systems Fuzzy sets Membership function Symbolic representation Fuzzy logic operations Complement (negation, NOT) Union (disjunction, OR) Intersection (conjunction, AND Basic laws of fuzzy logic. **Lectures Req : 8**
III	**Fuzzy logic control**	Introduction Background Basics of fuzzy control Steps of fuzzy logic control Composition using individual rules Defuzzification Centroid method Mean of maxima method Threshold methods Comparison of the defuzzification methods Fuzzification Singleton method Triangular function method Gaussian function method Discrete case of fuzzification Fuzzy control architectures Hierarchical fuzzy systems Hierarchical model Feedback/filter modules Functional/control modules Effect of information processing Effect of signal combination on fuzziness Decision table approach for a fuzzy tuner Properties of fuzzy control Fuzzy controller requirements Completeness Continuity Consistency Rule validity Rule interaction Rule base decoupling Decision-making through a coupled rule base Decision-making through an uncoupled rule Equivalence condition Robustness and stability **Lectures Req : 9**
IV	**Fundamentals of artificial neural networks**	Introduction learning and acquisition of knowledge Symbolic learning Numerical learning Features of artificial neural networks Neural network topologies the feed forward topology The recurrent topology neural network activation functions neural network learning algorithms Supervised learning Unsupervised learning Reinforcement learning Fundamentals of connectionist modeling McCulloch–Pitts models **Lectures Req : 8**
V	**Major classes of neural networks**	Introduction The multilayer perceptron Topology Back propagation learning algorithm Momentum Applications and limitations of MLP Radial basis function networks Topology Learning algorithm for RBF Applications Kohonen's self-organizing network Topology Learning algorithm The Hopfield network learning algorithm Applications of Hopfield networks. **Lectures Req : 7**

Total Lectures Req : 40

Reference Books:-

1) Soft Computing and Intelligent Systems Design Theory, Tools and Applications
Author:- Fakhreddine O. Karray and Clarence de Silva, Publication- Pearson education (Addison wisely)

REAL TIME SYSTEMS (7 CS6.3)

Teaching Hrs. **Exam Hrs.-3 Hrs.**
L-3 T-0 P-0 **Marks Theory Exam.-80 Term Test-20 Total 100**

Units	Topics	CONTENT OF SYLLABUS
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. **Lectures Req : 12**
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. **Lectures Req : 9**
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. **Lectures Req : 6**
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. **Lectures Req : 9**
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. **Lectures Req : 9**

Total Lectures Req : 45

Reference Books :

1. W.S.Liu-Real-Time Systems,Pearson Education Asia.
2. Raymond A.Buhr-Introduction to Real-Time Systems,Pearson education Asia.
3. Alan Burns-Real-Time Systems and Programming Languages, Pearson Education

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

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

1**.** 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)

2. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.

3. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes**.**

4. 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)

5. 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

6. Import metadata from specific business intelligence tools and populate a meta data repository.

7. Publish metadata stored in the repository.

8. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

Case study

9**.** 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.

10**.** Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'.

7 CS 9 . ADVANCED LOGIC SYSTEM 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.

8th Semester

INFORMATION SYSTEM AND SECURITIES (8 CS 1)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P- 0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**INTRODUCTION:**	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. **Lectures Req 10**
II	**VARIOUS ALGORITHMS**	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 **Lectures Req : 10**
III	**MESSAGE AUTHENTICATION &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. **Lectures Req : 8**
IV	**AUTHENTICATION APPLICATION**	Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME **Lectures Req : 6**
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. **Lectures Req : 6**

Total Lectures Req :40

Recommended Books:

1. William Stallings: Cryptography & Network Security
2. Atul kahate: Cryptography & Network Security
3. K. Sam Shanmugam – "Digital and Analog Communication System", John Wiley Sons.
4. Herbort Taub, Donald L. Schilling – "Principal of Communication system", Tata McGraw Hill.

