

B.Tech(CSE) course structure under Autonomy**SEMESTER-III**

SL. NO.	PAPER CODE	PAPER NAME	L	T	P	CONTACT HRS./WEEK	CREDIT
THEORY							
01.	BS(CS)306	PROBABILITY AND STATISTICS	3	1	0	4	3
02.	CS 301	NUMERICAL METHODS	2	1	0	3	2
03.	CS302	DIGITAL LOGIC	3	1	0	4	3
04.	CS303	COMPUTER ORGANIZATION	3	1	0	4	3
05.	CS304	DATA STRUCTURE & ALGORITHM	3	1	0	4	3
PRACTICAL							
06.	CS391	NUMERICAL METHODS LAB	0	0	3	3	2
07.	CS392	DIGITAL LOGIC LAB	0	0	3	3	2
08.	CS393	COMPUTER ORGANIZATION LAB	0	0	3	3	2
09.	CS394	ALGORITHMS-I LAB	0	0	3	3	2
		TOTAL	14	5	12	31	22
10.	MC303	VALUE EDUCATION, HUMAN RIGHTS	3	0	0	3	3

CSE 3RD SEM DETAILED SYLLABUS

Subject Name: PROBABILITY AND STATISTICS

Code: BS(CS)306

Contacts: 3L +IT = 4

Credits: 3

Module I - Theory of Probability: [8 L]

One dimensional random variable. Probability distributions-discrete and continuous. Expectation. Binomial, Poisson, Uniform, Exponential, Normal distributions and related problems. t , 2σ and F-distribution (Definition only). Transformation of random variables. Central Limit Theorem, Law of large numbers (statement only) and their applications. Tchebychev inequalities (statement only) and its application.

Module II – Two Dimensional Distribution: [6 L]

Two dimensional probability distributions. Discrete and continuous distributions in two dimensions. Uniform distribution and two dimensional normal distribution. Joint, marginal and conditional distributions .

Module III - Sampling theory: [6 L]

Random sampling: Parameter, Statistic and its Sampling distribution. Standard error of statistic. Sampling distribution of sample mean and variance in random sampling from a normal distribution (statement only) and related problems. Estimation of parameters: Unbiased and consistent estimators. Point estimation. Interval estimation. Maximum likelihood estimation of parameters (Binomial, Poisson and Normal). Confidence intervals and related problems.

Module IV - Testing of Hypothesis: [8 L]

Simple and Composite hypothesis. Critical region. Level of significance. Type I and Type II errors. One sample and two sample tests for means and proportions. χ^2 - test for goodness of fit. Neyman-Pearson theorem (Statement only) and its application to normal population. Likelihood ratio testing and its application to normal population. Comparison of Binomial Populations; Normal Populations; Testing of Equality of Means;

Module V - Linear Inference and Multivariate Analysis: [8L]

Multiple Regression analysis, linear regression, curvilinear regression and orthogonal polynomials, discriminant analysis, canonical correlations, principal component analysis.

Books:

1. Banerjee A., De S.K. and Sen S.: Mathematical Probability, U.N. Dhur & Sons.
2. De S.K. and Sen S.: Mathematical Statistics, U.N. Dhur & Sons.
3. Gupta S. C and Kapoor V K: Fundamentals of Mathematical Statistics, Sultan Chand & Sons.
4. Das N.G.: Statistical Methods, TMH.
5. Spiegel M R., Schiller J.J. and Srinivasan R.A. : Probability and Statistics (Schaum's Outline Series), TMH.
6. Multivariate Data Analysis: [Joseph F. Hair](#), Rolph E. Anderson , Prentice Hall Higher Education, 2010.
7. Applied Multivariate Statistical Analysis: R. A. Johnson and D.W. Wichern, PHI.
8. Fundamentals of Statistics (Vol-1) ; A.M. Gun, M.K. Gupta and B. Dasgupta, World Press.
9. Probability and Statistics; D. Biswas, New Central Book Agency.
10. Probability, Statistics and Random Processes; T Veerarajan, Tata McGraw-Hill.

Subject Name: NUMERICAL METHODS

Code: CS301

Contacts: 2L+1T

Credits: 2

Approximation in numerical computation: [4 L]

Truncation and rounding errors, Fixed and floating-point arithmetic, Propagation of errors.

Interpolation: [6 L]

Newton forward/backward interpolation, Lagrange's and Newton's divided difference Interpolation. Central difference interpolation formula – Stirling and Bessels interpolation.

Numerical integration: [3 L]

Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule. Expression for corresponding error terms.

Numerical solution of a system of linear equations: [6L]

Gauss elimination method, Matrix inversion, LU Factorization method, Gauss-Seidel iterative method.

Numerical solution of Algebraic equation: [4 L]

Bisection method, Regula-Falsi method, Newton-Raphson method.

Numerical solution of ordinary differential equation: [6 L]

Euler's method, Runge-Kutta methods, Predictor-Corrector methods and Finite Difference method.

Text Books:

1. C.Xavier: C Language and Numerical Methods.
2. Dutta & Jana: Introductory Numerical Analysis.
3. J.B.Scarborough: Numerical Mathematical Analysis.
4. Jain, Iyengar , & Jain: Numerical Methods (Problems and Solution).
5. Soumen Guha & Rajesh Srivastava: Numerical Methods, OUP.
6. Balagurusamy: Numerical Methods, Scitech.

References:

1. Atkinson, Kendall E. Elementary Numerical Analysis New York, NY: John Wiley
2. N. Dutta: Computer Programming & Numerical Analysis, Universities Press.
3. Soumen Guha & Rajesh Srivastava: Numerical Methods, OUP.
4. Srimanta Pal: Numerical Methods, OUP.
5. Stoer, J. and Bulirsch, R. Introduction to Numerical Analysis New York, NY: Springer-Verlag,
6. Conte, Samuel D. and de Boor, Carl. Elementary Numerical Analysis: An Algorithmic Approach, New York, NY: McGraw-Hill,

Subject Name: DIGITAL LOGIC

Code: CS 302

Contacts: 3L + 1T = 4

Credits: 3

Module - 1: [8L]

Number Systems , Boolean Algebra & Logic Gates: Binary numbers & Boolean algebra , Venn diagram, Logic gates, Truth Tables and function minimization using algebraic method, Karnaugh map, Quine- McClusky method; BCD, ASCII, EBDIC, Gray codes and their conversions, Signed binary number representation with 1's and 2's complement methods, Maxterm, Minterm, Representation in SOP and POS forms ; Realization of Boolean functions using NAND/NOR gates, two-level and multilevel logic circuit synthesis.

Module - 2: [10L]

Combinational circuits : Adder and Subtractor circuits (half & full adder & subtractor); Encoder, Decoder, Comparator, Multiplexer, De-Multiplexer and Parity Generator and checker; ROM, PLA .

Module - 3: [10L]

Sequential Circuits: Latch, Flip-flop. Design of Flip-flops with logic gates. Counters, Registers. Design and analysis of sequential circuits -Moore and Mealy model description, state diagram and state table – Minimization methods. Memory unit. Racing and Logic hazards. Implementation of hazard free logic circuit. asynchronous sequential circuit synthesis.

Module – 4: [10L]

Digital Integrated Circuits: Diode as switch. Use of diodes in AND, OR Circuits . Transistor as a switch. RTL, DTL, TTL logic gate circuits. MOS as a switch. Basic MOS inverter. MOS and CMOS logic gates. Fan -in and Fan-out of logic gates, propagation delay, Tristate logic.

Textbooks:

1. Digital Logic Design- Morries Mano- PHI
2. Digital Electronics - Kharate - Oxford
3. Digital Electronics - Logic & Systems by 1.Bigmell & R.Donovan; Cambridge Learning.
4. Digital Logic and State Machine Design (3rd Edition) - D.J.Comer, OUP

Reference:

- 5.P.Raja- Digital Electronics- Scitech Publications
6. R.P.Jain-Modern Digital Electronics, 2/e , Me Graw Hill
- 7.H.Taub & D.Shilling, Digital Integrated Electronics- Mc Graw Hill.
- 8.D.Ray Chaudhuri- Digital Circuits-Vol-I & II, 2/e- Platinum Publishers
- 9.Tocci, Widmer, Moss- Digital Systems,9/e- Pearson
- 10.J.Bignell & R.Donovan-Digital Electronics-Sle- Cenage Learning.
- 11.Leach & Malvino-Digital Principles & Application, Sle, Me Graw Hill
12. Floyed & Jain- Digital Fundamentals-Pearson.

Subject Name: COMPUTER ORGANIZATION

Code: CS303

Contacts: 3L +1T

Credits: 3

Introduction : [3 L]

History of computing, von Neumann machine, Instruction and data, fixed-point and floatingpoint numbers, errors, IEEE standards

Processor design: [7 L]

Instruction Set Architecture-Instruction format, opcode optimization; operand addressing; Instruction implementation-data movement, branch control, logical, Input/output and debugging instructions; arithmetic instruction implementation–addition and subtraction, multiplication-division, 2's complement multiplication; Booth's algorithm–theory and examples; bit-pair algorithm; high performance arithmetic

Control unit design: [8 L]

hardwired control, micro-programmed control design – micro-instruction formats, control optimization;

Memory subsystem: [9 L]

Memory technology, memory interfacing, Memory hierarchy–introduction to virtual memory system; cache memory – performance, address mapping, content addressable memory (CAM)

Peripherals: [7 L]

Basic properties, bus architectures, interfacing of I/O devices, data transfer schemes –programmed I/O, DMA, mass storage, RAID

Pipelining: [6 L]

pipelining datapath and instructions, speed up, CPI, latency; linear / non-linear pipeline–reservation table, MAL; super-pipelined and super-scalar processors.

Text Book:

1. Mano, M.M., "Computer System Architecture", PHI.
2. BehroozParhami " Computer Architecture", Oxford University Press

Reference Book:

1. Hayes J. P., "Computer Architecture & Organisation", McGraw Hill,
2. Hamacher, "Computer Organisation", McGraw Hill,
3. N. senthil Kumar, M. Saravanan, S. Jeevananthan, "Microprocessors and Microcontrollers" OUP
4. Chaudhuri P. Pal, "Computer Organisation & Design", PHI,
5. P N Basu- "Computer Organization & Architecture" , Vikas Pub

Subject Name: DATA STRUCTURE & ALGORITHM

Code: CS304

Contacts: 3L +1T

Credits: 3

(Note: examples should be given using pseudo codes; actual codes have to be developed in the practical classes. Preliminary knowledge of coding and executing some simple programs is required)

Introduction to algorithms: definition, properties, types, pseudo codes. Time and space complexity: asymptotic notations, simple examples. [2]

Abstract Data Type (ADT): concepts of data types, ADT and data structure. Typical ADT: integer, array and list; primitive data types. [1]

Linear and non-linear data structures-definition and examples. [1]

Arrays as data structure: memory representation and implicit addressing; 1D and 2D, row major and column major representations, address translation. [2]

Linked Lists: explicit addressing in a node (pointer/reference); singly linked list, circular linked list, doubly linked list, applications. [3]

Stack: definition, implementation with arrays and linked lists. infix, postfix and prefix notations [2]

Queue: circular queue, dequeue. Implementation of queue - linear and circular (using array and linked list); Application: well-formed parenthesis checking. [2]

Trees: basic terminologies, recursive nature; types: free tree, ordered and rooted tree. Tree representation with array and linked list. Binary trees: definition; node, path, level, height; skewed and complete binary tree; extended binary tree. Basic properties of binary trees : height of a CBT, maximum and minimum number of nodes, degree of nodes and their relationship, number of distinct binary trees with n nodes (statement only). Binary tree traversal (pre-, in-, post- level-order); threaded binary tree (left, right, full) - non-recursive traversal using threaded binary tree. [5]

Binary search tree: definition; operations (creation, insertion, deletion, searching). Height balanced binary tree – AVL tree and rotations for balancing, insertion and deletion of nodes (with examples only), B-tree. [3]

Graph: Representations of graphs - adjacency matrix, adjacency list, incidence matrix and incidence list; Graph traversal– DFS, BFS [5]

Sorting: Classification - internal and external sorts; stability of a sorting algorithm. Sorting by comparison: Bubble sort, Insertion sort, Selection Sort, Quick sort, Merge Sort, Radix sort. Comparisons of different sorting algorithms. [4]

Heap data structure: Binary heap (max and min). Use: priority queue. Heap sort.1 [2]

Searching: sequential search, Binary search (recursive and non-recursive), Interpolation search. [2]

Hashing: concept of key-to-address transformation, direct addressing, Hash functions- division remainder, multiplication, extraction, compression. Collision resolution - open addressing, chaining; load factor and comparison. [2]

Notes:

1 Statement of time complexities only. Advantages and disadvantages.

2 Derivation of worst case and average case time complexities.

3 Derivation of worst case time complexity, and mention of average case time complexity.

Text books:

1. **D.E. Knuth:** *The Art of Computer Programming* (Vol. 1& 3), Pearson, 1997.

2. **Horowitz, Sahni, Anderson-Freed:** *Fundamentals of Data Structures in C* (Second Edition), Universities Press, 2008.

3. **T.H. Cormen, C.E. Leiserson, R. Rivest and C. Stein:** *Introduction to Algorithms*, (Second/Third Edition), PHI, 2009.

4. **R. Sedgewick:** *Algorithms in C*, Pearson, 2004.

Reference book:

1. **Ronald L. Graham, Donald E. Knuth, and Oren Patashnik:** *Concrete Mathematics: A Foundation for Computer Science*. Addison-Wesley, 1988.

