1.1.2

List of Employability/ Entrepreneurship/ Skill Development Courses with Course Contents

Colour Codes		
Name of the Subjects	Yellow	
Employability Contents	Green	
Entrepreneurship Contents	Light Blue	
Skill Development Contents	Pink	

List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Information Technology Engineering*

Programme Name : *B.Tech.*

Academic Year : 2019-20

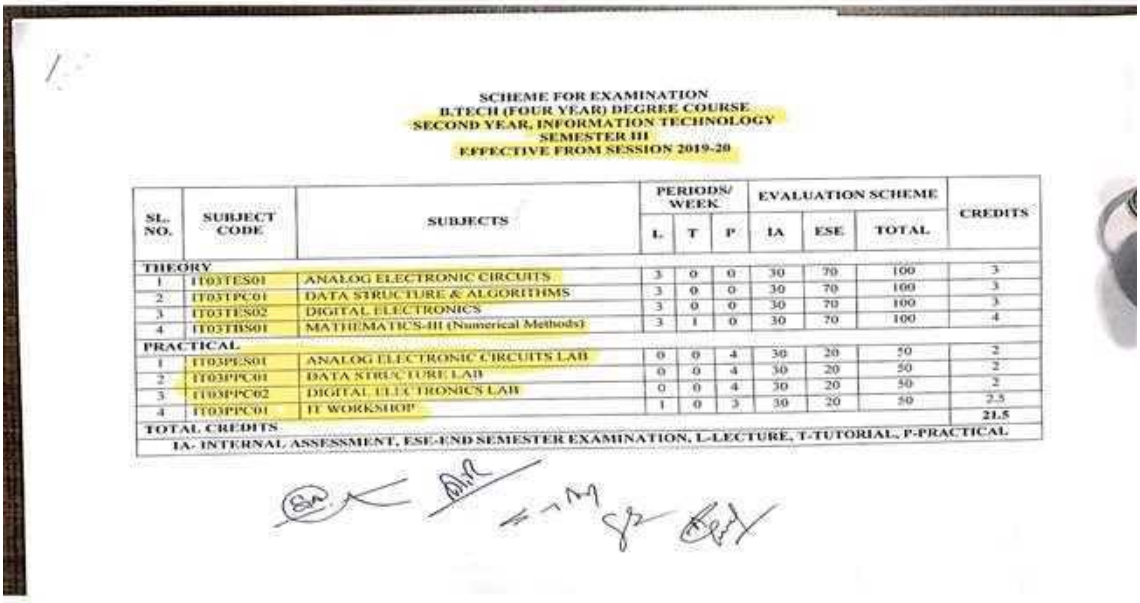
List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
1	IT03TES01	ANALOG ELECTRONIC CIRCUITS
2	IT03TPC01	DATA STRUCTURE & ALGORITHMS
3	IT03TES02	DIGITAL ELECTRONICS
4	IT03TBS01	MATHEMATICS-III
5	IT03PES01	ANALOG ELECTRONIC CIRCUITS LAB
6	IT03PPC01	DATA STRUCTURE LAB
7	IT03PPC02	DIGITAL ELECTRONICS LAB
8	IT03PPC01	IT WORKSHOP
9	IT04TPC01	DISCRETE MATHEMATICS
10	IT04TPC02	COMPUTER ORGANIZATION & ARCHITECTURE
11	IT04TPC03	OPERATING SYSTEMS
12	IT04TPC04	DESIGN & ANALYSIS OF ALGORITHMS
13	IT04PPC01	COMPUTER ORGANIZATION & ARCHITECTURE LAB
14	IT04PPC02	OPERATING SYSTEMS LAB
15	IT5TPC01	DATABASE MANAGEMENT SYSTEM
16	IT5TPC02	JAVA PROGRAMMING
17	IT5LPC01	DATABASE MANAGEMENT SYSTEM LAB
18	IT5LPC02	JAVA PROGRAMMING LAB
19	IT5LPC03	PROGRAMMING LAB
20	IT5TPE11	MICROPROCEESOR AND INTERFACES
21	IT5TPE15	DIGITAL & CYBER FORENSIC
22	IT5TPE21	THEORY OF COMPUTATION
23	IT5TPE22	MOBILE SOFTWARE DEVELOPMENT
24	IT5TPE23	MULTIMEDIA SYSTEM DESIGN
25	IT5TPE24	GRID AND CLOUD COMPUTING
26	IT5TOE12	SOFTWARE PROJECT MANAGEMENT

27	IT5TOE13	INTELLECTUAL PROPERTY RIGHTS
28	IT5TOE14	CYBER LAW
29	IT5TOE15	ANALYSIS AND DESIGN OF ALGORITHM
30	IT6TPC01	INTERACTIVE COMPUTER GRAPHICS
31	IT6TPC02	OPERATING SYSTEM
32	IT6LPC01	COMPUTER GRAPHICS LAB
33	IT6LPC02	OPERATION SYSTEM LAB
34	IT6LPC03	PROGRAMMING LAB
35	IT6TPE11	ADVANCE COMPUTER ORGANIZATION
36	IT6TPE12	SIMULATION AND MODELING
37	IT6TPE14	ADVANCE DATABASE
38	IT6TPE21	PARALLEL COMPUTING
39	IT6TPE22	DISTRIBUTED SYSTEM
40	IT6TPE25	MICROCONTROLLERS AND EMBEDDED SYSTEMS
41	IT6TOE12	NATURAL LANGUAGE PROCESSING
42	IT6TOE13	PATTERN RECOGNITION
43	IT6TOE14	WIRELESS AND MOBILE COMMUNICATION
44	IT6TOE15	MACHINE LEARNING
45	IT7TPC01	INTERNETWORKING AND NETWORK PROGRAMMING
46	IT7TPC02	WIRELESS SENSOR NETWORK
47	IT7LPC01	INTERNETWORKING AND NETWORK PROGRAMMING LAB
48	IT7LPC02	WIRELESS SENSOR NETWORK LAB
49	IT7LPC03	PROJECT
50	IT7LPC04	INTERNSHIP
51	IT7TPE11	COMPILER DESIGN
52	IT7TPE13	ADVANCE COMPUTER ARCHITECTURE
53	IT7TPE14	BIG DATA
54	IT7TPE22	MOBILE COMPUTING
55	IT7TPE24	SOFTWARE ARCHITECTURE
56	IT7TPE25	VLSI DESIGN
57	IT7TOE11	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
58	IT7TOE12	DIGITAL IMAGE PROCESSING
59	IT7TOE13	REAL TIME SYSTEM
60	IT7TOE14	WEB TECHNOLOGY
61	IT8TPC01	CYBER SECURITY

62	IT8TPC02	SOFT COMPUTING
63	IT8LPC01	CYBER SECURITY LAB
64	IT8LPC02	SOFT COMPUTING LAB
65	IT8LPC03	PROJECT
66	IT8LPC04	SEMINAR
67	IT8TPE11	OPEN SOURCE SYSTEM & PROGRAMMING
68	IT8TPE12	GAME THEORY
69	IT8TPE13	OBJECT ORIENTED ANALYSIS AND DESIGN
70	IT8TPE14	COMPUTER VISION
71	IT8TPE21	INTRODUCTION TO .NET TECHNOLOGY
72	IT8TPE22	INFORMATION SECURITY AUDIT AND RISK ASSESSMENT
73	IT8TPE23	DATA MINING
74	IT8TPE24	SOFTWARE TESTING AND QUALITY MANAGEMENT
75	IT8TOE11	DIGITAL SIGNAL PROCESSING

Scheme and Syllabus



SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, INFORMATION TECHNOLOGY
SEMESTER III
EFFECTIVE FROM SESSION 2019-20