CAD FOR VLSI DESIGN (8 CS 2)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P- **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	**Modern digital systems**	.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. **Lectures Req :6**
II	**Introduction to VHDL**	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. **Lectures Req :9**
III	**Structural specification**	. Structural specification of H/W- Parts library, Wiring, modeling, binding alternatives, top down wiring. Design organization and parameterization. Type declaration, VHDL operators **Lectures Req :6**
IV	**VHDL subprogram**	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, **Lectures Req :9**
V	**Examples of VHDL**	.Examples of VHDL synthesis subsets- combinational logic synthesis, sequential circuit synthesis, state machine synthesis. VHDL language grammar. Introduction to synthetic circuits and circuit repositories. **Lectures Req :6**

Total Lectures Req :36

Reference Books:

1. J.Bhaskar: VHDL primer
2. Douglas Terry: VHDL programming by examples

ADVANCED COMPUTER ARCHITECTURES (8 CS 3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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 **Lectures Req : 9**
II	**THREAD AND PROCESS LEVEL PARALLEL ARCHITECTURE:**	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 **Lectures Req : 8**
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 **Lectures Req : 9**
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. **Lectures Req : 9**
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 **Lectures Req : 9**

Total Lectures Req :44

Reference Books :

1. Hawang & Briggs : Computer Architecture & Parallel Processing, TMH

DISTRIBUTED SYSTEMS (8 CS 4.1)

Teaching Hrs. **Exam Hrs.-3 Hrs.**
L-3 T-1 P-0 **Marks Theory Exam.-80 Term Test-20 Total 100**

Units	Topics	CONTENT OF SYLLABUS
I	**CHARACTERIZATION OF DISTRIBUTED SYSTEMS:**	Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models TheoreticalFoundation for Distributed System: Limitation of Distributed system, absence of global clock,,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. **Lectures Req : 9**
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. **Lectures Req : 10**
III	**DISTRIBUTED OBJECTS AND REMOTE INVOCATION**:	Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. CORBA CASE STUDY: CORBA RMI, CORBA services.SECURITY: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent. **Lectures Req : 9**
IV	**TRANSACTIONS AND CONCURRENCY CONTROL**:	Transactions, Nested transactions, Locks, OptimisticConcurrency control, Timestamp ordering, Comparison of methods for concurrency control. DISTRIBUTEDTRANSACTIONS: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control indistributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and groupcommunication, Fault - tolerant services, highly available services, Transactions with replicated data. **Lectures Req : 9**
V	**DISTRIBUTED-SHARED MEMORY:**	Introduction to distributed-shared Memory (DSM)-message passing versus DSM, Implementation approaches to DSM. Design and implementation issues-structure and synchronization model**.** **Lectures Req : 6**

Total Lectures Req : 43

Reference Books :

1.George Coulouris- Distributed Systems Concepts and Design, 3rd ed., Pearson Education Asia.
2.A.S. Tanenbaum- Distributed Systems Principles and Paradigms,Prentice Hall of India.
3.Darrel Ince- Developing Distributed and E-Commerce Applications,Addition Wesley

IMAGE PROCESSING (8 CS 4.2)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T- 1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
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 **Lectures Req : 9**
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 Meansquare Error Restoration. **Lectures Req : 9**
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 **Lectures Req : 9**
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 **Lectures Req : 9**
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. **Lectures Req : 9**

Total Lectures Req :45

NATURAL LANGUAGE PROCESSING (8 CS 4.3)

Teaching Hrs. **Exam Hrs.- 3**
L-3 T-1 P-0 **Marks Theory Exam- 80 Term Test-20 TOTAL-100**

Units	Topics	CONTENTS OF SYLLABUS
I	INTRODUCTION TO NLP	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. **Lectures Req : 9**
II	SEMANTICS	Introduction to semantics and knowledge representation, Some applications like machine translation, database interface **Lectures Req : 6**
III	PARSING	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. **Lectures Req : 8**
IV	GRAMMERS	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 **Lectures Req : 8**
V	AMBIGUITY RESOLUTION	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 **Lectures Req : 10**

Total Lectures Req : 41

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:

01 Half adder, Full adder, Subtractor Flip Flops, 4bit comparator.

02 Parity generator

03 Bit up/down counter with load able count

04 Decoder and encoder

05 8 bit shift register

06 8:1 multiplexer

07 Test bench for a full adder

08 Barrel shifter

09 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.