Subject Name: NUMERICAL METHODS LAB

Code : CS 391

Contacts : 3P

Credits : 2

1. Assignments on Newton forward /backward, Lagrange's interpolation. [9 P]
2. Assignments on numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule. [9 P]
3. Assignments on numerical solution of a system of linear equations using Gauss elimination and Gauss-Seidel iterations. [6 P]
4. Assignments on numerical solution of Algebraic Equation by Bisection, Regular-falsi and Newton Raphson methods. [9 P]
5. Assignments on ordinary differential equation: Euler's and Runga-Kutta methods. [9 P]
6. Introduction to Software Packages: Matlab / Scilab / Labview / Mathematica. [6 P]

Subject Name: DIGITAL LOGIC LAB

Code: CS 392

Contacts: 3P

Credits: 2

Logic family: Implementation of OR and AND gates using diodes, Study on characteristics of DTL and TTL inverters using discrete components, Study on characteristics of TTL and CMOS gates. [12 P]

Combinational logic circuits: Design and implementation of combinational circuits such as, Adders, comparators, parity generator and checker. Implementation of Boolean functions using multiplexer and decoder/de-multiplexer. [12 P]

Sequential circuits: Study of latch and flip-flop, design of counters. [12 P]

Computer Organization Lab

Code: CS393

Contacts: 3P

Credits: 2

1. Design of adders [6 P]
2. Memory module design [9 P]
3. Implementation of simple memory test logic (such as March test) [6 P]
4. Realization of data transfer among CPU registers, Main memory and External sources [9 P]
5. Swapping of registers' contents [6 P]
6. Control design [9 P]

Subject Name: ALGORITHMS-I LAB

Code: CS 394

Contacts: 3P

Credits: 2

1. Review of Introduction to Computing and Computing Practice:

Assignments based on Array, etc. [6P]

2. Assignments based on Stack and its Applications: Parenthesis matching,

Evaluation and Conversion of Expressions in Postfix notation, etc. [6P]

3. Assignments on search algorithms (sequential, binary and interpolation) on ordered and/or unordered data. [3P]

4. Assignments on sorting algorithms (bubble sort, selection sort, merge sort, quick sort, etc.): Implementation and performance comparisons. [3P]

5. Assignments on queues (circular queue, priority queue): Implementation and applications. [3P]

6. Assignments on linked lists (linear, circular, doubly linked list, etc): Implementation and applications. [6P]

7. Assignments on tree (binary tree, binary search tree, arithmetic expression tree, AVL tree): Implementation, creation, operations, applications, etc. [6P]

8. Assignments on graph: Representations, Implementations and Applications. [3P]

B.Tech(CSE) course structure under Autonomy
SEMESTER-IV

SL. NO.	PAPER CODE	PAPER NAME	L	T	P	CONTACT HRS./WEEK	CREDIT
THEORY							
01.	BS 407	LIFE SCIENCE	3	0	0	3	3
02.	CS405	GRAPH THEORY & COMBINATORICS	3	1	0	4	3
03.	CS406	COMMUNICATION ENGINEERING	3	0	0	3	3
04.	CS407	MICROPROCESSOR & ITS INTERFACING	3	1	0	4	3
05.	CS408	FORMAL LANGUAGE & AUTOMATA THEORY	3	1	0	4	3
PRACTICAL							
06.	CS495	SOFTWARE TOOLS LAB	0	0	3	3	2
07.	CS496	COMMUNICATION ENGINEERING LAB	0	0	3	3	2
08.	CS497	MICROPROCESSOR LAB	0	0	3	3	2
09.	CS498	ALGORITHMS – II LAB	0	0	3	3	2
		TOTAL	15	3	12	30	23

Subject Name: LIFE SCIENCE

Code: BS407

Contact-3L,

Credit-2

Module 1A: *Concepts in Biology* covering, Chemical foundations and basic chemistry of cell-Carbon compounds and cell as a unit of life; Physical and chemical principles involved in maintenance of life processes; Scientific methods- Microscopy (principles and applications);

Module1B: *Cell structure and functions* covering, Ultra-structure and functions of cellular components- Prokaryotic and Eukaryotic cells, cell wall, plasma membrane, endoplasmic reticulum; Biomolecules- Carbohydrates, Lipids, Amino Acids, Proteins, Nucleic acids; Tissue systems- Overview of animal and plant tissue systems;

Module 2A: *Metabolisms* covering Bio-membranes, diffusion, absorption, osmo-regulation; Photo-synthesis and respiration

Module 2B: *Chromosomes and Cell Divisions* covering, Morphology of chromosomes; Cell theory- Cell cycle and phases; Mitosis and meiosis;

Module 3A: *Genetics* covering, Laws of heredity- Biological indicators, bio-sensors; Mutations- Cause, types and effects on species;

Module 3B: *Organic Evolution* covering, Origin of life- Haldane and Oparins concepts; Modern concept of natural selection and speciation- Lamarkism, Darwinism/Neo-Darwinism

Module 4 A *Biomaterials - an Overview*

Background-Biomaterial Classifications, Key Properties, Applications--Orthopedic Applications, Dental Applications, Cardiovascular Applications, Cosmetic Surgery

Module 4B *Human Physiology –in brief with special emphasis on* Locomotion and movement, Skeletal system, joints, disorders of muscular and skeletal system Body fluids and circulation-Blood groups, human circulatory system- heart, cardiac cycle, heart failure

Module 4C *Classification of Face and Teeth* : Types of teeth and face, and Orthodontic disorders –crossbite, openbite, overbite, undrbite, overjet

Recommended Books:-

1. BOOK OF BIOCHEMISTRY AND HUMAN BIOLOGY - BY G. P. TALWAR, L .M. SRIVASTAVA
2. CELL BIOLOGY AND GENETICS BY GEETA BANSAL, M. C. BHATNAGAR
3. TEXTBOOK OF STRUCTURAL BIOLOGY BY: ANDERS LILJAS, LARS LILJAS JURE PISKUR, GÖRAN LINDBLOM, POUL NISSEN AND MORTEN KJELDGAARD
4. LEHNINGER-PRINCIPLES-OF-BIOCHEMISTRY-5TH-EDITION
5. TEXT BOOK OF BIOLOGY, BY S VENUGOPAL

Subject Name: GRAPH THEORY & COMBINATORICS

Code: CS405

Contacts: 3L +IT = 4,

Credits: 3

Module I: [6L]

Introduction to Propositional Calculus: Propositions, Logical Connectives, Conjunction, Disjunction, Negation and their truth table. Conditional Connectives, Implication, Converse, Contrapositive, Inverse, Biconditional statements with truth table, Logical Equivalence, Tautology, Normal forms-CNF, DNF; Predicates and Logical Quantifications of propositions and related examples.

Module II: [8L]

Theory of Numbers: Well Ordering Principle, Divisibility theory and properties of divisibility; Fundamental theorem of Arithmetic; Euclidean Algorithm for finding G.C.D and some basic properties of G.C.D with simple examples; Congruences, Residue classes of integer modulo n (Z_n) and its examples. Order, Relation and Lattices: POSET, Hasse Diagram, Minimal, Maximal, Greatest and Least elements in a PO SET, Lattices and its properties, Principle of Duality, Distributive and Complemented Lattices.

Module III: [8L]

Pigeon-hole Principle, Principles of inclusion and exclusions; Recurrence relations: Formulation & Modeling of different counting problems in terms of recurrence relations,

Solution of linear recurrence relations with constant coefficients (upto second order) by (i) The iterative method (ii) Characteristic roots method (iii) Generating functions method.

Group, Subgroup, Cyclic group, Permutation group, Symmetric group (S_3), Coset, Normal subgroup, Quotient group, Homomorphism & Isomorphism (Elementary properties only). Definition of Ring, Field, Integral Domain and simple related problems.

Module IV :[8L]

Planar and Dual Graphs. Kuratowski's graphs. Homeomorphic graphs. Eulers formula ($n - e + r = 2$) for connected planar graph and its generalisation for graphs with connected components. Detection of planarity. Graph colouring. Chromatic numbers of C_n , K_n , $K_{m,n}$ and other simple graphs. Simple applications of chromatic numbers. Upper bounds of chromatic numbers (Statements only). Chromatic polynomial. Statement of four and five colour theorems. (10 L)

Module V: [6L]

Graph Coloring: Chromatic Numbers and its bounds, Independence and Clique Numbers, Perfect Graphs-Definition and examples, Chromatic polynomial and its determination, Applications of Graph Coloring. Matchings: Definitions and Examples of Perfect Matching, Maximal and Maximum Matching, Hall's Marriage Theorem (Statement only) and related problems.

Books:

1. Russell Merris, Combinatorics, Wiley-Interscience series in Discrete Mathematics and Optimisation
2. N. Chandrasekaran and M. Umapparvathi, Discrete Mathematics, PHI
3. Gary Haggard, John Schlipfand Sue Whitesides, Discrete Mathematics for Computer Science, CENGAGE Learning
4. Gary Chartrand and Ping Zhang - Introduction to Graph Theory, TMH
5. J.K. Sharma, Discrete Mathematics, Macmillan

Subject Name: COMMUNICATION ENGINEERING

Code: CS406

Contacts: 3L

Credits: 3

Module-I [12L]:

Introduction to Communication Engineering [2L]

Amplitude Modulation: Concept of AM, Calculation of Modulation Index, Total transmitted power of AM, DSB-SC Modulation, SSB- SC Modulation and their methods, Bandwidth calculation, Savings of Power, Demodulation of AM. [10L]

Module-II[5L]:

Frequency Modulation: Concept of FM, Direct & Indirect Method, Bandwidth calculation of FM, Demodulation of FM. [3L]

Phase Modulation: Concept of Phase Modulation, generation of PM from FM. [02L]

Module-III [12L]:

Pulse & Digital Communication: Sampling Theorem, PAM, PWM, PPM. PCM Transmitter & Receiver, DPCM, Companding, TDM & FDM, Delta Modulation, Quantization Noise in PCM System, Signal to Quantisation Noise ratio in PCM System. [09L]

ASK, FSK, PSK, BPSK, QPSK. [03L]

Module-IV [7L]:

Data Formatting: NRZ-Unipolar, NRZ-Polar, NRZ-Bipolar, RZ-Bipolar, Manchester Coding. [2L]

Synchronous & Asynchronous Data Transmission. [03L]

Concept of Satellite Communication. [2L]

Reference Books:

1. Modern Digital and Analog Communication Systems by B. P. Lathi; Published by Oxford University Press.
2. A Text Book of Analog and Digital Communication by P. Chakrabarti; Published by Dhanpat Rai & Co.
3. A Text Book of Communication Engineering by A. Kumar; Published by Umesh Publications.
4. Modern Electronic Communication: Principles and Practice by Sarma and Sinha; Published by Dhanpat Rai Publishing Company
5. Communication Systems by Simon Haykin; Published by Wiley Student Edition
6. Analog & Digital Communications by Simon Haykin and Michael Moher; Published by Wiley Student Edition

Subject Name: MICROPROCESSOR & INTERFACING

Code: CS407

Contacts: 3L + 1T

Credits: 3

Module-I [5L]:

Introduction to Microprocessors and their features.

Demultiplexing of Address & Data Bus, Generation of Read Write Control Signal for Memory & I/O. Uses of Decoder & Latch, Changes of Memory Map.

Module-II [13L]:

8085 Microprocessor: Architecture, Register Organisation, Control Signals, Hardware & Software Interrupts, Instruction Set, Addressing Modes & Assembly Language Programming. [07L]

Instruction Cycle, Machine Cycle, T-State, Timing Diagram [03L]

Interfacing of Memory Chips with Microprocessor, I/O Mapped I/O & Memory Mapped I/O. [03L]

Module-III [10L]:

Working of DMA Controller, Microprocessor based A/D Conversion using ADC0804. [03L]

Peripherals: 8255, 8253, 8259, 8237 [6L]

Industrial Applications of Microprocessor. [1L]

Module-IV [8L]:

8086 Microprocessor: Architecture, Memory Segmentation, Minimum Mode & Maximum Mode, Addressing Modes, brief description of Instruction Set and Assembly Language Programming. [6L]

Brief overview of some other Microprocessors [2L]

Reference Books:

1. Microprocessor Architecture, Programming, and Applications with the 8085 by Ramesh Gaonkar; Published by Penram International Publishing (India) Private Limited.
2. Fundamentals of Microprocessors and Microcomputers by B. Ram; Published by Dhanpat Rai Publications.
3. Microprocessors and Microcontrollers by N. Senthil Kumar, M. Saravanan and S. Jeevananthan; Published by Oxford University Press
4. Advanced Microprocessors and Peripherals: Architecture, Programming and Interfacing by A.K. Ray and K M Bhurchandi; Published by Tata McGraw-Hill Publishing Company Limited.
5. The 8051 Microcontroller and Embedded Systems: Using Assembly and C by M. A Mazidi, J. G. Mazidi and R. D. McKinlay; Published by Pearson.
6. The 8051 Microcontroller by Kenneth Ayala; published by Cengage Learning India Private Limited.

Subject name: FORMAL LANGUAGE AND AUTOMATA THEORY

Code: CS408

Contacts: 3L +IT

Credits: 3

Module-1 [7L]:

Fundamentals: Basic definition of sequential circuit, block diagram, mathematical representation, concept of transition table and transition diagram (Relating of Automata concept to sequential circuit concept) Design of sequence detector, Introduction to finite state model [2L]

Finite state machine: Definitions, capability & state equivalent, kth- equivalent concept [1L]

Merger graph, Merger table, Compatibility graph [1L]

Finite memory definiteness, testing table & testing graph. [1L]

Deterministic finite automaton and non deterministic finite automaton. [1L] Transition diagrams and Language recognizers. [1L]

Module-2[14L]:

Finite Automata (deterministic and non deterministic), equivalence of deterministic and non-deterministic finite Automata. [4L]

Myhill-Nerode Theorem, Minimization of FSM. [2L]

Regular Languages : Regular sets. [1L] Regular expressions, identity rules. Arden's theorem state and prove [1L] , Constructing finite Automata for a given regular expressions, Regular string accepted by NFA/DFA [1L], Pumping lemma of regular sets. Closure properties of regular sets (proofs not required). [1L]

Grammar Formalism: Regular grammars-right linear and left linear grammars. [1L]

Equivalence between regular linear grammar and FA. [1L] , Inter conversion, Context free grammar. [1L]

Derivation trees, sentential forms. Right most and leftmost derivation of strings. (Concept only) [1L]

Module:-3 [8L] Context free Language

Context free grammars(CFG) and languages (CFL), Derivations, Parse trees, Equivalence of parse tree and derivation. [2L]

Ambiguous, unambiguous and inherently ambiguous grammars. [1L]

Normal forms (Chomsky and Greibach), Simplification of CFG [1L]

Pushdown automata (deterministic and nondeterministic), Acceptance of language by empty stack, final state and their equivalence . [2L]

Properties of the class of CFLs, Proving a language to be context free language or not. Pumping lemma for CFG. [2L], Decision algorithms of CFG. Membership checking (CYK algorithm)

Module-IV [7L] Recursive and Recursively enumerable Language

Unrestricted grammar, Computable function [1L] Turing machines (deterministic and nondeterministic). Equivalence of deterministic and non-deterministic TM.

Extensions of TM and their simulations. [2L], Church-Turing thesis, universal TM, Halting problem of TM, TM as enumerator. [2L].

Decidability, Un-decidability/Non-computability, Complexity classes, Notion of reductions. [2L]

TEXT BOOKS:

"Introduction to Automata Theory Language and Computation", Hopcroft H.E. and Ullman J. D., Pearson Education.

"Theory of Computer Science ", Automata Languages and computation", Mishra and Chandrashekar, 2nd edition, PHI.