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/ WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	IT03TES01	ANALOG ELECTRONIC CIRCUITS	3	0	0	30	70	100	3
2	IT03TPC01	DATA STRUCTURE & ALGORITHMS	3	0	0	30	70	100	3
3	IT03TES02	DIGITAL ELECTRONICS	3	0	0	30	70	100	3
4	IT03TBS01	MATHEMATICS-III (Numerical Methods)	3	1	0	30	70	100	4
PRACTICAL									
1	IT03PES01	ANALOG ELECTRONIC CIRCUITS LAB	0	0	4	30	20	50	2
2	IT03PPC01	DATA STRUCTURE LAB	0	0	4	30	20	50	2
3	IT03PPC02	DIGITAL ELECTRONICS LAB	0	0	4	30	20	50	2
4	IT03PPC01	IT WORKSHOP	1	0	3	30	20	50	2.5
TOTAL CREDITS									21.5

IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, L-LECTURE, T-TUTORIAL, P-PRACTICAL

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, INFORMATION TECHNOLOGY
SEMESTER IV
EFFECTIVE FROM SESSION 2019-20

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/ WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	IT04TPC01	DISCRETE MATHEMATICS	3	1	0	30	70	100	4
2	IT04TPC02	COMPUTER ORGANIZATION & ARCHITECTURE	3	0	0	30	70	100	3
3	IT04TPC03	OPERATING SYSTEMS	3	0	0	30	70	100	3
4	IT04TPC04	DESIGN & ANALYSIS OF ALGORITHMS	3	0	0	30	70	100	3
5	IT04THS01	MANAGEMENT I – MANAGEMENT PROCESS AND ORGANIZATIONAL BEHAVIOUR	3	0	0	30	70	100	3
PRACTICAL									
1	IT04PPC01	COMPUTER ORGANIZATION & ARCHITECTURE LAB	0	0	4	30	20	50	2
2	IT04PPC02	OPERATING SYSTEMS LAB	0	0	4	30	20	50	2
TOTAL CREDITS									20

IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, L-LECTURE, T-TUTORIAL, P-PRACTICAL

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT03TES01	3	0	0	3 HOURS	30	70	3

ANALOG ELECTRONIC CIRCUITS

UNIT- I

Low frequency transistor amplifier, graphical analysis of CE Amplifier, h-parameter models for CB, CE, CC configurations and their interrelationship, analysis and comparison of the three configurations, linear analysis of transistor circuits, Miller's Theorem; Cascading, simplified models and calculation of CE and CC Amplifiers, effect of emitter resistance in CE amplifiers, cascade amplifiers, Darlington pair, analysis of single stage FET amplifiers-CS and CD configuration.

UNIT II

High frequency transistor amplifier, CE hybrid pi model, validity and parameter variation, current gain with resistive load, frequency response of a single stage CE amplifier, gain bandwidth product, CC stage high frequencies, multistage amplifier, classification, distortion in amplifiers, frequency response, bode plots, step response, pass band of cascaded stages, response of a two stage RC coupled amplifier at low and high frequencies, sources of noise in transistor circuits, noise figure.

UNIT III

Feedback Amplifiers: Classification, feedback concept, ideal feedback amplifier, properties of negative feedback amplifier topologies: method of analysis of feedback amplifier, voltage series feedback, voltage series feedback pair, current series, current shunt, voltage shunt feedback, effect of feedback on amplifier bandwidth and stability.

UNIT IV

Large Signal/power amplifier, classification, large signal amplifier characteristics, class A amplifiers, class A amplifier with direct coupled resistive load, transformer coupled class A amplifier, class A push pull amplifiers, class B amplifiers, transformer coupled push pull class B amplifier, complementary symmetry push pull class B amplifier, class AB amplifier, class C amplifier, Harmonic Distortion, Push Pull Amplifiers, Cross over Distortion.

UNIT V

Oscillator: Sinusoidal oscillator, phase shift oscillator, Wien bridge oscillator, Resonant circuit oscillator, LC Collpit, LC Hartley, Amplitude, Frequency, and phase stability analysis of all oscillators, General form of oscillator configuration, crystal oscillator, tuned Amplifiers, classification of tuned amplifier, analysis of single and double tuned amplifiers, stagger tuned amplifier.

TEXT BOOKS

1. Integrated Electronics, Millman & Halkias, TMH
2. Microelectronics, Millman & Grabel, TMH

REFERENCE BOOKS:

1. Electronic Device & Circuits, David A Bell, PHI
2. Electronic Device & Circuits Theory, Boylestad & Nashelsky, PHI

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT03TPC01	3	0	4	3 HOURS	30	70	3

DATA STURCTURE & ALGORITHMS

UNIT- I

Introduction: Basic Terminology, Definition of Data Structure, Types of Data Structure, Operation on Data Structure, **Arrays:** Array Definition, Representation of Arrays: Row Major Order, and Column Major Order. **Searching and Sorting:** Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Binary Search, Linear Search.

UNIT II

Linked lists: Definition, Representation and Implementation of Singly Linked Lists, Traversing and Searching of Linked List, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly Linked List, Circularly Linked List.

UNIT III

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack., **Queue:** Array and linked representation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Deques.

UNIT IV

Trees: Basic Technology , Binary Tree , Binary tree representation , Algebraic Expressions , Complete Binary Tree, Extended Binary Tree, Full Binary Tree, Array and linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Binary search trees (BST), Insertion and deletion in BST, AVL trees, Heap and heap sort.

UNIT V

Graph: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Weighted Graph, Sequential Representations of Graphs, Adjacency Matrices, Adjacency List, Path Matrices, Linked Representations of Graphs, Graph Traversal - DFS, BFS, Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm.

Text books:

1. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill.
2. G A V Pai, "Data Structures and Algorithms", TMH.
3. G.S.Baluja, "Data Structures through C", Dhanpat Rai & Co.
4. Yashavant Kanetkar, "Data Structure Through C", BPB Publication

References books:

5. Lipschutz, "Data Structures with C" Schaum's Outline Series, TMH.
6. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd.
7. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia.
8. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd.
9. K Loudon, "Mastering Algorithms with C", Shroff Publisher & Distributors Pvt. Ltd.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT03TES02	3	0	0	3 HOURS	30	70	3

DIGITAL ELECTRONICS

UNIT 1 - Fundamentals of Digital systems and logic families

Digital signals, digital circuits, AND,OR, NOT, NAND, NOR and Exclusive OR operations, Boolean algebra, examples of IC gates, number systems- binary, signed binary, octal, Hexadecimal number, binary arithmetic, Once's and two's complements, arithmetic codes, error detecting, and correcting codes, characteristics of digital ICs, digital logic families, TTL, schottky TTL and CMOS logic , interfacing CMOS and TTL, Tri-state logic.

UNIT 2 - Combinational Digital Circuits

Standard representation for logic function, K map representation, simplification of logic functions, using K map, minimization of logical functions. Don't care conditions, Multiplexes, De- Multiplexes, / Decoders, Adders, Sub tractors, BCD arithmetic, carry look ahead, serial adders , ALU , elementary ALU design, popular MSI chips , digital comparator , parity checker, / generator, code converters, priority encoders, decoders/ drivers, for display devices, Q-M method of function realization.

UNIT 3 - Sequential circuits and systems

A 1 bit memory, the circuits properties, of Bi-stable latch, the clocked SR flip flop, JK flip flops, T flip flops, D flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counter's design using flip flops, special counter IC's, Asynchronous sequential counters, applications of counters.

UNIT 4 - A/D and D/A converters

Digital to analog converters: weighted registers/ converters, R-2R Ladder, D/A converters , specifications for D /A converters, examples of D /A converter ICs, sample and hold circuits, Analog to digital converters: quantization and encoding, parallel comparator , A/D converter, successive approximation A/D converter, counting A/D converter, dual slop A / D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

UNIT 5 - Semiconductor memories and Programmable logic devices

Memory organization and operation, expanding memory size, classification and characteristics of memories, Sequential memories, read-only memory(ROM), read and write memory (RAM), content addressable memory (CAM) , charge coupled device memory (CCD) , commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS) , Field Programmable Gate Array (GPGA).

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT03TBS01	3	0	0	3 HOURS	30	70	3

Mathematics- III (Numerical Methods)

UNIT- I Introduction of Errors and their Analysis, types of errors, numerical problems on error analysis, curve fitting: method of least squares, fitting of exponential curves $y = ae^{bx}$, fitting of the curve $y = ab^x$, fitting of the curve $y = ax^b$.Method of moments

UNIT- II Numerical Solution of Algebraic and Transcendental Equations: Graphical method bisection Method, Secant Method,Regula-falsi Method, Newton Raphson Method,Solution of a system of simultaneous linear algebraic Equations Direct methods: Gauss elimination Method, Gauss Jordan method, Iterative methods ,Jacobi Iterative Method, Gauss Seidel Iterative method.

UNIT- III The Calculus of Finite Differences: Finite differences, Difference formula, operators and relation between operators. Inverse Operator, Interpolation with equal intervals: - Newton's forward and backward interpolation formula. Interpolation with Unequal intervals: - Lagrange's interpolation Newton's differenceformula, inverse interpolation.

UNIT- IV Numerical Differentiation and Integration: - Numerical Differentiation Newton's forward and Backward difference interpolation formula. Maxima and Minima of aTabulated function, Numerical Integration :-Trapezoidol rule, simpson's (1/3) rd and (3/8) th rule, Boole's rule, weddle rule.
Difference Equations: Definition ,order and degree of a difference equation, Linear difference equations, Difference equations reducible to Linear form, simultaneous difference equations with constant coefficients.

UNIT- V Numerical solution of ordinary differential equation : Taylor series method, Euler's method, Modified Euler method Runge's method Runge-Kutta method, numerical method for solution of partial differential equations. General linear partial differential equation.Laplace equation and Poisson equation.

Text Books :

1. JAIN & IYNGAR Numerical Methods for Scientific and Engineering Computations.
2. RAO G.S. Numerical Anlysis.
3. Grewal B S Numerical Methods In Engineering and Science.
4. Das K K Advance Engineering Methods.

Reference Books:

5. Rajaraman V Computer Oriented Numerical Methods
6. P. Kandasamy K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
7. S. S. Sastry, Introduction methods of Numerical Analysis, PHI, 4th Edition, 2005.
8. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT04TPC01	3	0	0	3 HOURS	30	70	3

Discrete Mathematics

Unit 1:

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Unit 2:

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination. Principle of Mathematical Induction, The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor, Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

Unit 3:

Propositional Logic: Basic Connectives and Truth Tables, Logical Equivalence, The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers.

Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Unit 4:

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Unit 5:

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Four colour conjecture, trees and rooted trees, binary trees.

Text books :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill

2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc.

3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

Reference books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG
Edition, TataMcgraw-Hill

2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT04TPC02	3	0	0	3 hours	30	70	3

COMPUTER ORGANIZATION & ARCHITECTURE

UNIT 1

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

UNIT 2

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

UNIT 3

Introduction to x86 architecture. CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU. Memory system design: semiconductor memory technologies, memory organization. Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

UNIT 4

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

UNIT 5

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Text books:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

Reference books:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT04TPC03	3	0	4	3 hours	30	70	3

OPERATING SYSTEMS

UNIT I - INTRODUCTION TO OPERATING SYSTEM:
Objective and function of operating system. The evaluation of the operating system, system components operating system services, system structure, batch interactive, time sharing and real time operating system , Protection. File system: File concepts, file organization and access mechanism.

UNIT II - CONCURRENT PROCESS:
Process concepts, principal of concurrency. the producer consumer problem , the critical section problem , semaphore, classical problem in concurrency , inter process communication , process generation , process scheduling .

UNIT III - CPU SCHEDULING:
scheduling concepts, performance criteria scheduling algorithms. Algorithm evaluation, multiprocessor scheduling. I/O management and Disk scheduling I/O devices and organization of the I/O functions. I/O buffering disk I/O operating system design issues.

UNIT IV - DEAD LOCKS:
System models, deadlock characterization, prevention, avoidance and detection recovery from deadlock, combined approach.

UNIT V - MEMORY MANAGEMENT:
Base machine , Residence monitor , multiprogramming with fixed partition , multiprogramming with variable partitions, multiple base register, paging, segmentation, paging segmentation, virtual memory concepts , demand paging performance , page replacement algorithms , allocation of frames, thrashing , cache memory organization impact on performance .

Text Books

1. Milenkovic M. , "Operating System concepts", MGH
2. Tanenbaubm A. S. "Operating System design and implementation" , PHI
3. Silberschartz A.and Patterson J.I. , " Operating system concepts", Wisley.

Reference Books

4. Stilling William " Operating System ", Maxwell McMillan International Edition 1992.
5. Dectel H.N. , "An introduction to operating system ", Addision Wisley.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT04TPC04	3	0	0	3 hours	30	70	3

DESIGN & ANALYSIS OF ALGORITHMS

Unit 1:
Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

Unit 2:
Fundamental Algorithmic Strategies: Brute-Force, Greedy,Dynamic Programming, Branchand-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics – characteristics and their application domains.

Unit 3:
Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

Unit 4:
Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques, N Queen Problem.

Unit 5:
Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE, Travelling Salesman Problem, Hamiltonian cycle.

Text books:
1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.

Reference books
1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
INFORMATION TECHNOLOGY
THIRD YEAR,SEMESTER V
Effective from Session 2017-2018

Sl. No.	Course No.	SUBJECT	PERIODS			Credits			
THEORY			L	T	P	IA	ESE	SUBJECT TOTAL	
1	IT5TPC01	DATABASE MANAGEMENT SYSTEM	3	1	-	40	60	100	4
2	IT5TPC02	JAVA PROGRAMMING	3	1	-	40	60	100	4
3		PROFESSIONAL ELECTIVE-1	3	1	-	40	60	100	4
4		PROFESSIONAL ELECTIVE-2	3	-	-	40	60	100	3
5		OPEN ELECTIVE-1	3	-	-	40	60	100	3
		TOTAL	15	3		200	300	500	18

	Course No.	SUBJECT	PERIODS			Credits			
PRACTICAL			L	T	P	IA	ESE	SUB TOTAL	
6	IT5LPC01	DATABASE MANAGEMENT SYSTEM LAB	-	-	3	30	20	50	2
7	IT5LPC02	JAVA PROGRAMMING LAB	-	-	3	30	20	50	2
8	IT5LPC03	PROGRAMMING LAB	-	-	3	30	20	50	2
		TOTAL			9	90	60	150	06

IA – Internal Assessment, ESE – End semester Exam. Total Credits: 24
L- Lecture T-Tutorial P-Practical

PROFESSIONAL ELECTIVE-1		PROFESSIONAL ELECTIVE-2	
Subject Code	Name	Subject Code	Name
IT5TPE11	MICROPROCEESOR AND INTERFACES	IT5TPE21	THEORY OF COMPUTATION
IT5TPE12	BIOMATRICS	IT5TPE22	MOBILE SOFTWARE DEVELOPMENT
IT5TPE13	INFORMATION STRETGY MANAGEMENT	IT5TPE23	MULTIMEDIA SYSTEM DESIGN
IT5TPE14	OPERATION RESEARCH	IT5TPE24	GRID AND CLOUD COMPUTING
IT5TPE15	DIGITAL & CYBER FORENSIC	IT5TPE25	TECHNOLOGY MANAGEMENT

OPEN ELECTIVE-1	
Subject Code	Name
IT5TOE11	RURAL TECHNOLOGY AND COMMUNITY DEVELOPMENT
IT5TOE12	SOFTWARE PROJECT MANAGEMENT
IT5TOE13	INTELLECTUAL PROPERTY RIGHTS
IT5TOE14	CYBER LAW
IT5TOE15	ANALYSIS AND DESIGN OF ALGORITHM

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
INFORMATION TECHNOLOGY
THIRD YEAR, SEMESTER VI
Effective from Session 2017-2018