"Formal Languages and Automata Theory", C.K.Nagpal, Oxford

REFERENCES:

2.1 "Switching & Finite Automata", ZVI Kohavi, 2nd Edn., Tata McGraw Hill

2.2 "Introduction to Computer Theory", Daniel I.A. Cohen, John Wiley

2.3 "Introduction to languages and the Theory of Computation", John C Martin, TMH

2.4 "Elements of Theory of Computation", Lewis H.P. & Papadimitrou C.H. Pearson, PHI

Subject Name:- SOFTWARE TOOLS LAB

Paper Code-CS495

Contact: 3P

Credit-2

1. Visual Basic Environment (2P)- How to use VB compiler to compile / debug as well as run the programs. Concept about VB-form, Project, Application, Tools, Toolbox, & Properties.

Introduction to VB Controls - Labels, Command Buttons, Text Boxes , Frames, Check Boxes , Option Buttons, timer control, images, Designing the User Interface using forms.

2. Data type options & Variables in VB(2P) – Different types of variables- Public, Private, Static, Constants, Data types and their naming rules/conventions, Scope of variables, Val Function, Arithmetic Operations, List boxes & Combo Boxes for Data lists- AddItem Method, List box Properties, Removing an item from a list, data Arrays-concept of single & two dimensional arrays.

3. Decision making using Conditions in VB (2P)– Use of ‘ If then-else’ Statement, Compound Conditions(And, Or, Not), Case Structure ,Using If statements with Option Buttons & Check Boxes, use of different loops- Do/Loops, For/Next Loops, String manipulations– concept of String reserve, comparing, concatenation, length calculation, counting, mid function.

4. Sub-functions & Procedure details(1P)- Concepts of menu - defining and modifying menu, Use of Dialog box, Use of Input box () & MsgBox () functions, Creating a New sub-procedure, passing arguments to procedure by value or by reference, Using Call Statement to call a procedure.

5. Handling of Projects including relevant form design with the help of visual programming aids –

(i) Setting up Database connectivity with VB(2P) - Creating the database files using MS-Access, Linking of different tables; establishing the connections between the MS-Access Database and VB (as the front end tool) using ODBC database connectivity. Use of Multiple Forms - Creating, adding, removing forms in project, use of Show Method, Load and Unload options.

(ii) Manipulation of the Database through VB(1P)- Accessing the MS-Access Database from the VB applying different queries, updating the Database i.e. adding, deleting updating the records.

(iii) Project related case studies (2P)

Subject Name: COMMUNICATION ENGINEERING LAB

Code: CS496

Contact: 3P

Credit-2

Practical Designs & Experiments:

Module - 1: Generation of Amplitude Modulation [06 Periods]

Module - 2: Generation of FM [06 Periods]

Module - 3: Generation of PAM [06 Periods]

Module - 4: Generation of PWM & PPM [06 Periods]

Module -5: Generation of TDM Pulses [06 Periods]

Subject Name: MICROPROCESSOR & INTERFACING LAB

Code: CS- 497

Contact: 3P

Credit-2

Name of the Experiments:

Module -1

Familiarization with 8085 register level architecture and trainer kit components. [03 Periods]

Module -2

Study of prewritten programs on trainer kit using the basic instruction set (data transfer, Load/Store, Arithmetic, Logical etc.) [09 Periods]

Module – 3: Programming using kit/simulator for

i) Table look up

ii) Copying a block of memory

iii) Shifting a block of memory [04 Periods]

Module - 4

Program using subroutine calls and IN/OUT instructions using 8255 PPI on the Trainer Kit. Subroutine for delay, reading switch state & glowing of LEDs accordingly, finding out the frequency of a pulse train etc. [06 Periods]

Module – 5: Interfacing with I/O modules:

a) ADC

b) Keyboard

c) Multi-digit Display with multiplexing

d) Stepper motor [08 periods]

Subject Name:- ALGORITHMS-II LAB

Code:- CS498

Contact: 3P

Credit-2

Module-I

Implementation of sorting algorithms (comparison based and linear time sorting) and comparing their efficiencies [3P]

Module-II

Determining k-th smallest element of an input array of size n in linear worst case running time [3P]

Module-III

Implementation of hashing [3P]

Module-IV

Solving problems using greedy algorithms [6P]

Module-V

Solving problem using Dynamic programming [3P]

Module-VI

Solving problem using back-tracking [3P]

Module-VII

Implementing graph algorithms (e.g., single source shortest path problem, all-pair shortest path problem)-[6P]

Module-VIII

Implementation of Approximation algorithm for NP-complete problems [3P]

B.Tech(CSE), course structure under autonomy
SEMESTER-V

SL. NO.	PAPER CODE	PAPER NAME	L	T	P	CONTACT HRS./WEEK	CREDIT
THEORY							
01.	CS509	DATA BASE MANAGEMENT SYSTEMS	3	1	0	4	3
02.	CS510	COMPUTER ARCHITECTURE	3	1	0	4	3
03.	CS511	OPERATING SYSTEM	3	1	0	4	3
04.	CS512	OBJECT ORIENTED METHODOLOGIES	3	1	0	4	3
05.	PE(CS)501	A. ARTIFICIAL INTELLIGENCE B. IMAGE PROCESSING C. SOFT COMPUTING D. VLSI DESIGN & ALGORITHMS	3	0	0	3	3
PRACTICAL							
06.	CS599	DATA BASE MANAGEMENT SYSTEMS LAB	0	0	3	3	2
07.	CS591	OPERATING SYSTEM LAB	0	0	3	3	2
08.	CS592	PROGRAMME PRACTICES LAB USING C++	0	0	3	3	2
09.	PE(CS)591	A. ARTIFICIAL INTELLIGENCE LAB B. IMAGE PROCESSING LAB C. SOFT COMPUTING LAB D. VLSI LAB	0	0	3	3	2
		TOTAL	15	4	12	31	23

B.Tech(CSE), 5TH Sem, Detailed Syllabus

Subject Name: DATABASE MANAGEMENT SYSTEM

Code: CS509

Contact: 3L +1T

Credit: 3

Introduction [2L]

Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Three Schema architecture of DBMS.

Entity-Relationship Model [4L]

Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features.

Relational Model [4L]

Structure of relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Views, Modifications Of the Database.

SQL and Integrity Constraints [8L]

Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Subqueries, Database security application development using SQL, Stored procedures and triggers.

Relational Database Design [5L]

Functional Dependency, Different anomalies in designing a Database., Normalization using functional dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Normalization using multi-valued dependencies, 4NF, 5NF

Internals of RDBMS [7L]

Physical data structures, Query optimization : join algorithm, statistics and cost based optimization. Transaction processing, Concurrency control and Recovery

Management : transaction model properties, state serializability, lock based protocols.

File Organization & Index Structures [6L]

File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree .

Text Books:

1. Henry F. Korth and Silberschatz Abraham, "Database System Concepts", Mc.Graw Hill.
2. Elmasri Ramez and Novathe Shamkant, "Fundamentals of Database Systems", Benjamin Cummings Publishing. Company.
3. Ramakrishnan: Database Management System , McGraw-Hill

Subject name: Computer Architecture

Code: CS510

Contacts: 3L+1T

Credit-3

Module-I

Pipelining Architecture: [10L]

Introduction: Review of basic computer architecture (Revisited), Quantitative techniques in computer design, measuring and reporting performance. (3L)

Pipelining: Basic concepts, instruction and arithmetic pipeline, data hazards, control hazards and structural hazards, techniques for handling hazards.Exception handling.Pipeline optimization techniques; Compiler techniques for improving performance. (7L)

Module-II

Instruction-level parallelism: [10L]

Basic concepts, techniques for increasing ILP, RISC Architecture, superscalar, super pipelined and VLIW processor architectures.Array and vector processors.

Module-III

Multiprocessor Architecture: [10L]

Multiprocessor architecture: taxonomy of parallel architectures; Centralized shared-memory architecture: synchronization, memory consistency, interconnection networks. Distributed shared-memory architecture, Cluster computers. (6L)

Non von Neumann architectures: data flow computers, reduction computer architectures, systolic architectures (4L).

Module-IV

Multicore Architecture: [4 L].

Non-Von Chip multiprocessors: Why CMP (Moore's law, wire delay); Shared L2 vs. tiled CMP; Core complexity; Implementation techniques for multi-cores; Chip multiprocessor case studies: Intel dual core processor, multi-core Intel/AMD processor. (4L).

Module-V

Performance Evaluation [2 L]

Books:

1. Advanced Computer Architecture-Kai Hwang & NareshJotwani, McGraw Hill
2. Computer Architecture and Parallel Processing -Kai Hwang and A. Briggs, McGraw Hill
3. Architecture - H. Peterson or nance issues: Brief introduction to cache hierarchy and communication latency; power versus performance.

Subject Name: OPERATING SYSTEM

Code: CS 511

Contacts: 3L+1T

Credits: 3

Module-I

Operating System Overview: [4L]

Evolution of Operating Systems, Different types of O.S, Address Space, role of interrupts in operating system functions , Concept of batch-processing, multi-programming, time sharing, real time operations, operating system structure (simple, layered, virtual machine), O/S services, system calls.

Module-II

Process Management : [12L]

Introduction [2L]: Concept of processes, state diagram, process control block, process scheduling, interprocess communication.

Threads [2L]: Overview, benefits of threads, context switching, privileged mode, user and kernel threads. Multithreading models

Scheduling [3L]: Scheduling criteria, scheduling algorithms (FCFS, SJF, RR, preemptive, non-preemptive, priority), Multiprocessor and Real time scheduling, algorithm evaluation

Synchronization [3L]: Concept of process and Process synchronization, critical section problem, critical region, synchronization hardware, classical problems of synchronization, Semaphores, Monitors. Discussion of synchronization problems like producer-consumer, readers-writers, dining philosophers, sleeping-barber

Deadlocks [2L]: Deadlock and Starvation, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, avoidance technique – Banker’s algorithm and related algorithms, deadlock detection, recovery from deadlock.

Module-III

Memory Management: [7L]

Address space and address translation, static partitioning, dynamic partitioning, Logical and Physical address space, Swapping, different types of fragmentation, Paging, Segmentation, Demand Paging, Different Page replacement algorithms, Frame allocation, Thrashing, working set strategy

Module-IV

Device management:[5L]

Device drivers, concept of driver routines, Magnetic disks, disk scheduling- criteria, algorithms – FCFS, SSTF, SCAN, C-SCAN, LOOK etc, disk management formatting, boot block, disk free space management techniques, concept of RAID etc.

Module-V

File Management:[4L]

Design of IO systems, File and operations on it, file organization and access, file allocation, directory structures, file sharing, file protection.

Module-VI

Protection and Security:[4L]

Concepts of domain, Access matrix and its implementation, access control, Security of systems- concepts, threats- Trojan horse, virus, worms etc, introduction to cryptography as security tool, user authentication.

A CASE STUDY OF UNIX

BOOKS:

1. Operating Systems Concepts – A. Silberschatz, P. Galvin and G. Gagne. Wiley India
2. Operating Systems Concepts – Gary Nutt, N. Chaki and S. Neogy, Pearson Education
3. Operating Systems – W. Stallings, Pearson Education
4. Operating Systems: A Concept-based Approach – D. M. Dhamdhare, Tata McGraw-Hill
5. An Introduction to Operating Systems– Harvey M.Deitel, Pearson Education Asia

Subject Name: OBJECT ORIENTED METHODOLOGIES

Code: CS512

Contact: 3L+1T

Credit: 3

MODULE-I (BASIC CONCEPTS OF OOP) [2L]

Gradual development of OOP concepts, features of OOP, comparison of OOP and the conventional structured programming languages, benefits of OOP, Object-Oriented Languages.

MODULE-II (C++ PROGRAMMING LANGUAGE)

(BASIC C++ FEATURES) [3L]

Introduction to C++, I/O streams, Reference Variables, C++ operators – scope resolution operator, Memory Management operators, Functions in C++ with call & return by reference, inline functions, Function overloading.

CLASS PROPERTIES IN C++ [7L]

Introduction to classes and objects, array of objects, access specifier, static data members and member functions, basic concepts of friend functions, pointer to members, local classes, constructors and destructors, dynamic initialization of objects, copy constructor, basic concepts of operator overloading, operator overloading using friends, command line arguments.

INHERITANCE CONCEPTS [6L]

Defining derived classes, Virtual base classes, abstract classes, constructors in derived classes, nesting of classes, pointers to derived classes, virtual functions and polymorphism, basic concepts of templates -class template, function template.

MODULE-III (JAVA PROGRAMMING LANGUAGE)

CLASS & OBJECT PROPERTIES [4L]

Basic concepts of java programming –byte-code & JVM, array declaration, class, object, access specifier, constructor, idea of garbage collection, use of method overloading, this keyword, static variables & methods, singleton class, nested/inner classless – properties of static & non static inner classes with their comparisons, local inner classes, keyboard input using Buffered Reader classes.

REUSABILITY PROPERTIES [6L]

Super class & subclasses including multilevel hierarchy, constructor calling procedure for superclass, use of super and final keywords, dynamic method dispatch / polymorphism, use of abstract classes, interfaces, extended interfaces, nesting of abstract classes and interfaces, concepts of packages and its usage.

EXCEPTION HANDLING & MULTITHREADING [6L]

Exception handling basics, exception class hierarchy, use of try, catch and finally block, throw & throws clause, creation of user defined exception classes. Concept of multithreading, main thread properties, thread life cycle, differences between threads and processes.

MODULE-IV (BASIC CONCEPTS OF OBJECT ORIENTED ANALYSIS & DESIGN) [2L]

Benefits of Object Modelling Techniques, class and instance diagram, class relationships - association, reflexive association, aggregation, composition, generalization, specialization, ternary relationship, case studies.

Textbooks/References:

1. Rambaugh, James Michael, Blaha – "Object Oriented Modelling and Design" – Prentice Hall, India
2. Patrick Naughton, Herbert Schildt – "The complete reference-Java2" – Tata McGraw Hill.
3. Deitel and Deitel – "Java How to Program" –Pearson
4. E Balagurusamy – "Object Oriented Programming with C++ " – McGraw Hill Education (India).
5. Robert Lafore – "Object Oriented Programming in C++", CourseSams Publishing.

Subject name: ARTIFICIAL INTELLIGENCE

Code: PE(CS)-501A

Contact: 3L

Credits: 3

Introduction [2L]

Overview of Artificial intelligence- Problems of AI, AI technique, Tic - Tac - Toe problem.

Problem Solving [2L]

Defining the problem as state space search, production system, problem characteristics, issues in the design of search programs.