Sl. No.	Course No.	SUBJECT	PERIODS			Credits			
THEORY			L	T	P	IA	ESE	SUBJECT TOTAL	
1	IT6TPC01	INTERACTIVE COMPUTER GRAPHICS	3	1	-	40	60	100	4
2	IT6TPC02	OPERATING SYSTEM	3	1	-	40	60	100	4
3		PROFESSIONAL ELECTIVE-3	3	1	-	40	60	100	4
4		PROFESSIONAL ELECTIVE-4	3	-	-	40	60	100	3
5		OPEN ELECTIVE-2	3	-	-	40	60	100	3
		TOTAL	15	03		200	300	500	18

Sl. No.	Course No.	SUBJECT	PERIODS			Credits			
PRACTICAL			L	T	P	IA	ESE	SUB TOTAL	
6	IT6LPC01	COMPUTER GRAPHICS LAB	-	-	3	30	20	50	2
7	IT6LPC02	OPERATION SYSTEM LAB	-	-	3	30	20	50	2
8	IT6LPC03	PROGRAMMING LAB	-	-	3	30	20	50	2
		TOTAL			9	90	60	150	06

IA – Internal Assessment, ESE – End semester Exam. Total Credits: 24
L- Lecture T-Tutorial P-Practical

PROFESSIONAL ELECTIVE-3		PROFESSIONAL ELECTIVE-4	
Subject Code	Name	Subject Code	Name
IT6TPE11	ADVANCE COMPUTER ORGANIZATION	IT6TPE21	PARALLEL COMPUTING
IT6TPE12	SIMULATION AND MODELING	IT6TPE22	DISTRIBUTED SYSTEM
IT6TPE13	REVERSE CODE ENGINEERING	IT6TPE23	BIOINFORMATICS
IT6TPE14	ADVANCE DATABASE	IT6TPE24	UNIX SYSTEM DESIGN
IT6TPE15	SCRIPTING LANGUAGE AND PROGRAMMING	IT6TPE25	MICROCONTROLLERS AND EMBEDDED SYSTEMS

OPEN ELECTIVE-2	
Subject Code	Name
IT6TOE11	KNOWLEDGE MANAGEMENT
IT6TOE12	NATURAL LANGUAGE PROCESSING
IT6TOE13	PATTERN RECOGNITION
IT6TOE14	WIRELESS AND MOBILE COMMUNICATION
IT6TOE15	MACHINE LEARNING

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPC01	3	1	0	4 HOURS	40	60	4

DATA BASE MANAGEMENT SYSTEM

UNIT- I INTRODUCTION:

An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT- II RELATIONAL DATA MODEL AND LANGUAGE:

Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL, introduction to PL/SQL

UNIT- III DATA BASE DESIGN & NORMALIZATION:

Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT- IV TRANSACTION PROCESSING CONCEPTS:

Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

UNIT- V CONCURRENCY CONTROL TECHNIQUES:

Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

Text Books

1. Date C J, "An Introduction To Database System", Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley
4. Leon & Leon, "Database Management System", Vikas Publishing House.

References Books

1. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
2. Majumdar & Bhattacharya, "Database Management System", TMH
3. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
4. Kroenke, "Database Processing: Fundamentals, Design and Implementation", Pearson Education.
5. Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New Delhi

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPC02	3	1	0	4 HOURS	40	60	4

JAVA PROGRAMMING

UNIT I INTRODUCTION: History of Java, Features of Java, data types, variables, literals, expressions, operators,programming constructs, Enhanced for loop, Comparison with C++, Java program Compilation and Execution,JVM as an interpreter and emulator, class File Format, Class loaders, Verification, Class Area, Java Stack,Heap, Security Promises of the JVM, Garbage Collection.

UNIT II CLASSES AND OBJECTS: Classes, Objects and References, "this" keyword, Methods, Accessors and Mutators, overloading method, static keyword, Access specifiers, Arrays, Command line arguments.Constructors and finalizers, overloading constructors, Inner classes, Wrapper Classes, Cloning objects, Shallowand Deep Cloning, Type compatibility and conversion.Inheritance; definition and advantages, overriding, Super,final and abstract classes, Interface, Package: Defining package, interfaces in package, importing packages.

UNIT III EXCEPTION HANDLING, STRINGS AND COLLECTION API: Basics of exception handling, Checked and Unchecked Exceptions, default Exception handling, try and catch, Multiple catch statements, try-catch-finally, uses of throw and throws, Strings: string constructor, string arithmetic, string methods, StringBuffer and methods. Overview of Collections Framework.

UNIT IV MULTI THREADING AND FILE HANDLING: Thread Concepts, Thread life cycle, Runnable Vs Thread class, Thread Priority, Thread Methods, Thread Synchronization: Concept of Monitor, Synchronized methods & Synchronized blocks, Deadlocks. File Handling using Java, Streams, Byte and Character Streams, Various operations with files.

UNIT V GUI APPLICATION AND APPLET DEVELOPMENT: Overview of AWT , applets and application, applet life cycle, User interfacing components, Layout Managers, Event Driven programming in java, Event delegation model, Event types and classes, Listeners, Overview of Swing Components. Introduction to JDBC, ODBC,JDBC drivers: Type I, Type II, Type III, Type IV. JDBC Architecture, executing DDL, DML,DCL commands.

TEXT BOOKS:

1. Introduction to Java Programming: Liang, Pearson Education, 7thEdition.
2. Java The complete reference: Herbert Schildt, TMH, 5thEdition.

REFERENCE BOOKS:

1. Balguruswamy, Programming with JAVA, TMH.
2. "Head first Java" by Kathy Sierra, Bert Bates , O'Reilly Media Publication.
3. Big Java: Horstman, Willey India, 2ndEdition.
4. Java Programming Advanced Topics: Wigglesworth, Cengage Learning.
5. Java How to Program: H.M. Deitel & Paul J. Deitel, PHI, 8thEdition.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPE11	3	1	0	4 HOURS	40	60	4

MICROPROCEESOR AND INTERFACES

UNIT 1 MICROPROCEESOR ARCHITECTRUE:
INTRODUCTION TO MICROPROCESSOR ARCHITECTURE OF 8085, INTERNAL REGISTER & FLAG REGISTER, GENERATION OF CONTROL SIGNALS: BUS TIMINGS, DEMULTIPLEXING OF BUSES; FETCH CYCLE , EXECUTE CYCLE, INSTRUCTION CYCLE. ARCHITECTURE OF 8086, PIN CONFIGRATION OF 8086 & PHYSICAL MEMORY ORGANIZATION, GENERAL BUS OPERATION, I/O ADDRESSING CAPABILITIES.

UNIT II ASSEMBLY LANGUAGE PROGRAMMING:
MINIMUM MODE & MAXIMUM MODE OF 8086, INSTRUCTION FORMAT, ADDRESSING MODES OF 8086, INSTRUCTION SET, ASSEMBLE DIRECTIVES AND OPREATERS.

UNIT III MODULAR PROGGRAMING:
STACKS AND PROCEDUERS, INERRUPTS AND INTERRUPT ROUTINES, NON MASKABLE INTERRUPT, MASKABLE INTERRUPTS, MACRO PROGRAMS DESING. STRING MANIPULATION INSTRUCTIONS.

UNIT IV ARCHITECTURE OR PERIPHERAL INTERFACING DEVICES:
INTERFACING OF I/O PORTS, 8255 (PPI), PROGRAMMABLE INTERNAL TIMER 8253/8254, PROGRAMMABLE INTERRUPT CONTROLLER 8259A, DMA CONTROLLER 8257, NUMERIC PROCESSOR 8087.

UNIT V 80386
BASIC ARCHITECTURE AND SIGNAL DESCRIPTION OF 80386, REGISTER ORGANISATION, ADDRESSING MODES, DATA TYPES, REAL MODE AND PROTECHTED MODE OF 80386, SEGMENTATION , PAGING, VIRTUAL 8086 MODE, ENHANCED INSTRUCTION SET OF 80386, COPROCESSOR 80387

REFRENCE BOOKS

1. Microprocessor system : 8086/8088 Family – Arhitecture Programming and Design : Y Liu and G A Gibson : Prentice Hall
2. Microprocessor 8086, 80386 & Pentium : Barry B Brey
3. Advanced Microprocessor and Peripherals : K M Bhurchandi and A K Ray
4. The 8086 Microprocessor : programing and Interfacing the PC by Kenneth j Ayala
5. Microprocessor Architecture programming and Application : R C Gaonkar : Wiley Eastern

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPE15	3	1	0	4 HOURS	40	60	4

DIGITAL AND CYBER FORENSICS

UNIT I

Computer crime: Introduction and Classification of Computer crime; Computer Forensic Data, Relevant sections of Information technology Act 2000

UNIT II

Basics of computers: Computer organization, Components of computers –Data representations. Introduction to operating system, File system and networking.

UNIT III

Introduction to internet: World Wide Web, E-mails, networking protocols, network security threats, vulnerabilities, Access control, virus, Trojans etc.

UNIT IV

Cybercrime: Definition and types. Digital evidence- Definition Nature and types Precautions during evidence collection; Cyber crime Investigation; Basics of Cryptography, Public Key Cryptography, Encryption and Decryption methods, Electronic and Digital signature.

UNIT V

Basic concepts of Steganography; Pornography, Software piracy; Hacking, Cookies and obscenity; Programme manipulation.

Recommended Books

1. Relevant sections of Information technology Act 2000.
2. Esharenana, Adoni, Frame works for ICT Policy Government, Social and Legal Issues. Information Science Reference, Harsey, New YORK.
3. Robert C. Newman ,Computer Forensics: Evidence Collection and Management Auerbach Publications.
4. Eoghan Casey , Handbook of Computer Crime Investigation: Forensic Tools and Technology ,Academic Press
5. Clark, Franklin, and Diliberto, Ken, (1996). Investigating computer Crime, CRC Press, Boca Raton, Florida, USA
6. Tewari, R.K., Sastry, P.K. and Ravikumar, K.V. (2003) : Computer Crime & Computer Forensics, Select Publisher, New Delhi.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPE21	3	0	0	3 HOURS	40	60	3

THEORY OF COMPUTATION

UNIT I

Deterministic and non-deterministic finite automata , Regular Expression , Two way finite automata , finite automata with output , properties of regular set , pumping lemma , closure properties, My-Hill Nerode Theorem.

UNIT II

Context Free Grammars (CFG), derivation trees, Simplification normal forms, Chomskey Hierarchy: Regular Grammars, Unrestricted Grammars and Relations between Classes of languages.

UNIT III

Push Down Automata: Definitions relationship between PDA and Context Free Languages, properties of CGL's Decision Algorithms.

UNIT IV

Turing Machine : The Turing machine model , Computable languages and functions, Modification of Turing machines Church's Hypothesis.

UNIT V

Properties of recursive and recursive enumerable languages, Universal Turing machine, Undesirability Post correspondence problem introduction to recursive function theory.

REFERENCE BOOKS:

1. Hopcroft and Ullman " Introduction to Automata Theory Languages and Computation ", Narosa.
2. Mishra and Chandrashekharan, " Theory of Computer Science ", PH.
3. Kohan " Theory of Computer Science". 4. Korral " Theory of Computer Science".

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPE22	3	0	0	3 HOURS	40	60	3

MOBILE SOFTWARE DEVELOPMENT

UNIT I INTRODUCTION

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

UNIT II BASIC DESIGN

Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

UNIT III ADVANCED DESIGN

Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

UNIT IV TECHNOLOGY I - ANDROID

Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

UNIT V TECHNOLOGY II - IOS

Introduction to Objective – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

REFERENCES:

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012
3. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012
4. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPE23	3	0	0	3 HOURS	40	60	3

MULTIMEDIA SYSTEM DESIGN

UNIT I:

An introduction, Multimedia elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Defining Objects for Multimedia systems, Multimedia Data Interface Standard, The need for data Compression, Multimedia databases.

UNIT II:

Compression and Decompression, Types of compression, Binary Image Compression schemes, Color, Gray Scale, Still-video image Compression, Video Image Compression, Audio Compression, Fractal Compression.

UNIT III:

Data and Format Standards, Rich-text Format, TIFF File Format, Resource Interchange File Format (RIFF), MIDI File Format, JPEG DIB File Format for still and Motion Images, MPEG standards Pen Input, Video and Image Display systems, Print Output Technologies, Image Scanners, Digital Camera, Video Images and Animation.

UNIT IV:

Storage and Retrieval Technologies, Magnetic Media Technology, Optical Media, Hierarchical Storage Management, Cache management for storage systems, Multimedia Application Design, Multimedia application classes, Types of multimedia systems, Components of multimedia systems, Organizing multimedia databases,

UNIT V:

Unified Communication, video conferencing and Chat,Multimedia Authoring and User Interface, Multimedia authoring system, Hypermedia application design consideration, Object display/playback issues, Multimedia Operating Systems Introduction, real time, Resource management, process management, file systems.

List of Books:

1. PrabhatK.Andleigh& Kiran Thakrar, multimedia system design, Prentice PTR, NJ.
2. Ralf Steinmetz and Klara Nahrstedt multimedia computing communications and applications, innovating technology series by Pearson Edu. Asia.
3. Jerry D.Gibson, multimedia communications directions & innovations, Harcourt India Pvt.Ltd.
4. Borko, Handbook of multimedia computing,CRC Press.
5. Mark J.Bunzel Sandra K.Morris, multimedia applications development McGraw Hill.
6. Ze-Nian Li, Mark S.Drew, fundamentals of multimedia, by Pearson Edu. Asia

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TPE24	3	0	0	3 HOURS	40	60	3

GRID AND CLOUD COMPUING

UNIT I

Cloud Computing, Cloud Architecture, Cloud Storage, Advantages and Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services, Web-Based Application, Ubiquitous computing, On-Demand Computing, Cloud Computing for the Community, Collaborating on Group Projects and Events, Cloud Computing for the Corporation.

UNIT II

Infrastructure as a Service: Introduction, Virtualization, Client and Server, Storage, RAID, IBM SAN, Infrastructure creation, Elastic Computing: Amazon Ec2, Computation Services, Case Study.

UNIT III

Platform as a Service: Microsoft AZURE, Google App Engine, Amazon Web Services, IBM Clouds, Software as a Service, IBM Websphere Cast Iron, Case studies.

UNIT IV

MapReduce, GFS, Hadoop, HDFS, Bigdata, business perspectives, IBM Infosphere Biginsight, Analytics of BigData, Infosphere Streams,

UNIT V

Grid Computing: History, Definition, Types, Architecture and Goals Applications and Challenges of Grid Computing, Providers of Grid Computing. IBM Globus Toolkit, Grid Security Infrastructure, Open Grid Service Architecture.

List of Books:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing.
Viktors Berstis , Grid Computing : IBM Red Book
Understanding Bigdata, by Paul C. Zikopoulos et al. McGrawHill,
"Introduction to Grid Computing with Globus", Luis Ferreira et al. IBM Red Books

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TOE12	3	0	0	3 HOURS	40	60	3

SOFTWARE PROJECT MANAGEMENT

UNIT-I: Introduction and Software Project Planning

Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

UNIT-II: Project Organization and Scheduling

Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

UNIT-III: Project Monitoring and Control

Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Desk checks, Walkthroughs, Code Reviews, Pair Programming.