Search techniques [8L]

Solving problems by searching, uniform search strategies, breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies. Greedy best-first search, A* search, memory bounded heuristic search, local search algorithms & optimization problems, Hill climbing search, simulated annealing search, local beam search, genetic algorithms; constraint satisfaction problems, local search for constraint satisfaction problems.

Adversarial search [3L]

Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.

Intelligent Agents [2L]

Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents.

Using logic [6L]

Representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction. Computational Logic - Review of PL & FOPL.

Knowledge & reasoning [8L]

Knowledge representation issues, representation & mapping, Procedural verses declarative knowledge, forward verses backward reasoning, matching, control knowledge. Automatic Reasoning using Resolution in PL , Skolem Standard Form in FOPL, Clauses and Clausal Forms, Substitution, Unification, General Resolution, Theorem Proving with Resolution Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory.

Basic knowledge of programming language like Prolog & LISP. [5L]

Books:

1. Artificial Intelligence, Ritch & Knight, TMH
 2. Artificial Intelligence A Modern Approach, Stuart Russel Peter Norvig Pearson
 3. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
 4. Poole, Computational Intelligence, OUP
 5. Logic & Prolog Programming, Saroj Kaushik, New Age International
 6. Expert Systems, Giarranto, VIKAS
 7. Artificial Intelligence, Russel, Pearson
- Visual Programming & Web Technology

Subject Name: IMAGE PROCESSING

Code: [PE(CS)501B]

Contact: 3L

Credit: 3

Module-I : DIGITAL IMAGE FUNDAMENTALS: [3L]

Digital Image Representation, Fundamental Steps in Image Processing, some basic Relationships between pixels. Coordinate conventions, Image Sampling & quantization, Image file formats.

Module –II: IMAGE TRANSFORMS: [2L]

2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete cosine Transform, comparison of different image transforms.

Module –III: IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:[6L]

Basic Intensity transformations functions, histogram Processing, fundamentals of Spatial Filtering, Smoothing Spatial filters, Sharpening spatial filters, Combining spatial enhancement methods.

Module –IV: IMAGE ENHANCEMENT IN FREQUENCY DOMAIN: [6L]

Basics of filtering in frequency domain, additional characteristics of the frequency domain, correspondence between filtering in the spatial and frequency domains. Image smoothing using frequency domain filters, image sharpening using frequency domain filters – Gaussian High pass filters, Laplacian in the frequency domain, Holomorphic filtering.

Module –V: IMAGE DEGRADATION / RESTORATION:[4L]

Noise models, Restoration in the presence of Noise only-spatial filtering, - mean, order- statistic and adaptive filters, Estimating the Degradation function, Inverse filtering, Weiner filtering.

Module –VI: IMAGE SEGMENTATION:[10L]

Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method.

Module –VII: MORPHOLOGICAL IMAGE PROCESSING : [2L] Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms.

Module –VIII: COLOR IMAGE PROCESSING:[3L] Color Fundamentals ,Color Models , The RGB Color Model

Module –IX: IMAGE COMPRESSION: [5L] Fundamentals, Lossy and lossless Image Compression

TEXT BOOKS:

1. Digital Image Processing-R. C .Gonzalez & R.E. Woods, Addison Wesley/Pearson education, 3rd Edition, 2010.
2. Digital Image processing– S jayaraman, S Esakkirajan, T Veerakumar, Tata McGraw Hill.

REFERENCES:

1. Digital Image processing using MATLAB-Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, Tata McGraw Hill, 2010.
2. Fundamentals of Digital Image processing-A .K. Jain, PHI.

Subject Name: SOFT COMPUTING

Code: [PE (CS) 501C]

Contact: 3L

Credit: 3

Module-I [4L] Introduction: Introduction to soft computing; introduction to fuzzy sets and fuzzy logic systems; introduction to neural network; introduction to Genetic Algorithm; introduction to Rough set.

Module-II [12L] Fuzzy sets and Fuzzy logic systems: Classical Sets and Fuzzy Sets and Fuzzy relations: Operations on Classical sets, properties of classical sets, Fuzzy set operations, properties of fuzzy sets, cardinality, operations, and properties of fuzzy relations.

Membership functions: Features of membership functions, standard forms and boundaries, different fuzzification methods. Fuzzy to Crisp conversions: Lambda Cuts for fuzzy sets, fuzzy Relations.

Defuzzification methods. Classical Logic and Fuzzy Logic: Classical predicate logic, Fuzzy Logic, Approximate reasoning and Fuzzy Implication

Module- III [14L] Neural Network : Introduction to Neural Networks: Advent of Modern Neuroscience, Classical AI and Neural Networks, Biological Neurons and Artificial neural network; model of artificial neuron.

Learning Methods : Hebbian, competitive, Boltzman etc., Neural Network models: , single and multiple layer Perceptron, Adaline and Madaline networks; Back-propagation and multi-layer networks.

Module-IV[6L] Genetic Algorithms: Simple GA, Encoding Techniques

Crossover, mutation, inversion and deletion, genetic algorithms in search and optimization.

Text Books:

1. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI
2. Neural Networks: A Comprehensive Foundation (2nd Edition), Simon Haykin, Prentice Hall.
3. Principles of Soft Computing , S N Sivanandam, S. Sumathi, John Wiley & Sons
4. Genetic Algorithms in search, Optimization & Machine Learning by David E. Goldberg
5. Neuro-Fuzzy and Soft computing, Jang, Sun, Mizutani, PHI
6. Neural Networks: A Classroom Approach,1/e by Kumar Satish, TMH,
7. Genetic Algorithms in search, Optimization & Machine Learning by David E. Goldberg, Pearson/PHI
8. A beginners approach to Soft Computing, Samir Roy & Udit Chakraborty, Pearson
9. Fuzzy Sets and Fuzzy Logic: Theory and Applications, George J. Klir and Bo Yuan, Prentice Hall
10. Fuzzy logic with engineering applications, Timothy J. Ross, John Wiley and Sons.

Subject Name: VLSI DESIGN & ALGORITHM

Code: [PE(CS)501D]

Contact: 3L +1T

Credit: 3

MODULE - I : Introduction [5L]

VLSI technology, MOS Transistor & Switches, Layout of basic devices- Inverter, NAND, NOR, Compound gates, Multiplexer, Memory-Latches & Register.

MODULE - II : Overview of VLSI Design cycle [15L]

System specification; Design- Functional, Logic, Circuit, Physical; Fabrication, Design methodologies, Packaging; Design styles- Full custom, Standard cell, Gate arrays
FPGA;

Partitioning [5L]

Problem formulation, Approximation of hyper graphs with graphs, Kerninghan-Lin & Fiduccia- Mattheyses heuristic algorithm, Ratio cut.

Placement [5L]

Cost function, Force directed methods, Partitioning placement, Resistive network, Regular & linear placement.

Floorplanning [5L]

Problem formulation, Hierarchical approach, Rectangular dualization, Floorplan sizing-

MODULE - III

Routing [8L]

Global- Problem formulation; Fundamentals- Maze running, Line searching, Steiner trees; Lee & line probe algorithm, Hierarchical approach, Randomized routing;
Detailed- Problem formulation, Channel routing & Switchbox routing, Hierarchical approach, Greedy algorithm; Single layer- General river routing algorithm; Two
layer- Left edge algorithm (Basic & Dogleg); Constraint graph- Yoshimura & Kuh algorithm.

Module-IV: Testing [8L]

Need for testing- Functionality & Manufacturing test; Manufacturing test principles- Stuck

At, short & open circuit, Observability, controllability, Fault coverage; Automatic test pattern generation, Design strategies for test- Scan based, Self test.

Books:

1. Algorithms For VLSI Physical Design Automation: Naved A. Sherwani, Kulwer Academic
2. An Introduction to VLSI Physical Design: M Sarafzadeh & C.K.Wong, TMH.
3. VLSI Design: SujataPandey& Manoj Pandey, DhanpatiRai& Co.
4. A VHDL Primer: Bhasker, PE.Publisher
6. VHDL Programming by Example: Douglas L. Pery, TMH
7. Digital Testing – B. Abrhamkhi
8. Testing- P.Lal

Subject Name: DATABASE MANAGEMENT SYSTEM LAB

Code: CS599

Contact: 3P

Credit: 2

Structured Query Language

1. Creating Database [9P]

- i. Creating a Database
- ii. Creating a Table
- iii. Specifying Relational Data Types
- iv. Specifying Constraints
- v. Creating Indexes

2. Table and Record Handling [9P]

- i. INSERT statement
- ii. Using SELECT and INSERT together
- iii. DELETE, UPDATE, TRUNCATE statements
- iv. DROP, ALTER statements

3. Retrieving Data from a Database [9P]

- i. The SELECT statement
- ii. Using the WHERE clause
- iii. Using Logical Operators in the WHERE clause
- iv. Using IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING Clause
- v. Using Aggregate Functions
- vi. Combining Tables Using JOINS
- vii. Subqueries

4. Database Management [9P]

- i. Creating Views
- ii. Creating Column Aliases
- iii. Creating Database Users
- iv. Using GRANT and REVOKE

Subject Name: OPERATING SYSTEM LAB

Code: CS591

Contact : 3P

Credit: 2

1. **Shell programming [6P]:** Creating a script, making a script executable, shell syntax (variables, conditions, control structures, functions, commands).
2. **Process [6P]:** Starting new process, replacing a process image, duplicating a process image, waiting for a process, zombie process.
3. **Signal [6P]:** Signal handling, sending signals, signal interface, signal sets.
4. **Semaphore [6P]:** programming with semaphores (use functions semctl, semget, semop, set_semvalue, del_semvalue, semaphore_p, semaphore_v).
5. **POSIX Threads [6P]:** programming with pthread functions(viz. pthread_create, pthread_join, pthread_exit, pthread_attr_init, pthread_cancel)
6. **Inter-process communication [6P]:** pipes(use functions pipe, popen, pclose), named pipes(FIFOs, accessing FIFO)

Subject Name: OOP LAB USING C++

Code: CS592

Contact: 3P

Credit: 2

1. Introduction to the source code writing, compilation and execution process of C++ programme. Writing C++ Programme using I/O stream, basic loop control, functions with call by reference, identification of variables with scope resolution operator. [3P]
2. Programme writing on classes using access specifier, creation of objects, accessing members, array of objects, accessing static members [3P]
3. Programme writing on function overloading, constructors and destructors, Object passing as function arguments and returning of objects from functions. [3P]
4. Programme writing on friend functions– class independent and class specific declaration oriented, local classes. [3P]
5. Programme writing on pointers to members, nested calling of member functions, dynamic initialization of objects.[3P]
6. Programme writing on copy constructor, operator overloading – binary and unary operators. [3P]
7. Programme writing on operator overloading using friend functions, command line arguments. [3P]
8. Programme writing on derived classes, implementation of single inheritance with the use of private and protected access specifier, multilevel inheritance. [3P]
9. Programme writing on multiple inheritances, constructor calling in derived classes, virtual base classes. [3P]
10. Programme writing on abstract classes, pointer to objects, this pointer, pointers to derived class. [3P]
11. Programme writing on virtual functions and run time polymorphism [3P]
12. Programme writing on basic Class and Function templates [3P]

BOOKS:-

1. E Balagurusamy – “Object Oriented Programming with C++ “ – McGraw Hill Education (India).
2. Robert Lafore – “Object Oriented Programming in C++”, CourseSams Publishing.

Subject Name: ARTIFICIAL INTELLIGENCE LAB

Code: [PE(CS) 591A]

Contact: 3P

Credit: 2

Programming in Prolog :

1. Writing program to compute factorial of positive integer using recursion.
2. Writing program to compute Fibonacci term using recursion.
3. Writing program to compute greatest common divisor (using Euclidean algorithm).
4. Writing program to check whether an element is a member of a given list or not.
5. Writing program to find length of a list.
6. Writing program to multiply the elements of integer list (list containing integer elements).
7. Writing program for concatenating two list.
8. Writing program to interchange the value of two variable without using third variable.
9. Writing program to find the sum of two numbers.
10. Writing program to find the subtraction of two numbers.
11. Writing program to find the multiplication of three numbers.

Programming in LISP:

1. Writing program to calculate the average of three numbers.
2. Writing programme to find the maximum of two numbers.
3. Writing programe to find the maximum of three numbers.
4. Writing programe to calculate area of a circle.
5. Writing programe to calculate the percentage of 1st number with respect to 2nd number.
6. Writing programe to calculate the volume of a sphere,
7. Writing programe to calculate the factorial of a number.
8. Writing programe to remove an element from a list.
9. Writing programe to check a string palindrome or not.
10. Writing programe to convert a prefix to infix.
11. Writing programe to add two list.

Subject Name: IMAGE PROCESSING LAB

Code: [PE(CS)-591B]

Contact: 3P

Credit: 2

- **List of Experiments**

- Lab 1: Programs on image enhancement [9P]
- Lab2: Programs on image segmentation [9P]
- Lab 3: Programs on morphological image processing [9P]
- Lab 4: Programs on Edge detection using Operators. [9P]

Subject Name: SOFT COMPUTING LAB

Code: [PE (CS)591C]

Contact: 3P

Credit: 2

FUZZY LOGIC:

1. Matlab\C program to implement the different Fuzzy Membership functions. [3P]
2. Matlab\C program to implement Fuzzy set operations and its properties. [3P]
3. Matlab\C program to implement composition of Fuzzy and Crisp Relations. [3P]

Neural network:

4. Matlab\C program to implement McCulloh-Pitts neural network for generate AND, OR functions. [3P]
5. Matlab\C program to implement Perceptron learning . [3P]
6. Matlab\C program for OR function with bipolar inputs and targets using Adaline network. [3P]
7. Matlab\C program for XOR function with bipolar inputs and targets using Madaline network. [3P]

Genetic Algorithm

8. Simple Genetic Algorithm in C for solving optimization problem. [3P]
9. Matlab\C program for maximizing $F(x)=x^2$, , where x ranges from say 0 to 31 using Genetic Algorithm. [6P]
10. Use of Genetic Algorithm toolbox in matlab\C for optimization problem solving. [6P]

Subject Name: VLSI LAB

Code: [PE(CS)591D]

Contact: 3P

Credit: 2

VHDL Implementation

1. Introduction to VHDL [3P]
2. VHDL Terms [3P]
3. Describing Hardware in VHDL –Entity, Architecture, [3P]
4. Concurrent Signal Assignment, [3P]
5. Structural Design [3P]
6. Sequential Behavior [3P]
7. Behavioral Modeling [6P]
8. Generics, Data Types [6P]
9. Sequential Statements- IF, CASE, LOOP, EXIT, ASSERT, WAIT [6P]

B.Tech(CSE), course structure under autonomy**SEMESTER-VI**

SL. NO.	PAPER CODE	PAPER NAME	L	T	P	CONTACT HRS./WEEK	CREDIT
THEORY							
01.	HS(CS)603	MANAGEMENT PRINCIPLES AND PRACTICES	3	0	0	3	2
02.	CS613	COMPUTER NETWORK	3	1	0	4	3
03.	CS614	SOFTWARE ENGINEERING	3	1	0	4	3
04.	CS615	DESIGN & ANALYSIS OF ALGORITHM	3	1	0	4	3
05.	CS616	COMPILER DESIGN	3	1	0	4	3
PRACTICAL							
06.	CS693	COMPUTER NETWORK LAB	0	0	3	3	2
07.	CS694	SOFTWARE ENGINEERING LAB	0	0	3	3	2
08.	CS695	JAVA PROGRAMMING LAB	0	0	3	3	2
09.	CS696	SEMINAR ON PROPOSED PROJECT	0	0	3	3	2
		TOTAL	15	4	12	31	22
10.	MC604	TECHNICAL COMMUNICATION AND SOFT SKILLS	0	0	3	3	3

B.Tech(CSE), 6th sem Detailed Syllabus

Subject name:- MANAGEMENT PRINCIPLES AND PRACTICES

Code: [H(CS)603]

Contact- 3L

Credit -2

Module-I (6L) : Concept of Management

Functions and Responsibilities of Managers, Fayol's Principles of Management, Management Thought –

- i) The Classical School
- ii) The Human Relations School,
- iii) Systems Theory
- iv) Contingency Management
- v) Cross cultural issues in management.

Module-II (5L)

Planning- Nature and Purpose of Planning, the Planning Process, Principles of Planning, Types of Planning, Levels of Planning, Techniques of Planning of different resources, Advantages and Limitations of Planning.

Module-III (5L)

Concept and Nature of Objectives: Types of Objectives, Importance of Objectives, Setting Objectives, Management by Objectives (MBO), Benefits and Weaknesses of MBO.

Module-IV(8L)

Strategies and Policies: Concept of Corporate Strategy, Formulation of Strategy, Types of Strategies. The Strategic Planning Process, The SWOT Matrix, The Portfolio Matrix, BCG Matrix, 7Ss of Mckinsey, Effective Implementation of Strategies, Types of Policies, Principles of Formulation of Policies, Decision Making Process, Individual Decision Making Models.

Module-V(6L)

Organizing-Nature and Purpose of Organizing, Formal and Informal Organizations, Bases of Departmentation, Span of Management, Determinants of Span of Management, Line and Staff Relationship, Line-Staff Conflict, Bases of Delegation, Kinds of Delegation and Decentralization, Methods of Decentralization.

Module-VI (5L)

Staffing: - Nature & Scope of Staffing, Manpower Planning, Selection & Training, Performance Appraisal.

Module-VII (5L)

Controlling- Concept and Process of Control, Control Techniques, Human Aspects of Control, Control as a Feedback System, Feed Forward Control, Preventive Control, Profit and Loss Control, Control Through Return on Investment, The Use of Computer for Controlling and Decision Making, The Challenges Created by IT as a Control Tool.

Text Books

1. Stephen P. Robbins, David A. Decenzo, Sanghmitra Bhattacharya, Madhushree Nanda, Fundamentals of Management, 7th Edition, Pearson Education, 2009
2. Robbins, Management, 9th edition Pearson Education, 2008.
- 3 Griffin, Management Principles and Applications, First Edition, Cengage Learning, India.
- 4 Harold Koontz, O'Donnell and Heinz Weihrich, Essentials of Management, Tata McGraw Hill, New Delhi, 2006.
- 5 Stoner, Management, PHI Learning, 2008

Subject Name: COMPUTER NETWORKING

Code: CS613

Contact- 3L+1T

Credit -2

Module I [12L]

Overview of Data Communication and Networking: Introduction; Layered Network Architecture; Mode of communication, topology, Data and Signal; Categories of network (LAN, MAN, WAN); Internet: brief history, Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

Physical Layer: Transmission Media: Guided, Unguided; switching: time division & space division switch, TDM bus, Banyan switch; Interfaces-DTE-DCE, MODEM; The telephone network system.

Data link Layer: Error Control: Types of errors, framing(character and bit stuffing), error detection & correction

Flow control: Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC;

Medium Access sub layer: Point to Point Protocol, LCP, NCP, Token Ring; Reservation, Polling, Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA, Traditional Ethernet, fast Ethernet.

Module II[10L]

Network layer: Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway;

Addressing: IP addressing (IPv4, IPv6), masking, Classful and Classless Addressing, Subnetting, NAT, ; Routing : techniques, Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast. static vs. dynamic routing , Unicast Routing Protocols: RIP, OSPF, BGP; Other Protocols: ARP, IP, ICMP, IPv6;.

Mapping between IP and MAC address: ARP & RARP

Switching Communication Networks: Circuit switching; Packet switching; Routing in packet switched networks; X.25; Frame Relay; ATM, SONET.

Module III[8L]

Transport layer: Process to Process delivery; UDP; TCP, Features, Segment, Three-Way Handshaking, socket, Flow Control, Error Control, Congestion Control: Open Loop, Closed Loop, choke packets; Quality of service: techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm.

Module IV[10L]

Application Layer Introduction to DNS, SMTP, SNMP, FTP, HTTP & WWW;

Security: Cryptography (Public, Private Key based), Digital Signature, Firewalls, IDS, Malware.

Data Communication Technologies: ISDN services & ATM, DSL technology, Cable Modem, Wireless LAN: IEEE 802.11, Multimedia Communication.

Text Books:

1. B. A. Forouzan – “Data Communications and Networking (4th Ed.)” – TMH , 2007
2. A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI, 2002
3. W. Stallings – “Data and Computer Communications (5th Ed.)” –Pearson Education / PHI, 1997
4. Zheng & Akhtar, Network for Computer Scientists & Engineers, OUP, 2001
5. Black, Data & Computer Communication, PHI , 2007
6. Miller, Data Communication & Network, McGraw-Hill/Irwin, 2006
7. Miller, Digital & Data Communication, Jaico Publishers , 1994
8. Shay, Understanding Data Communication & Network, Vikas Publishers, 2004

Reference Books:

1. Kurose and Ross – “ Computer Networking -A top down approach featuring the internet” – Pearson Education, 2005
2. Leon, Garica, Widjaja – “Communication Networks” – TMH, 2004
3. Walrand – “Communication Networks” – TMH, 2009
4. Comer – “Internetworking with TCP/IP, vol. 1, 2, 3(4th Ed.)” – Pearson Education/PHI, 2006

Subject name: SOFTWARE ENGINEERING

Code: CS 614

Contacts: 3L+1T

Credit- 3

Module I (6L)

Software Engineering –Definitions, Objectives, Software Process models - Waterfall, Spiral, Prototype model, RAD, Evolutionary, Incremental models, Comparative analysis of models, Software Requirements Specification

Module II (4L)

Software Project Planning, Monitoring and Control, Scheduling, Feasibility Analysis, Cost Estimation, Cost- Benefit Analysis, COCOMO model, Delphi and Putman model, Risk management.

Module III (4L)

Structured Analysis, Context diagram, Physical and Logical DFDs, Data Modeling, ER diagrams

Module IV (5L)

Design Aspects: Top-Down, Bottom-Up design, Decision tree, decision table and structured English, Structure chart, Transform analysis, Functional vs. Object-Oriented design approach.

Module V (5L)

Unified Modeling Language

Class diagram, interaction diagram, collaboration diagram, sequence diagram, state chart diagram, activity diagram, implementation diagram, Concept of UML-2

Module VI (6L)

Coding & Documentation – Structured Programming, Modular Programming, Module Relationship- Coupling, Cohesion, OO Programming, Information Hiding, Reuse, System Documentation. Testing – Levels of Testing, Integration Testing, System Testing.(5L)

Module VII (6L)

Software Quality- Quality Assurance, Verification, Validation, Reliability and fault- tolerance, Software measurement and Metrics ,Software Maintenance, Software Configuration Management, Software Architecture.

Module-VIII (4L) - CASE tools, Case study on software development process.

Reference Books:

1. Pressman, Software Engineering : A practitioner’s approach– (TMH)
2. Pankaj Jalote, Software Engineering- (Wiley-India)
3. Rajib Mall, Software Engineering- (PHI)
4. Agarwal and Agarwal, Software Engineering – (PHI)
5. Sommerville, Software Engineering – Pearson
6. Martin L. Shooman, Software Engineering – TMH

Subject name: DESIGN & ANALYSIS OF ALGORITHM

Code: CS615

Contact: 3L+1T

Credit: 3

Module-I [6L]

Models of computation [2L]: RAM model, Deterministic and Non-deterministic problems, Tractable and Intractable problems, Solvability, Time and Space Complexity- best, worst and average cases.

Algorithm design frameworks [4L]: Brute force, Iterative and Recursive techniques; Divide/Decrease and Conquer, Backtracking, Greedy, Branch and Bound, Randomized algorithms; principle of optimality, Decision and Optimization problems-; Comparison: D&C, Greedy and DP. Proving correctness (basic idea).

Module-II [6L]

Complexity analysis: Asymptotic notations- Big O, Big-Theta and Big-Omega; examples. Recurrence relations: formation and solution; examples. Developing recurrences and complexity analysis for Merge sort, Quick sort and Binary search. Priority queues- Max/ Min Heap and Heap sort and its complexity. Linear time sort. Complexity analysis- Linear search, Hashing.

Module-III [7L]

Dynamic Programming [4L]: Optimal substructure and overlapping subproblems; Matrix-chain multiplication.

Backtracking [1L]: 8-queens problem., **Greedy Method [2L]:** Knapsack problem, Job sequencing with deadlines.

Module-IV [7L]

Graph Algorithms [4L]: BFS and DFS- algorithm and comparison; All pair shortest paths, Single source shortest path; Prim's and Kruskal's algorithms for finding minimum spanning tree, Hamiltonian Cycle.

String matching problem [3L]: Naive algorithm, Knuth-Morris-Pratt (KMP) algorithm.

Module-V [8L]

Amortized Analysis [2L]: Basic concept; illustration of aggregate, accounting and potential methods.

Network Flow [3L]: Ford Fulkerson algorithm, Max-Flow Min-Cut theorem (statement and

illustration only). **Matrix Manipulation Algorithms [3L]:** LUP decomposition; Inversion of Matrix and Boolean matrix multiplication.

Module-VI[6L]

Approximation Algorithms [2L]: Concept; Vertex cover problem.

Notion of NP Class [4L]: P, NP, NP-hard, NP-complete; reduction (concept only); Cook's theorem (statement only); Travelling salesman problem and its solution techniques, Satisfiability problem.

Text Books:

1. T.H.Cormen, C.E. Leiserson, R.L.Rivest and C. Stein ,“Introduction to Algorithms”, PHI.
2. Ellis Horowitz, Sartaz R. Sahani, “Fundamentals of Computer Algorithms”. Computer Science Press.
3. A. Aho, J. Hopcroft and J. Ullman, “The Design and Analysis of algorithms”, Pearson Education.

Reference:

1. D.E. Knuth: The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3, Addison-Wesley.
2. G.Brassard, P.Bratley, Fundamentals of Algorithmics -, PHI.
3. S.Baase, Allen Ven Gelder“Computer Algorithms-Introduction to Design & Analysis"- 3rd Edition , Pearson Education

Subject Name: COMPILER DESIGN (CS616)

Contracts: 3L+1T

Credits- 3

Module I [8L]

Introduction to Compiling [3L]

Compilers, Analysis-synthesis model, The phases of the compiler, Cousins of the compiler.

Lexical Analysis [5L]

The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of tokens, lexical analyzer generator (Lex).

Module II [12L]

Syntax Analysis [8L]

The role of a parser, Top down Parsing, Predictive parsing (LL), Bottom up parsing, Handles, Viable prefixes, Operator precedence parsing, LR parsers (SLR, LALR, CLR), Parser generators (YACC). Error Recovery strategies for different parsing techniques.

Syntax directed translation [4L]

Syntax directed definitions, Construction of syntax trees, Bottom-up evaluation of S attributed definitions, L attributed definitions.

Module III [8L]

Type checking [3L]

Type systems, Specification of a simple type checker.

Run time environments [5L]

Source language issues (Activation trees, Control stack, scope of declaration, Binding of names), Storage organization (Subdivision of run-time memory, Activation records), Storage allocation strategies, Parameter passing (call by value, call by reference, copy restore, call by name), Symbol tables.

Module IV [12L]

Intermediate code generation [4L]

Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).

Code optimization [5L]

Introduction, Basic blocks & flow graphs, Transformation of basic blocks, DAG representation of basic blocks, The principle sources of optimization, Loops in flow graph, Peephole optimization.

Code generations [3L]

Issues in the design of code generator, Register allocation & assignment.