UNIT-IV: Software Quality Assurance and Testing

Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

UNIT-V: Project Management and Project Management Tools

Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

REFERENCES:

1. M. Cotterell, Software Project Management, Tata McGraw-Hill Publication.
2. Royce, Software Project Management, Pearson Education
3. Kieron Conway, Software Project Management, Dreamtech Press
4. S. A. Kelkar, Software Project Management, PHI Publication.
5. Harold R. Kerzner, Project Mangment "A Systems Approach to Planning, Scheduling, and Controlling" Wiley.
6. Mohapatra, Software Project Management, Cengage Learning

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TOE13	3	0	0	3 HOURS	40	60	3

INTELLECTUAL PROPERTY RIGHTS

Unit I Trade Mark The rationale of protection of trademarks as (a) an aspect of commercial and (b) of Consumer rights., Definition and concept of trademarks, Registration, Distinction between trademark and property mark, The doctrine of honest Current User, The doctrine of deceptive similarity, Protection of well-known marks, Passing off and infringement, Criteria of infringement, Standards of proof in passing off action, Remedies

Unit- II Patents Concept of patent, Historical view of the patents law in India, Patentable inventions with special reference to biotechnology products entailing creation of new forms of life. , Patent protection for computer programme

Process of obtaining a patent: application, examination, opposition and sealing of patents: general introduction

Procedure for filing patents. Patent co-operation treaty, some grounds for opposition, the problem of limited locus standing to oppose, especially in relation to inventions having potential of ecological and mass disasters ,Wrongfully obtaining the invention ,Prior publication or anticipation, Obviousness and the lack of inventive step, Insufficient description

Unit – III Rights and obligations of a patentee ,Patents as chose in action ,Duration of patents : law and policy considerations, Use and exercise rights ,Right to secrecy ,The notion of "abuse" of patent rights, Compulsory licenses, Special Categories, Employee Invention: Law and Policy Consideration, International Patents, Transfer of Technology, Know-How and problems of self-Reliant development, Infringement , Criteria of infringement, Onus of Proof ,Modes of Infringement: the Doctrine of Colorable Variation ,Defenses in suits of infringement ,Injunctions and related remedies.

UNIT – IV Designs Nature and Meaning ,Scope of Protection ,Procedure for Protection ,Enforcement and Remedies

Unit- V Copyright Historical evolution of the law ,Meaning of copyright ,Copyright in literary, dramatic and musical works ,Copyright in sound records and cinematograph films ,Copyright in computer programme ,Ownership of copyright ,Assignment of copyright ,Author's special rights ,Notion of infringement ,Criteria of infringement ,Infringement of copyright by films of literary and dramatic works. ,Importation and infringement ,Fair use provisions ,Piracy in internet ,Aspects of copyright justice, Remedies, especially, the possibility of Anton pillar injunctive relief in India.

Books Recommended -

1. Cornish W.R., Intellectual Property, Patents, Trade Marks, Copy Rights and Allied Rights (1999),Asia Law House, Hyderabad.
2. Vikas Vashishth, Law and Practice of Intellectual Property (1999), Bharat Law House, Delhi.
3. P. Narayanan, Intellectual Property Law (1999), (ed) Eastern Law House, Calcutta.
4. Bibeck Debroy (ed.) Intellectual Property Rights (1998) Rajiv Gandhi Foundation, Delhi.
5. U.I.F. Anderfelt, International Patent Legislation and Developing Countries (1971).
6. W.R. Cornish, Intellectual Property(3rd ed.) (1996) Sweet and Maxwell
7. W.R. Mann, Transfer of Technology (1982)

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TOE14	3	0	0	3 HOURS	40	60	3

CYBER LAW

Unit I:
Fundamentals of Cyber Space ,Understanding Cyber Space ,Interface of Technology and Law Defining Cyber Laws

Unit II.
Jurisdiction in Cyber Space ,Concept of Jurisdiction ,Internet Jurisdiction ,Indian Context of Jurisdiction ,International position of Internet Jurisdiction Cases in Cyber Jurisdiction

Unit III.
E-commerce- Legal issues ,Legal Issues in Cyber Contracts ,Cyber Contract and IT Act 2000 , The UNCITRAL Model law on Electronic Commerce

Unit IV
Intellectual Property Issues and Cyberspace – The Indian Perspective ,Overview of Intellectual Property related Legislation in India
Copyright law & Cyberspace , Trademark law & Cyberspace , Law relating to Semiconductor Layout & Design

Unit- V
Case Studies

Reference Books

- CYBER LAWS & Information Technology by Dr. Jyoti Rattan & Vijay Rattan 6th Edition, 2017 Media : Paper Back ISBN : 9789351394709
- INTRODUCTION TO INFORMATION SECURITY AND CYBER LAWS (MISL-DT series) by SURYA PRAKASH TRIPATHI, RITENDRA GOEL, PRAVEEN KUMAR SHUKLA Media : Paper Back ISBN : 9789351194736
- Cyber Laws - Intellectual Property and E-commerce Security by Author : Krishna Kumar (Legal Advisor, Ministry of Law) Media : Hard Back ISBN : 8187336897
- A Practical Approach to Cyber Laws by K.Mani Edition : 2nd Edition 2012 Media : Hard Back ISBN : B00PC57N4Y

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT5TOE15	3	0	0	3 HOURS	40	60	3

ANALYSIS AND DESIGN OF ALGORITHM

UNIT I Performance Analysis
Space and Time Complexity, Asymptotic Notations. Divide and Conquer: Finding Maxima and Minima Binary search, Merge Sort, Quick Sort, and selection sort.

UNIT II Greedy Method and Dynamic Programming
Knapsack problem and Minimum Spanning trees, Dynamic Programming: Rod Cutting Problem, Longest Common Subsequence Problem, All pair's shortest path, optimal binary search tree,

UNIT III SEARCH TECHNIQUES
Techniques for binary trees, techniques for graphs –DES and BFS, connected components and spanning tree, Bi-connected components and DFS. Backtracking: The 8-queen problem, graph coloring , Hamiltonian cycles.

UNIT IV BRANCH AND BOUND
O/1 knapsack problem, traveling sales person problem, efficiency consideration, Algebraic Problems, lower Bound theory.

UNIT V NP HARD AND NP COMPLETE PROBLEM
Basic concepts, problem classes, P, NP, NP hard, NP complete problem, deterministic and non-deterministic Polynomial time algorithm

REFERENCE BOOKS:
1. Horowitz E & sahani s, "Fundamentals of Computer algorithms" , Galgotia.
2. Aho , Hopcroft & Ullman , "the design and Analysis of computer Algorithms" Addison Wesely
3. Sedgewick , "Algorithms in C"

************End of V Sem Scheme & Syllabus****************

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPC01	3	1	3	4 HOURS	40	60	4

INTERACTIVE COMPUTER GRAPHICS

UNIT-I OVERVIEW OF GRAPHICS SYSTEM:
I/O devices, Raster scan & Random scan system, DDA & Bresenhams Line drawing Algorithm, Mid-Point & Bresenhams circle drawing Algorithm, Midpoint ellipse generating algorithm, Clipping: Sutherland Cohen Line Clipping, Polygon clipping: Hodgeman-Sutherland & Weiler-Atherton polygon clipping. 2-D & 3-D Transformation.

UNIT-II CURVES & SURFACES:
Conics-Parametric forms for circle, ellipse, parabola, Bezier Curves-Need for cubic parametric curves c0, c1, c2 continuity, Generation though Bernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Knot vectors-uniform and open uniform curves, Uniform, Periodic B-splines, Open B-splines, Uniform B-splines, Non-uniform B-splines, Rational B-splines, Beta splines.

UNIT-III PROJECTIONS & HIDDEN SURFACE REMOVAL :
Parallel projection on xy plane (including oblique view), Perspective projection-1, 2 and 3 Vanishing points, Reconstruction of 3-D images. Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, Z-Buffer or Depth Buffer Algorithm, Painters algorithm (Depth sorting method), Binary space partitioning trees, Scan-line algorithm, Warnock's algorithm.

UNIT-IV SHADING & COLOR ISSUES :
Filled Area Primitives, Illumination model for diffused & specular reflection, Computing reflection vector, Gouraud and Phog Shading, Texture mapping, Bump mapping, Handling shadows, Radiosity: Lambert's Law, Basic element, Modeling transparency, Visualization of data sets, volume rendering, Color issues: Additive, Subtractive primaries, Filled Area Primitives.

UNIT-V FRACTALS & ANIMATION:
Fractals: self-similar fractals-fractal dimension, Generation of Terrain-random midpoint displacement, Self-squaring fractals. Solid Modeling: Generation through sweep techniques, Constructive sold geometry, B representations, Octrees, Ray Tracing & their Theory, Animation: In-between using rotation and translation, Procedural animation, Morphing, Motion Control (Key framing).