Text Book:

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman.- Compilers Principles, Techniques, and Tools, 2nd Edition, Pearson Education, New Delhi, 2006

Reference Books:

1. A.I.Holub -Compiler Design in C, Prentice Hall of India, New Delhi, 1995
2. J.P. Tremblay - The Theory and Practical of Compiler Writing, McGraw Hill, Singapore, 1993.
3. K.C. Loudon- Compiler Construction: Principles and Practice, Thomson Learning, New Delhi, 2005.
4. Chattopadhyay , S- Compiler Design (PHI)

Subject name: COMPUTER NETWORK LAB

Code: CS693

Contact -3P

Credit-2

1. NIC Installation & Configuration (Windows/Linux) [3P]
2. Understanding IP address, subnet etc [3P]
3. Networking cables (CAT5, UTP) , Connectors (RJ45, T-connector) [3P]
4. Physical verification of existing LAN [3P]
5. TCP/UDP Socket Programming [3P]
 - i) UDP time client server program [3P]
 - ii) UDP echo client server program [3P]
 - iii) TCP time client server program [3P]
 - iv) TCP echo client server program [3P]
 - v) TCP chat client server program [3P]
- Vi) Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check) [3P]
6. Server Setup/Configuration FTP, TelNet, DNS. [3P]

Subject Name: SOFTWARE ENGINEERING LAB

Code: CS694

Contacts: 3P

Credits- 2

Assignments to be given from the following

1. Preparation of requirement document for standard application problems in standard format.(e.g Library Management System, Railway Reservation system, Hospital management System, University Admission System) [6P]
2. Project Schedule Preparation. [3P]
3. Use Case diagram, Class diagram, Sequence diagram and prepare Software Design Document using tools like Rational Rose. (For standard application problems) [9 P]
4. Estimation of project size using Function Point(FP) for calculation. [6P]
5. Design Test Script/Test Plan(both Black box and White Box approach) [9P]
6. Compute Process and Product Metrics (e.g Defect Density, Defect Age, Productivity, Cost etc) [6 P]

Subject Name: JAVA PROGRAMMING LAB

Code: CS695

Contact – 3P

Credits-2

1. Program implementation of java classes with method / constructors overloading, this keyword, static variables and methods, String Handling functions like – length (), equals (), charAt(), command line arguments. [3P]
2. Program implementation of non-static inner classes, resolving of name conflicts and the scopes for the different instance variables / methods in the outer as well as inner classes. [3P]
3. Program implementation on abstract classes, inheriting multiple interfaces, combine inheritances of abstract classes and multiple interfaces, extending multiple interfaces, resolving the name conflicts of different instance variables / methods within the abstract classes and interfaces. [3P]
4. Program implementation on different nesting combinations of the abstract classes and interfaces, such as one abstract class within another abstract class, one interface within another interface, abstract class within interfaces, interfaces within abstract classes. [3P]
5. Programming on combining the implementation of different abstract classes & interfaces within a single implemented classes and also observing the accessing capabilities of different sub class properties using superclass & super interfaces reference variables. [3P]
6. Program implementation on try/catch, finally, throw, throws clause, design of user defined exception classes and handling its throwing of objects. [3P]
7. Creation of multiple threads, use of thread priority, thread synchronization. [3P]
8. Program implementation on inter thread communication and deadlock scenario for two threads. [3P]
9. Program implementation on applet programming, handling keyboard inputs in applets, use of repaint () method for handling repetitive output printing in applet windows, Program writing on parameter passing using applets. [3P]
10. Programme writing with getDocumentBase() and getCodeBase() methods, Graphics Programming using applets – line, rectangle, square, circle, ellipse, pentagon drawing with blank and fill colour options. [3P]

Subject Name: SEMINAR

Code: CS696

Contact – 3P

Credit-2

Seminar on current R & D topics of Computer Science

Subject Name: TECHNICAL COMMUNICATION AND SOFT SKILLS

Code: MC604

Contact – 3P

Credit-2

Group Discussion on current affairs and technical report writing on specified domain assigned in the lab classes.

B.Tech(CSE) course structure under Autonomy**SEMESTER-VII**

SL. NO.	PAPER CODE	PAPER NAME	L	T	P	CONTACT HRS./WEEK	CREDIT
THEORY							
01.	CS717	INTERNET & WEB PROGRAMMING	3	1	0	4	3
02.	CS718	DISTRIBUTED COMPUTING SYSTEMS	3	1	0	4	3
03.	PE(CS)702	A. INFPRMATION & CODING THEORY B. CLOUD COMPUTING C. DATA WAREHOUSING AND DATA MINING E. BIO-MEDICAL ENGINEERING F. COMPUTATIONAL GEOMETRY G. SENSOR NETWORK	3	1	0	4	3
03.	OE(CS)701	A. DIGITAL SIGNAL PROCESSING B. EMBEDDED SYSTEMS C. E-COMMERCE & ERP	3	1	0	4	3
PRACTICAL							
05.	CS797	WEB PROGRAMMING LAB	0	0	3	3	2
06.	OE(CS)791	A. DIGITAL SIGNAL PROCESSING LAB B. EMBEDDED SYSTEMS LAB C. ERP LAB	0	0	3	3	2
07.	HS714	GROUP DISCUSSION	0	0	2	2	2
08.	CS720	INDUSTRIAL TRAINING (4 WEEKS AFTER 6 TH SEM)	0	0	0	0	2
09.	CS721	PROJECT PART - I	0	0	6	6	3
		TOTAL	12	1	14	27	23

Subject name: INTERNET & WEB PROGRAMMING

Code: CS717

Contact Hrs: 3L+1T

Credit: 3

WEB AND HTTP[6L]

Web applications & their types, Web Architectures, Enterprise architecture styles: Single 2-tier, 3-tier, n-tier, comparison of J2EE and .NET framework, concepts of HTML, URL, HTTP, Message format of HTTP-Request and response message, Persistent & Non Persistent connections in HTTP, Web Caching, HTTP Proxies.

CLIENT SIDE PROGRAMMING[10L]

HTML Basics[6L] –HTML elements, attributes and tags, comments, title, paragraphs, line breaks, changing font size, style, making text bold, underlined , italicized, Table with Row and Column Header, CSS & its advantages, different style informations, cascading rules.

Java Script [4L]- statements, comments, placing functions, variables, literals- String, Number, Boolean, looping- for, while, do-while, conditional statements, arrays, objects.

SERVER SIDE PROGRAMMING [12L]

SERVLET[6L]- Introduction, concepts of CGI, server side java, advantages over applets, servlet architecture, life cycle of servlet, Generic Servlet and HTTP servlet, parameter passing to servlets, retrieving parameters.

JAVA SERVER PAGES(JSP)-[6L]- Introduction, JSP & HTTP, JSP & SERVLET, JSP components- directives, declarations, expressions, scriptlets, variables and methods, scope of JSP objects, concepts of beans-useBean, setProperty, getProperty.

JAVA DATABASE CONNECTIVITY (JDBC)-[4L]

Introduction to data streams, JDBC architecture, JDBC Driver types- Type1, Type2, Type3 and Type4, making connections with the database for accessing the records.

XTENSIBLE MARK UP LANGUAGE -XML [4L]

Need for XML, HTML and XML, XML syntax and tags, elements and attributes, comments, Role of XML DTD and Schema, need for XML parser.

BOOKS

1. Web Design Technology (Theory And Technique On The Cutting Edge)-D.P. Nagpal, S.Chand Publication
2. Learn Object Oriented Programming Using Java: An Uml Based- Dr. N.B. Venkateswarlu & Dr. E.V. Prasad- S.Chand Publication
3. Web Technologies-Uttam K. Roy, Oxford University Press, Higher Education
4. Web Technologies: Tcp/Ip To Internet Application Architectures-Achyut S. Godbole, Achyut S Godbole Atul Kahate-Tata Macgraw-Hill Publication
5. Web Technology & Design- C.Xavier, New Age International

Subject Name:- DISTRIBUTED COMPUTING SYSTEMS

Code: CS718

Contact- 3L+1T

Credit-3

INTRODUCTION TO DISTRIBUTED SYSTEMS [6L]

Distributed systems- advantages and disadvantages, network operating system & different types of addressing, Differences between distributed operating system and network operating system, characteristics of distributed communication algorithms- happened before Relationship & time stamping algorithm, Lamport's total ordering of events.

INTRODUCTION TO DISTRIBUTED DATA BASE[4L]

Distributed DBMS features & promises, concepts of replication, Transparency management of distributed and replicated data, layers of transparency, reliability through distributed transactions, criteria for improved performances, some complicating factors of DDBs.

STRUCTURAL ASPECTS OF DISTRIBUTED DATA BASE SYSTEMS [8L]

DDB architecture- ANSI/SPARC architecture, client-server reference architecture, peer-to-peer distributed systems, components of Distributed DBMS, MDBS architecture with & without GCS, components of an MDBS, Global directory rules.

DISTRIBUTED DDB DESIGN & QUERY PROCESSING[10L]

Framework for DDB design[5L] - top down & bottom up approach, distribution design issues- reason for fragmentation, correctness rules of fragmentation, allocation issues, Different types of fragmentation -Horizontal, Vertical & Mixed or Hybrid fragmentation. **DDB query processing [5L]**- objectives of query processing, layers of query processing, query decomposition- normalization, analysis, elimination of redundancy, rewriting, localization of distributed data-reducing horizontal and vertical fragmentation, query optimization process, feature comparisons on distributed query optimization algorithms.

DDB TRANSACTION PROCESSING [8L]

Concepts of serializability and global schedule, Locking protocols-centralized 2PL, primary copy 2PL, Distributed 2PL, Timestamp based concurrency control algorithms, multi version TO algorithm, optimistic concurrency control algorithms, concepts of deadlock detection-centralized, hierarchical, distributed reliability protocols-centralized and distributed 2PC, Termination and recovery protocols for 2PC-coordinator and participant perspective.

Books-

1. Distributed Operating Systems, P.K. Sinha, PHI Publication.
2. Distributed databases principles & systems, Stefano Ceri & Giuseppe Pelagatti, McGraw-Hill Publication.
3. Principles of Distributed database systems, M.Tamer Ozsü & Patrick Valduriez, Pearson Education.

Subject Name: INFORMATION THEORY & CODING

Code:- [PE(CS)702A]

Contact – 3L+1T

Credit -3

INFORMATION THEORY [4L]

Uncertainty and information, self-information and mutual information, average mutual information and entropy, Information measures for continuous random variables.

SOURCE CODING [6L]

Concept of fixed and variable length codes, source coding theorem, prefix codes, Shannon-fanon coding, Huffman coding, Run Length Coding, Lempel-Ziv coding-LZ77 & LZ78.

CHANNEL CAPACITY & CODING [4L]

Channel capacity, Channel Coding, Channel coding theorem, Information Capacity Theorem (only equation), Shannon Limit.

LINEAR BLOCK CODES FOR ERROR CORRECTION[8L]

Channel communication, Objectives of good error control coding schemes, Hamming weight and Hamming Distance, Matrix description of linear block codes, equivalent codes, Parity Check Matrix, Nearest Neighbour decoding of linear block codes, perfect codes.

CYCLIC CODES [8L]

Definition of Cyclic Codes, polynomial representation, Division algorithm for polynomials, reducible and irreducible polynomials, Monic and prime polynomials, Method for generating cyclic codes, Matrix description of cyclic codes.

BCH CODES [6L]

Primitive elements, primitive polynomials, derivation of minimal polynomial from conjugates, generator polynomials in terms of minimal polynomials for BCH codes.

Books

1. Information theory, coding and cryptography - Ranjan Bose; TMH.
2. Information and Coding - N Abramson; McGraw Hill.
3. Introduction to Information Theory - M Mansurpur; McGraw Hill.
4. Information Theory - R B Ash; Prentice Hall.
5. Error Control Coding - Shu Lin and D J Costello Jr; Prentice Hall.

Subject Name:- BIO-MEDICAL ENGINEERING

Code:- [PE(CS)702E]

Contact- 3L+1T

Credit:3

Unit-I: Overview of Human Physiology[4L]

Human Cell: Cell Membrane Potential, Action Potential, Membrane Resting Potential (MRP), Depolarisation and Repolarisation of Cell. Human Blood: Composition of Blood, Function of Blood, Arterial Blood Pressure.

Unit-II: Heart and Circulatory System[6L]

Structure of Human Heart: SA Node & AV Node, Chambers, Valves, Vessels.

Heart Muscles and Properties of Heart Muscles.

Cardiac Cycle: Atrial Cycle and Ventricular Cycle.

Cardiac Output: Stroke Volume and Heart Rate.

Pulmonary (lung) Circulation and Systemic(body) Circulation.

Unit-III: Basic Signals and Analysis:[6L]

Sampling Theorem, Signal to Noise Ratio, Amplification of Signal, Low Pass Filter, High Pass Filter, Analog to Digital Conversion and Digital to Analog Conversion of Signal.

Unit-IV: Measurement Method and Devices:[12L]

Electrocardiogram: Recording of ECG Signal, Electrodes and their position in the Measurement of ECG Signal, Devices for the Measurement of ECG Signal.

Blood Cell Counting: Manual Counting and Automatic Blood Cell Counting Method and Devices.

X-Rays: Properties of X-Rays, Generation of X-Rays, Frequency and Wavelength of X-Rays.

Ultra Sound System: Features of Ultra Sound, Generation of Ultra Sound, Application of Ultra Sound.

Electromyography (EMG): Measurement of electrical activities in Muscles and basic Devices for the Measurement of EMG Signal.

Electroencephalograph (EEG): Measurement of electrical activities in Brain and basic Devices for the Measurement of EEG Signal.

MRI: Basic Operation of Magnetic Resonance Imaging (MRI) System.

Unit-V Transducer: [4L]

Different types of Transducers and their Properties. Basic Operation of Pace PMaker.

Unit-VI: Biotelemetry:[4L]

Transmission and Reception of Biomedical Signals using Mobile Phone, IP Camera and Computer Network for Remote Analysis, Diagnosis and Patient Care Monitoring.

Subject Name:- SENSOR NETWORKS

Code: PE(CS)702G

Contracts: 3L+1T

Credits- 3

Module I: Introduction and Overview [4L]

Overview of wireless networks, types, infrastructure-based and infrastructure-less, introduction to MANETs (Mobile Ad-hoc Networks), characteristics, reactive and proactive routing protocols with examples, introduction to sensor networks, commonalities and differences with MANETs, constraints and challenges, advantages, applications, enabling technologies for WSNs.

Module II: Architectures [9L]

Learning Objective: To study about the node and network architecture of sensor nodes and its execution environment. Single-node architecture - hardware components, design constraints, energy consumption of sensor nodes, operating systems and execution environments, examples of sensor nodes, sensor network scenarios, types of sources and sinks – single hop vs. multi hop networks, multiple sources and sinks – mobility, optimization goals and figures of merit, gateway concepts, design principles for WSNs, service interfaces for WSNs.

Module III: Communication Protocols [9L]

Learning Objective: To understand the concepts of communication, MAC, routing protocols and also study about the naming and addressing in WSN. Physical layer and transceiver design considerations, MAC protocols for wireless sensor networks, low duty cycle protocols and wakeup concepts - S-MAC, the mediation device protocol, wakeup radio concepts, address and name management, assignment of MAC addresses, routing protocols- classification, gossiping, flooding, energy-efficient routing, unicast protocols, multi-path routing, data-centric routing, data aggregation, SPIN, LEACH, Directed-Diffusion, geographic routing.

Module IV: Infrastructure Establishment [9L]

Learning Objective: To learn about topology control and clustering in networks with timing synchronization for localization services with sensor tasking and control. Topology control, flat network topologies, hierarchical networks by clustering, time synchronization, properties, protocols based on sender-receiver and receiver-receiver synchronization, LTS, TPSN, RBS, HRTS, localization and positioning, properties and approaches, single-hop localization, positioning in multi-hop environment, range based localization algorithms – location services, sensor tasking and control.

Module V: Sensor Network Platforms and Tools [6L]

Learning Objective: To study about sensor node hardware and software platforms and understand the simulation and programming techniques. Sensor node hardware, Berkeley nodes, programming challenges, node-level software platforms, node-level simulators, state-centric programming, Tiny OS, nesC components, NS2 simulator, TOSSIM.

Module VI : Application of Wireless sensor network [2]

Introduction, Background, Range of Applications, Home Control, Building Automation, Industrial Automation, Medical Applications, Sensor and Robots, Reconfigurable Sensor Networks, Highway Monitoring, Military Applications, Civil and Environmental Engineering Applications, Wildfire Instrumentation.

TEXT BOOKS

1. Holger Karl & Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks- Technology, Protocols, and Applications", John Wiley, 2007.
2. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.
3. Thomas Haenselmann, "Sensor Networks", available online for free, 2008.
4. Edgar Callaway, "Wireless Sensor Networks: Architectures and Protocols", Auerbach, 2003.

Subject Name:- DIGITAL SIGNAL PROCESSING

Code: OE(CS)701A

Contact: 3L+1T

Credits: 3

MODULE – I: 9L

Discrete-time signals: Concept of discrete-time signal, basic idea of sampling and reconstruction of signal, sampling theorem, sequences – periodic, energy, power, unit-sample, unit-step, unit-ramp, real & complex exponentials, arithmetic operations on sequences. 3L

LTI Systems: Definition, representation, impulse response, derivation for the output sequence, concept of convolution, graphical and analytical methods to compute convolution supported with examples and exercises, properties of convolution, interconnections of LTI systems with physical interpretations, stability and causality conditions, recursive and non-recursive systems. [6L]

MODULE –II: 15L

Z-Transform: Definition, mapping between s-plane and z-plane, unit circle, convergence and ROC, properties of Z-transform, Z-transform on sequences with examples and exercises, characteristic families of signals along with ROCs, convolution, correlation and multiplication using Z-transform, initial value theorem, inverse Z-transform by contour integration, power series & partial-fraction expansions with examples and exercises. [6L]

Discrete Fourier Transform: Concept and relations for DFT/IDFT, Twiddle factors and their properties, computational burden on direct DFT, DFT/IDFT as linear transformations, DFT/IDFT matrices, computation of DFT/IDFT by matrix method, multiplication of DFTs, circular convolution, computation of circular convolution by graphical, DFT/IDFT and matrix methods, linear filtering using DFT, aliasing error, filtering of long data sequences – Overlap-Save and Overlap-Add methods with examples and exercises. [5L] .

Fast Fourier Transform: Radix-2 algorithm, decimation-in-time, decimation-in-frequency algorithms, signal flow graphs, Butterflies, computations in one place, bit reversal, examples for DIT & DIF FFT Butterfly computations and exercises. [4L]

MODULE – III: 8L

Filter Design: Basic concepts of IIR and FIR filters, difference equations, design of Butterworth IIR analog filter using impulse invariant and bilinear transforms, design of linear phase FIR filters, rectangular, Hamming and Blackman windows. [5L]

MODULE – IV: 4L

Digital Signal Processor: Elementary idea about the architecture and important instruction sets of TMS320C 5416/6713 processor, writing of small programs in Assembly Language.

TEXT BOOKS:

1. Digital Signal Processing – Principles, Algorithms and Applications, J.G.Proakis & D.G.Manolakis, Pearson Ed.
2. Digital Signal processing – A Computer Based Approach, S.K.Mitra, TMH Publishing Co.
3. Digital Signal Processing Signals, Systems and Filters, A. Antoniou, TMH Publishing Co.
4. VLSI Digital Signal Processing Systems Design and Implementation, Wiley International Publication. 7. Digital Signal Processing with Field Programmable Gate Arrays, U.Meyer-Baese, Springer. REFERENCE BOOKS:
5. Digital Signal Processing, P. Rameshbabu, Scitech Publications (India).
6. Digital Signal Processing, S.Salivahanan, A.Vallabraj & C. Gnanapriya, TMH Publishing Co. Syllabus for B.Tech(Computer Science & Engineering) Up to Fourth Year Revised Syllabus of B.Tech CSE (for the students who were admitted in Academic Session 2010-2011) 32
7. Digital Signal Processing; A Hands on Approach, C. Schuler & M.Chugani, TMH Publishing Co. 6. Digital Signal Processing, A. Nagoor Kani, TMH Education
8. Digital Signal Processing S. Poornachandra & B. Sasikala, MH Education
9. Digital Signal Processing; Spectral Computation and Filter Design Chi-Tsong Chen, Oxford University Press
10. Texas Instruments DSP Processor user manuals and application notes.
11. Digital Signal Processing – A practical Approach (second Edition) – Emmanuel C. Ifeacheer & Barrie W. Jervis, Pearson Education
12. Xilinx FPGA user manuals and application notes.

Subject Name:- EMBEDDED SYSTEMS

Code: OE(CS)701B

Contact : - 3L+1T

Credit:3

Unit-I: Introduction :[3L]

General Purpose Processor(Microprocessor) and Embedded Processor(Microcontroller). Introduction to Embedded System, features of Embedded System, application of Embedded System.

Unit-II: 8051 Microcontroller:[8L]

Overview of 8051 family and various versions of 8051 Microcontroller. Block Diagram of 8051 Microcontroller, Memory Organisation: bit addressable register, byte addressable register, general purpose register and special function register(SFR). Timers and Ports.

Unit-III: 8051 Assembly Language Programming:[7L]

Assembly Language Programming for Arithmetic and Logic operations, Assembly Language Programming using JUMP, LOOP, CALL instructions and Input-Output Port Programming of 8051 Microcontroller. (7L)

Unit-IV: Interfacing with 8051 Microcontroller:[5L]

LCD Interfacing, Stepper Motor Interfacing, Temperature Controller Interfacing, LDR Interfacing and ADC Interfacing. (5L)

Unit-V: AVR Microcontroller:[8L]

Introduction to AVR Microcontroller. Description of AVR ATmega8 Microcontroller. Assembly Language Programming for Arithmetic and Logic operations of AVR ATmega8 Microcontroller. Assembly Language Programming for Input-Output Port Programming of AVR ATmega8 Microcontroller. Interfacing of sensors with AVR ATmega8 Microcontroller.

Unit –VI: Arduino Platform:[5L]

Overview and features of Arduino UNO R3. Mapping of AVR pins and Arduino UNO R3 pins. Programming of Arduino UNO R3. Interfacing of sensors with Arduino UNO R3.

Subject Name:- E-COMMERCE & ERP

Code: OE(CS)701C

Contracts: 3L+1T

Credits- 3

Module 1: Enterprise [6L]

An Overview: Business Functions and Business Processes, importance of Information: Characteristics of information; Types of information,

Information System: Components of an information system; Different types of information systems; Management information system, Enterprise Resource Planning: Introduction to ERP; Business modeling; integrated data model

Defining ERP, Origin and Need for an ERP System, Benefits of an ERP System, Reasons for the Growth of ERP Market, Reasons for the Failure of ERP Implementation: Roadmap for successful ERP implementation

Module 2 : Technologies and ERPs [8L]

Business Process Re-engineering, Management Information systems, Decision Support Systems, Executive Information Systems- Advantages of EIS; Disadvantages of EIS, Data Warehousing, Data Mining, On-Line Analytical Processing, Product Life Cycle Management, Supply Chain Management, ERP Security

Life Cycle of ERPs: ERP Tools and Software, ERP Selection Methods and Criteria, ERP Selection Process, ERP Vendor Selection, ERP Implementation Lifecycle, Pros and cons of ERP implementation, Factors for the Success of an ERP Implementation

Module 3 : ERP Model Structure [12L]

Finance, Sales and Distribution, Manufacturing and Production Planning- Material and Capacity Planning; Shop Floor Control; Quality Management; JIT/Repetitive Manufacturing; Cost Management ; Engineering Data Management; Engineering Change Control ; Configuration Management ; Serialization / Lot Control ;Tooling, Human Resource, Plant Maintenance- Preventive Maintenance Control; Equipment Tracking; Component Tracking; Plant Maintenance Calibration Tracking; Plant Maintenance Warranty Claims Tracking, Quality Management - Functions of Quality Management; CAQ and CIQ; Materials Management- Pre-purchasing; Purchasing; Vendor Evaluation; Inventory Management and Invoice Verification and Material Inspection

Project Management and Monitoring

ERP Project Organization, Formation of Steering Committee and different User Groups. Top Management Commitment and Steering Committee meetings. Change Management, Risks and Challenges in ERP implementation.

Modules 4 : Security of ERP systems and Controls Solutions [10L]

Problems with Non-ERP Systems, ERP Architecture, Web Services Security, Secure Content and Knowledge Sharing, Policies, ERP system maintenance, Software upgrade (patch, release, version), Security and Access control of ERP systems, IT controls, Automated application controls, Manual application controls, Hybrid or computer-dependent application controls

Enterprise Application Integration

Basic understanding of the concept, Types of EAI (levels) – User Interface, Method (logic), Application Interface, Data. EAI architecture – Typical framework (Business Processes, Components & Services, Messaging service, and Transport service, Mention of some of the leading EAI vendors – IBM, Microsoft, Oracle, SAP, TIBCO.

Radio Frequency Identification (RFID) and ERP: awareness of RFID technology, Benefits of RFID integrated with ERPs.

M-Commerce: basic concept and applications, difference with E-Commerce, benefits of integration with ERPs

ERP Future: New Trends in ERP, ERP to ERP II-Implementation of Organization-Wide ERP, Development of New Markets and Channels, Latest ERP Implementation Methodologies, ERP and E-business, Market Snapshot, The SOA Factor, Growing mobile applications, Economical and Easy models of ERP deployment etc.

Subject Name:- WEB PROGRAMMING LAB**Code:- CS797****Contact: 3P****Credit:2**

1. **Assignments on HTML[6P]**- elements, attributes, title, paragraphs, breaks, changing font size, style, making text bold, underlined, italicized, Table with Row and Column Header, CSS- different style information, cascading rules.
2. **Java Script [6P]**- statements, comments, placing functions, variables, literals- String, Number, Boolean, looping- for, while, do-while, conditional statements, arrays.
3. **Server Side Programming –**
 - A. **HTTP servlet [3P]**- parameter passing & retrieving.
 - B. **JSP[6P]** - JSP components- directives, declarations, expressions, scriptlets, variables and methods.
4. **JDBC[3P]**- Accessing of data residing in the database using Java Programme.
5. **XML[3P]**- Writing XML programme with elements and attributes.

Subject Name:- DIGITAL SIGNAL PROCESSING LAB**Code: OE(CS)791A****Contact: 3P****Credits: 2**

Simulation Laboratory using standard Simulator:

1. Sampled sinusoidal signal, various sequences and different arithmetic operations.
2. Convolution of two sequences (using graphical methods and using commands)- verification of the properties of convolution.
3. Z-transform of various sequences – verification of the properties of Z-transform.
4. DFTs / IDFTs using matrix multiplication and also using commands.
5. Circular convolution of two sequences using graphical methods and using commands, differentiation between linear and circular convolutions.
6. Butterworth filter design with different set of parameters.
7. FIR filter design using rectangular, Hamming and Blackman windows.
8. Twiddle factors – verification of the properties.

Hardware Laboratory using either 5416 or 6713 Processor:

9. Writing & execution of small programs related to arithmetic operations using Assembly Language of TMS320C 5416/6713 Processor.

Subject Name:- EMBEDDED SYSTEMS LAB**Code:- OE(CS)791B****Contact : 3P****Credit:2****Lab Experiments for Embedded System:**

- 1) _Assembly Language Programming (8051) for Arithmetic and Logic Operation.
- 2) Input-Output Port Programming of 8051 Microcontroller.
- 3) Interfacing of A/D converter with 8051 Microcontroller
- 4) Basic Assembly Language Programming (AVR ATmega8) for Arithmetic and Logic Operation
- 5) Input-Output Port Programming for AVR ATmega8 Microcontroller.
- 6) Interfacing of different Sensors with AVR ATmega8 Microcontroller.
- 7) Programming of ARDUINO UNO R3
- 8) Interfacing of various Sensors with ARDUINO UNO R3

B.Tech(CSE), course structure under autonomy
SEMESTER-VIII

SL. NO	PAPER CODE	PAPER NAME	L	T	P	CONTACT HRS./WEEK	CREDIT
THEORY							
01.	CS819	CRYPTOGRAPHY & INFORMATION SECURITY	3	1	0	4	3
02.	PE(CS)803	A. MOBILE COMPUTING B. ADVANCED WEB TECHNOLOGY C. PATTERN RECOGNITION D. NATURAL LANGUAGE PROCESSING E. REMOTE SENSING	3	1	0	4	3
03.	OE(CS)802	A. PROJECT MANAGEMENT B. ROBOTICS C. CYBER CRIME & SECURITY POLICY D. OPERATION RESEARCH E. CONTROL SYSTEM F. REAL TIME OPERATING SYATEMS	3	1	0	4	3
PRACTICAL							
04.	CS822	PROJECT PART –II	0	0	12	12	6
05.	CS823	COMPREHENSIVE VIVA VOCE	0	0	0	0	2
		TOTAL	09	3	12	24	17

B.Tech(CSE), 8TH sem Syllabus in Details

Subject Name:- CRYPTOGRAPHY & INFORMATION SECURITY

Code:- CS 819

Contracts: 3L+1T

Credits- 3

Module1: Attacks on Computers & Computer Security (5L)

Introduction, Need for Security, Security approaches, Principles of Security, Types of attack.

Module2: Cryptography: Concepts & Techniques (7L)

Introduction, Plaintext & Cipher text, Substitution Techniques, Transposition Techniques, Symmetric & Asymmetric key Cryptography, Key Range & Key Size

Module3: Symmetric Key Algorithm (6L)

Introduction, Algorithm types & Modes, DES(Data Encryption Standard) algorithm, Types of DES, IDEA(International Data Encryption Algorithm) algorithm,

Module4: Asymmetric key Cryptography Algorithm (5L)

RSA algorithm, Symmetric & Asymmetric key Cryptography together, Concepts of Digital Signature and Message Digest.

Module5: User Authentication Mechanisms(6L)

Authentication Basics, Password based Authentication, Dynamic Authentication concepts, Authentication Token, Certificate based Authentication, Biometric Authentication.

Module6: Authentication with Watermarking (3L)

Concepts of steganography and watermarking, Domains of watermarking with their features, Evaluation of watermarking aspects.

Module7: Security Implementations(4L)

Mail Security, PGP, S/MIME, concepts of firewalls, types of firewalls.

Text Books:

1. "Cryptography and Network Security", William Stallings, 2nd Edition, Pearson Education Asia
2. "Network Security private communication in a public world", C. Kaufman, R. Perlman and M. Speciner, Pearson
3. Cryptography & Network Security: Atul Kahate, TMH.