Text Books:

1. Computer graphics, Hearn and Baker, PHI
2. Computer Graphics, Foley, PE-LPE,

Reference Books:

1. Procedural Elements of Computer graphics, Rogers, McGraw Hill
2. Computer graphics, Harringtons S., McGraw Hill.
3. Computer Graphics, Schoum Series.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPC02	3	1	0	4 HOURS	40	60	4

OPERATING SYSTEM

UNIT I INTRODUCTION TO OPERATING SYSTEM :
objective and function . The evaluation of the operating system , system components operating system services , system structure ,batch interactive , time sharing and real time operating system , Protection. File system : File concepts , file organization and access mechanism , directory.

UNIT II CONCURRENT PROCESS :
Process concepts , principal of concurrency . the producer consumer problem , the critical section problem , semaphore, classical problem in concurrency , inter process communication , process generation , process scheduling .

UNIT III CPU SCHEDULING :
scheduling concepts, performance criteria scheduling algorithms. algorithm evaluation , multiprocessor scheduling.I/O management and Disk scheduling I/O devices and organization of the I/O functions. I/O buffering disk I/O operating system design issues.

UNIT IV DEAD LOCKS :
system models, deadlock characterization , prevention , avoidance and detection recovery from deadlock , combined approach.

UNIT V MEMORY MANAGEMENT :
Base machine , Residence monitor , multiprogramming with fixed partition , multiprogramming with variable partitions, multiple base register, paging, segmentation, paging segmentation, virtual memory concepts , demand paging performance , page replacement algorithms , allocation of frames, thrashing , cache memory organization impact on performance .

Reference Books

1. Milenkovic M. , "Operating System concepts", MGH
2. Tanenbaubm A. S. "Operating System design and implementation" , PHI
3. Silberschartz A.and Patterson J.I. , " Operating system concepts", Wisley.
4. Stilling William " Operating System ", Maxwell McMillan International Edition 1992. Dectel H.N. , "An introduction to operating system ", Addision Wisley.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPE11	3	1	0	4 HOURS	40	60	4

ADVANCED COMPUTER ORGANIZATION

UNIT-I BASIC COMPUTER ORGANIZATION AND DESIGN

Computer Organization, Computer Architecture, Machine Language, Organization of a Simple Computer, Interconnection Structures, Bus Interconnection, MAR, MBR, PC, IR, PCI. Data Path of a typical Vo n Neumann Machine, Instruction Code, Decoding & Execution, The Fetch- Decode-Execute Cycle: Example, Instruction Formats, Stack Organization, architectural classification schemes , SISD , SIMD , MISD , MIMD architectures , multiprocessor and multicomputer , UMA , NUMA , COMA , NORMA models.

UNIT-II ARITHMETIC PROCESSOR DESIGN

Fixed-Point Arithmetic- Addition and Subtraction: addition and subtraction with Signed- Magnitude Data, Hardware Implementation, Hardware Algorithm, addition and subtraction with Signed- 2's Complement Data. Multiplication Algorithm: Hardware Implementation, Hardware Algorithm, Binary Multiplication, Booth Multiplication Algorithm. Division Algorithm, Floating-Point Arithmetic Operations: Basic Considerations, Register Configuration, Addition, subtraction, Multiplication & Division. Decimal Arithmetic Unit: Decimal Multiplication, Decimal division.

UNIT-III CONTROL UNIT ORGANIZATION

The Control Unit: Type of control unit, Control Unit Function, Control Unit Operation, Hardwired Control Unit- Basic Concept, Advantages, Disadvantages. Micro-Programmed Control Unit- Basic Concept, Advantages, Disadvantages. Difference between Hardwired Control Unit and Micro-Programmed Control Unit, Control Memory, Address Sequencing. Micro -Programmed Micro-Instruction Types- Vertical Micro-Programming, Horizontal Micro-Programming, Control Store, Horizontal Versus Vertical, Principle Advantages, Disadvantages, Microinstruction Formats, Microinstruction Sequence, Emulation, Bit Slicing.

UNIT-IV PRINCIPAL OF PIPELINING

Over lapped parallelism , principal of Liner pipelining processor , General pipelining and reservation tables, arithmetic pipelining, Design of pipeline Instruction units , arithmetic pipelining design example, hazard detection and resolution , JOB sequencing and collision prevention.

UNIT V PRINCIPLES OF MULTITHREADING

Multithreading issue and solution, multiple context processor, multidimensional architecture, Advanced processor technology – RISC & CISC computers, super scalar architecture. Superscalar Processor.

Text Books

1. Computer System Architecture By, M. Morris Mano Prentice- Hall, 1993.
2. Computer Architecture & Organization By John P. Hayes, McGraw Hill-1998
3. Advanced computer Architecture by Kai Hwang.

Reference Books

1. Structured Computer Organization by Andrew S. Tanenbaum.
2. Computer architecture a quantitative approach, Patterson D. A. and Hennessy, J. L.,
3. Computer architecture and parallel processing by Hwang and Briggs.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPE12	3	1	0	4 HOURS	40	60	4

SIMULATIONS & MODELING

Unit 1 Introduction to Simulation: Discrete and Continuous Systems, Model of a System, Types of Models, Discrete –Event System Simulation, Steps in a Simulation Study.
System Studies: Subsystems, A Corporate Model, Environment Segment. Production Segment, Management Segment, The Full Corporate Model, Types of System Study, System Analysis, System Design, System Postulation.

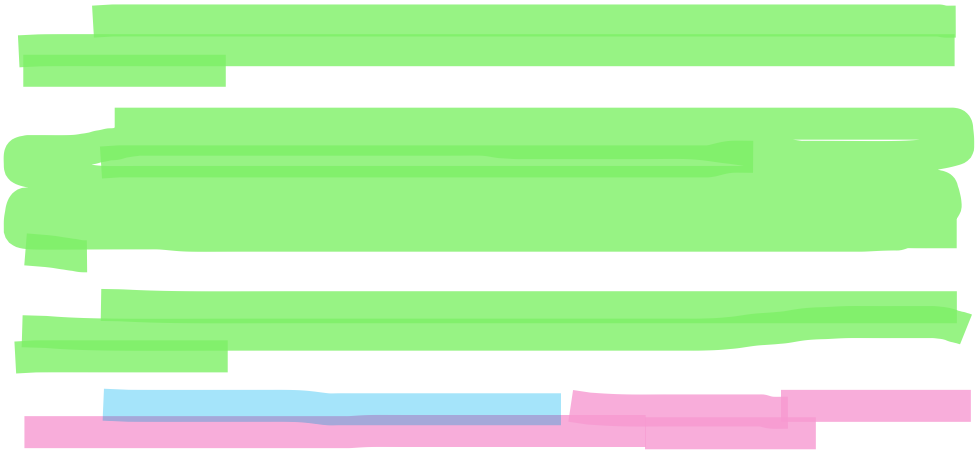
Unit 2 System Simulation: The Technique of Simulation, The Monte Carlo Method, Comparison of Simulation and Analytical Methods, Experimental Nature of Simulation, Types of System Simulation, Numerical Computation Techniques for Continuous Models, Distributed Lag Models, Cobweb Models.
System Dynamics: Exponential Growth Models, Exponential Decay Models, Modified Exponential Growth Models, Logistic Curves, System Dynamics Diagrams, Simple System Dynamics Diagrams, Multi-Segment Models, Representation of Time Delays.

Unit 3 Probability Concepts in Simulation: Stochastic Variables, Discrete Probability Functions, Continuous Probability Functions, Measures of Probability Functions, Numerical Evaluation of Continuous Probability Functions, Continuous Uniformly Distributed Random Numbers, Computer Generation of Random Numbers, A Uniform Random Number Generator , Generating Discrete Distributions, Non-Uniform Continuously Distributed Random Numbers, The Rejection Method.

Unit 4 Arrival Patterns and Service Times: Congestion in Systems. Arrival Patterns, Poisson Arrival Patterns, The Exponential Distribution, The Coefficient of Variation, The Erlang Distribution, The Hper-Exponential Distribution, Service Times, The Normal Distribution, Queuing Disciplines, Queuing notation, Measures of Queues, Mathematical Solutions of Queuing Problems.