References :

1. "Network Security Essentials: Applications and Standards" by William Stallings, Pearson
2. "Designing Network Security", Merike Kaeo, 2nd Edition, Pearson Books
3. "Building Internet Firewalls", Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman, 2nd Edition, Oreilly
4. "Practical Unix & Internet Security", Simson Garfinkel, Gene Spafford, Alan Schwartz, 3rd Edition, Oreilly

Subject Name:- MOBILE COMPUTING

Code: [PE(CS)803A]

Contacts: 3L+1T

Credits- 3

Module 1 [7L]- Introduction to Mobile Computing (MC), Current Wireless Systems, Cordless Phones, Cellular concept, Satellite Communication, Wireless LANs, GSM Systems Overview, Architecture, Location tracking and call setup, GPRS Network Nodes, Radio interface, Protocols, Localization and calling, Handover, channel structure, location management, HLR-VLR, Overview of Paging Systems.

Module II [5L]- Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA. IEEE 802.11, TCP over wireless, data broadcasting, Mobile IP, protocol stack.

Module III [7L]- Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunnelling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

Module IV[5L] –

Mobile Transport Layer:

Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP. Transport Layer Security. Session Protocol.

Module V[7L]-

Data management Issues :

Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware, context-aware computing, transactional models, query processing, recovery, quality of service issues. Data Dissemination, Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

Module VI [5L]-Application Issues of Dynamic DNS File System, Synchronization Protocol, Wireless Application Protocol-WAP. Mobile Agents computing, Mobile networking security, Mobile Operating Systems: Blue tooth, Overview of Mobile Ad hoc Networks (MANETs)

TEXT BOOKS :

1. Jochen Schiller, "Mobile Communications", Addison-Wesley.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing".
3. John Wiley, 'Mobile Communication Design Fundamentals'.
4. "Wireless and Mobile Networks Architectures", Yi-Bing Lin & Imrich Chlamtac, John Wiley & Sons.
5. "Mobile and Personal Communication systems and services", Raj Pandya, Prentice Hall of India.
6. "Third Generation Mobile Telecommunication systems", by P.Stavronlakis, Springer Publishers.

Subject Name:- ADVANCED WEB TECHNOLOGY

Code:- [PE(CS)803B]

Contact: 3L+1T

Credits- 3

Enterprise Architectural concepts [6L]

Enterprise architecture styles: Single, 2-tier, 3-tier, n-tier with comparisons of different layers, MVC Architecture-explanation, need, Introduction to J2EE-component and service technologies, comparison of J2EE and .NET, J2EE container architecture- component contract and container services.

Server Side Programming

Java Servlet [8L]

Introduction, Advantages over Applet, different types of Servlet alternatives- like CGI, ASP, Servlet lifecycle, Servlet Architecture, Temporary v/s Permanent Servlet, Servlet container, Servlet environment and its role, Generic Servlet & the HTTP Servlet, Handling Request & Response by the servlet-passing and retrieving parameters, HTTP support for Request and Response-concepts of doGet() and doPost() methods, different types of Servlet session management techniques.

Java Server Pages [8L]

Introduction, JSP and HTTP, JSP engines, how JSP works, JSP & Servlet, Comparisons of JSP & ASP, JSP & CGI, JSP Life cycle, JSP architecture, JSP components– Directives, Expressions, Declarations- Declaring variables, methods, JSP Actions- include and forward actions, concepts of JSP tag extensions-writing of simple tags, sharing data between JSP pages- concepts of useBean, setProperty and getProperty actions.

Distributed Computing Technologies

Enterprise Java Beans (EJB) [4L]

Introduction, Benefits of EJB, EJB architecture, Comparison of EJB & Java Beans, Different types of beans in EJB – Session, Entity and Message Driven Bean.

Java RMI [3L]

Introduction, method invocation procedure, concepts of RMI Registry, RMI Architecture -roles of stubs and skeletons, comparison of Java RMI & CORBA.

JNDI [1L]

Introduction and applications, Comparison between LDAP and JNDI

JDO (Java Data Objects)[1L]

Introduction, Integration of EJB and JDO, JDO & RMI

JINI [1L]

Introduction, Applications

XML[4L]

XML Parsers- SAX & DOM parsers, introduction to XSLT, building of XSLT documents, use of X-Query, introduction to JAXP and JAXB.

Text :

1. "Professional JAVA Server Programming", Allamaraju and Buest ,SPD Publication
2. "Beginning J2EE 1.4" Ivor Horton, SPD Publication.
3. "Advanced Programming for JAVA 2 Platform" Austin and Pawlan, Pearson

Reference Books:

1. Internet & Java Programming by Krishnamoorthy & S. Prabhu(New Age Publication)

Subject name:- PATTERN RECOGNITION

Code: [PE(CS)803C]

Contact: 3L+1T

Credit: 3

Module – I

Introduction– Definitions, data sets for Pattern Recognition, Different Paradigms of Pattern Recognition, Representations of Patterns and Classes, Metric and non-metric proximity measures. **[8L]**

Module - II

Feature extraction, Different approaches to Feature Selection, Nearest Neighbour Classifier and variants, Efficient algorithms for nearest neighbor, classification. **[8L]**

Module - III

Different Approaches to Prototype Selection, Bayes Classifier, Decision Trees, Linear Discriminant Function. **[12L]**

Module - IV

Support Vector Machines, Clustering, Clustering Large datasets, Combination of Classifiers Applications – Document Recognition. **[12L]**

REFERENCES

1. Devi V.S.; Murty, M.N. (2011) Pattern Recognition: An Introduction, Universities Press, Hyderabad.
2. R. O. Duda, P. E. Hart and D. G. Stork, Pattern Classification, Wiley, 2000.

Subject Name:- NATURAL LANGUAGE PROCESSING

Code:- [PE(CS)803D]

Contacts: 3L+1T

Credit: 3

MODULE-I (8L)

Introduction – Models -and Algorithms - The Turing Test -Regular Expressions Basic Regular Expression Patterns -Finite State Automata -Regular Languages and FSAs – Morphology -Inflectional Morphology - Derivational Morphology -Finite-State Morphological Parsing - Combining an FST Lexicon and Rules -Porter Stemmer.

MODULE-II (8L)

N-grams Models of Syntax - Counting Words - Unsmoothed N-grams – Smoothing-Backoff - Deleted Interpolation – Entropy - English Word Classes - Tagsets for English -Part of Speech Tagging -Rule-Based Part of Speech Tagging - Stochastic Part of Speech Tagging - Transformation-Based Tagging -

MODULE-III (5L)

Context Free Grammars for English Syntax- Context-Free Rules and Trees - Sentence- Level Constructions –Agreement – Sub Categorization – Parsing – Top-down – Earley Parsing -Feature Structures - Probabilistic Context-Free Grammars

MODULE-IV (7L)

Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus- Representing Linguistically Relevant Concepts -Syntax-Driven Semantic Analysis -Semantic Attachments - Syntax-Driven Analyzer - Robust Analysis - Lexemes and their Senses - Internal Structure - Word Sense Disambiguation -Information Retrieval

MODULE-V (8L)

Discourse -Reference Resolution - Text Coherence -Discourse Structure - Dialog and Conversational Agents - Dialog Acts – Interpretation – Coherence –Conversational Agents - Language Generation – Architecture -Surface Realizations - Discourse Planning – Machine Translation -Transfer Metaphor – Interlingua – Statistical Approaches.

Textbook:

1. Daniel Jurafsky and James H Martin. Speech and Language Processing, 2e, Pearson Education, 2009

Reference Books:

1. James A.. Natural language Understanding 2e, Pearson Education, 1994
2. Bharati A., Sangal R., ChaitanyaV.. Natural language processing: a Paninian perspective, PHI, 2000
3. Siddiqui T., Tiwary U. S.. Natural language processing and Information retrieval, OUP,2008

Subject Name:- REMOTE SENSING

Code: [PE(CS)803E]

Contact: 3L+1T

Credit: 3

MODULE-I

INTRODUCTION (6L)

Introduction of Remote Sensing – Energy sources and Radiation principles, Energy equation, EMR and Spectrum, EMR interaction with Atmosphere scattering, Absorption, EMR interaction with earth surface features reflection, absorption, emission and transmission, Spectral response pattern , vegetation, soil, water bodies- Spectral reflectance

MODULE-II

AERIAL PHOTOGRAPHY AND SATELLITE REMOTE SENSING (10 L)

Data acquisition Process, Reflectance and Digital numbers, Reference data , Ground truth, Analog to Digital conversion, Aerial Photography – Photogrammetry and Visual Image Interpretation, Satellites in orbit and their sensors, Resolutions; Multispectral Remote Sensing system, Visible-Near Infra Red- Thermal Infra Red Radiation properties and applications, Microwave and LIDAR Remote Sensing – Principles and Applications, Hyper spectral Remote Sensing-Principles and Applications .

MODULE-III

IMAGE DISTORTION AND RECTIFICATION (7 L)

Introduction-Sensor model, Preprocessing and Post processing Geometric distortion, sources and causes for distortion, rectification, GCP, Re-sampling, Image registration, transformation, Radiometric distortion, sources and causes, Computation of radiance, Computation of reflectance, cosmetic operations, Noise removal, atmospheric correction.

MODULE-IV

IMAGE INTERPRETATION (5 L)

Digital images; Subsetting of Data; Geo-referencing of Digital data; Image enhancement techniques: Histogram equalization; Band ratioing; Image filtering; Principal Component Analysis (PCA).

MODULE-V

IMAGE CLASSIFICATION (8 L)

Classification techniques, Feature extraction, Training stage, Scatter plot, Minimum Distance to Mean Classifier, Parallelepiped Classifier, Gaussian Maximum Likelihood Classifier, Unsupervised Classification, Hybrid Classifier, Classification of Mixed Pixel-Fuzzy Classification, Classification Accuracy, Error matrix

REFERENCES

1. Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W. Chipman, “Remote sensing and image interpretation “, John Wiley & Sons.
2. Jensen J. , “Remote Sensing and Image Processing”, Pearson
3. Burroughs P. A, “Principles of Geographical Information System”, Oxford University Press.

Subject Name:- CYBER CRIME AND SECURITY POLICY

Code: OE(CS)802C

Contacts: 3L+1T

Credit: 3

Module – I

Introduction of Cybercrime, Category of Cybercrime crime, Forgery, Hacking, Software Piracy, Computer Network intrusion. **[3L]**

Module-II

Attacks: passive attack, Active attacks, cyberstalking. **[3L]**

Module – III

Cybercrime on Mobile & Wireless devices: Security challenges posted by mobile devices, cryptographic security for mobile devices, Attacks on mobile/cell phones, Theft, Virus, Hacking. Bluetooth; Different viruses on laptop. **[8L]**

Module -IV:

Tools and Methods used in Cybercrime: Proxy servers, password checking, Random checking, Trojan Horses and Backdoors; DOS & DDOS attacks; SQL injection: buffer over flow. **[8L]**

Module – V:

Phishing methods, Identity theft, Online identity method. **[6L]**

Module –VI

Security policy: Intrusion detection system(IDS), password protection law, Legal aspects, Indian laws, IT act, Public key certificate. **[8L]**

Text Books:

1. Cyber security , Nina Gobole & Sunit Belapune; Pub: Wiley India.
2. Information Security and Cyber Laws, Pankaj Agarwal

Subject Name: OPERATION RESEARCH

Code: OE(CS)802D

Contact: 3L+1T

Credit: 3

Module I

Linear Programming Problems (LPP):

Basic LPP and Applications; Various Components of LP Problem Formulation.

Solution of Linear Programming Problems:

Solution of LPP: Using Simultaneous Equations and Graphical Method; Definitions: Feasible Solution, Basic and non-basic Variables, Basic Feasible Solution, Degenerate and Non-degenerate Solution, Convex set and explanation with examples. **(5L)**

Solution of LPP by Simplex Method; Charnes' Big-M Method; Duality Theory. Transportation Problems and Assignment Problems. **(12L)**

Module II

Network Analysis: Shortest Path: Floyd Algorithm; Maximal Flow Problem (Ford-Fulkerson); PERT-CPM (Cost Analysis, Crashing, Resource Allocation excluded). **(6L)**

Inventory Control: Introduction to EOQ Models of Deterministic and Probabilistic; Safety Stock; Buffer Stock. **(3L)**

Module III

Game Theory: Introduction; 2-Person Zero-sum Game; Saddle Point; Mini-Max and Maxi-Min Theorems (statement only) and problems; Games without Saddle Point; Graphical Method; Principle of Dominance. **(5L)**

Module IV

Queuing Theory: Introduction; Basic Definitions and Notations; Axiomatic Derivation of the Arrival & Departure (Poisson Queue). Poisson Queue Models: (M/M/1): (∞ / FIFO) and (M/M/1: N / FIFO) and problems. **(5L)**

Text Books:

1. H. A. Taha, "Operations Research", Pearson
2. P. M. Karak – "Linear Programming and Theory of Games", ABS Publishing House
3. Ghosh and Chakraborty, "Linear Programming and Theory of Games", Central Book Agency
4. Ravindran, Philips and Solberg - "Operations Research", WILEY INDIA

References:

1. KantiSwaroop — "Operations Research", Sultan Chand & Sons
2. Rathindra P. Sen— "Operations Research: Algorithms and Applications", PHI
3. R. Panneerselvam - "Operations Research", PHI
4. A.M. Natarajan, P. Balasubramani and A. Tamilarasi - "Operations Research", Pearson
5. M. V. Durga Prasad – "Operations Research", CENGAGE Learning 6. J. K. Sharma - "Operations Research", Macmillan Publishing Company

Subject Name:-CONTROL SYSTEM

Code:- OE(CS)802E

Contacts: 3L+1T

Credits- 3

Module – I :

INTRODUCTION [4L]: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems , temperature control, liquid level control, voltage control of an Alternator.

TRANSFER FUNCTION REPRESENTATION-[4L]

Transfer Function of linear systems, Pole and Zeroes of a transfer function , Properties of Transfer function.

Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula. Control system components: Potentiometer, Synchros, Resolvers, Position encoders. DC and AC tachogenerators., Actuators.

Module – II:

TIME RESPONSE ANALYSIS-[4L] - Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants. Concept of undamped natural frequency, damping, overshoot, rise time and settling time.

STABILITY ANALYSIS IN S-DOMAIN -[5L]

The concept of stability – Routh's stability criterion – limitations of Routh's stability. Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to $G(s)H(s)$ on the root loci.

Module – III:

FREQUENCY RESPONSE ANALYSIS -[5L]- Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

STABILITY ANALYSIS IN FREQUENCY DOMAIN-[4L]

Polar Plots, Nyquist Plots Stability Analysis.

Module - IV :

CLASSICAL CONTROL DESIGN TECHNIQUES-[5L] - Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PI, PD and PID Controllers.

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS-[5L]: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability .

TEXT BOOKS:

1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John Wiley and son's.,
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
3. Control System Engineering, D. Roy Choudhury, PHI

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Engineering Theory & Practice, Bandyopadhyaya, PHI