Unit 5 Discrete System Simulation: Discrete Events, Representation of Time, Generation of Arrival Patterns, Simulation of a Telephone System, Delayed Calls, Simulation Programming Tasks, Gathering Statistics, Counters and Summary Statistics, Measuring Utilization and Occupancy, Recording Distribution and Transit Times, Discrete Simulation Languages.
Input Modeling: Data Collection, Identifying the Distribution with Data, Parameter Estimation, Selecting Input Models without Data.
Simulation Software: Simulation in C++, Simulation in GPSS.
Reference Books:-

- System Modeling & Simulation – V.P. Singh- New Age Publishing



SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPE21	3	0	0	3 HOURS	40	60	3

PARALLEL COMPUTING

UNIT I SCALABILITY AND CLUSTERING Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

UNIT II ENABLING TECHNOLOGIES System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

UNIT III SYSTEM INTERCONNECTS Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

UNIT IV PARALLEL PROGRAMMING Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

UNIT V MESSAGE PASSING PROGRAMMING Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

TEXT BOOK

1. Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing", Tata McGraw-Hill, New Delhi, 2003.

REFERENCES

1. David E. Culler & Jaswinder Pal Singh, "Parallel Computing Architecture: A Hardware/Software Approach", Morgan Kaufman Publishers, 1999.
2. Michael J. Quinn, "Parallel Programming in C with MPI & OpenMP", Tata McGraw-Hill, New Delhi, 2003.
3. Kai Hwang, "Advanced Computer Architecture" Tata McGraw-Hill, New Delhi, 2003.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPE22	3	0	0	3 HOURS	40	60	3

DISTRIBUTED SYSTEM

UNIT -1 INTRODUCTION

Introduction to Distributed System – Goals: - advantages of distributed system over centralized ones, advantages of distributed system over independent PC's, Disadvantages of distributed system.

Hardware Concept - Bus based multiprocessors, switched multiprocessors, bus based multi-computers, switched multi-computers. Software Concept – Network operating system and NFS, true Distributed System, multi-processor time sharing system. Design Issues – Transparency, Flexibility, Reliability, Performance and Scalability.

UNIT-2 COMMUNICATION IN DISTRIBUTED SYSTEM

Layered protocol, The client server method - Clients and servers, An example Clients and servers, Addressing, Blocking versus non blocking primitives, Buffer versus Un buffer primitives, Reliable versus unreliable primitives, Implementing the client server model, Remote procedure call – Basic RPC failures, implementation issues, problem areas.

Group Communication - Introduction to Group Communication, design issues, Group Communication in ISIS.

UNIT-3 RESOURCE MANAGEMENT AND PROCESS MANAGEMENT

Introduction, Desirable features of a good global scheduling algorithm, Task assignment approach, load balancing approach, process migration, threads.

UNIT-4 DISTRIBUTED FILE SYSTEMS

Introduction, desirable features of a good distributed file system, File Model, file accessing models, file sharing semantics, file caching schemes, file replication, fault tolerance, atomic transactions, design principal, case studies.

UNIT-5 SYNCHRONIZATION AND REPLICATION

Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time and logical clocks - Global states - Coordination and Agreement - Introduction - Distributed mutual exclusion - Elections - Transactions and Concurrency Control- Transactions -Nested transactions -Locks - Optimistic concurrency control - Timestamp ordering - Atomic Commit protocols –Distributed deadlocks - Replication - Case study - Coda.

REFERENCE BOOKS

1. Modern operating system – Andrew S. Tanenbaum.
2. Distributed Operating Systems Concepts and Design – Pradeep K. Sinha.
3. Operating System – Achyuts Godbole.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TPE25	3	0	0	3 HOURS	40	60	3

MICROCONTROLLERS AND EMBEDDED SYSTEMS

UNIT -1

Microcontroller : types of microcontroller, architecture of microcontroller, family members & microcontroller resources,8051 microcontroller, internal & external memories, counters,timers synchronous serial cum asynchronous serial communication

Unit – 2

Microcontroller 8051 instruction sets: types of instruction sets interrupt control flow, interrupt handling structure, interrupt latency and interrrupt dadlines, multiple sources of interrupts, non-maskable interrupt sources, interrupt structure in 8051, programmable timers in the mcu's, free running counter and real time control, interrupt interval and density contraints

Unit -3

Assembly and c programming: programming basics, structure of the cpu registers and and internal rams, programming in asembly language, assemblers, saving cpu status during interrupts, passing parameters, control structure, computing branch destinations at run time, programming in c and use of gnu tools, real time operating system , exemplary rtx51 rtos of keil, uses of rtos in design, development phases of a microcontroller-based system design

Unit-4

16 bit microcontrollers : 8096 /80196 family :- hardware. Memory map, io prots, programmable timers, interrupts, instructions. Motorola mc68hc11 family :- architecture, addressing modes and instructions, interfacing methods, interrupts, programmable timer. Arm 32 bit mcus : introcution of 16/32 bit processors, arm architecture and organization, arm/thumb programming model, instruction sets and development tools.

Unit -5

Inroduction of embedded systems :- an embedded system, hardware units in the system, software embedded in to a system, embedded system on chip (soc) and vlsi circuits, processor selection, memory selection for an embbeded system, allocation of memory to programe segments and blocks, memory map of a system, i/o devices, timer and counting devices, serial communication

REFERENCES

1. Architecture programming, interfacing and system design by raj kamal , pearson education.
2. Embedded systems design by rajeshwar singh , dhanpat rai publications.
3. Embedded systems by raj kalam , tata mcgraw hill publications

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TOE12	3	0	0	3 HOURS	40	60	3

NATURAL LANGUAGE PROCESSING

Unit- I

Sound : Biology of Speech Processing; Place and Manner of Articulation; Word Boundary Detection; Argmax based computations; HMM and Speech Recognition.

Unit- II

Words and Word Forms : Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields.

Unit-III

Structures : Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

Unit-IV

Meaning : Lexical Knowledge Networks, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Co references.

Unit-V

Web 2.0 Applications : Sentiment Analysis; Text Entailment; Robust and Scalable Machine Translation; Question Answering in Multilingual Setting; Cross Lingual Information Retrieval (CLIR).

REFERENCES

1. Allen, James, Natural Language Understanding, Second Edition, Benjamin/Cumming, 1995.
2. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
3. Jurafsky, Dan and Martin, James, Speech and Language Processing, Second Edition, Prentice Hall, 2008.
4. Manning, Christopher and Heinrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TOE13	3	0	0	3 HOURS	40	60	3

PATTERN RECOGNITION

UNIT I PATTERN CLASSIFIER

Overview of Pattern recognition – Discriminant functions – Supervised learning – Parametric estimation – Maximum Likelihood Estimation – Bayesian parameter Estimation – Problems with Bayes approach– Pattern classification by distance functions – Minimum distance pattern classifier.

UNIT II CLUSTERING

Clustering for unsupervised learning and classification – Clustering concept – C Means algorithm – Hierarchical clustering – Graph theoretic approach to pattern Clustering – Validity of Clusters.

UINT III FEATURE EXTRACTION AND STRUCTURAL PATTERN RECOGNITION

KL Transforms – Feature selection through functional approximation – Binary selection -Elements of formal grammars - Syntactic description - Stochastic grammars - Structural representation. .

UNIT IV HIDDEN MARKOV MODELS AND SUPPORT VECTOR MACHINE

State Machines – Hidden Markov Models – Training – Classification – Support vector Machine – Feature Selection.42

UNIT V RECENT ADVANCES

Fuzzy logic – Fuzzy Pattern Classifiers – Pattern Classification using Genetic Algorithms – Case Study Using Fuzzy Pattern Classifiers and Perception.

REFERENCES:

1. M. Narasimha Murthy and V. Susheela Devi, "Pattern Recognition", Springer 2011.
2. S.Theodoridis and K.Koutroumbas, "Pattern Recognition", 4th Ed., Academic Press, 2009.
3. Robert J.Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", John Wiley & Sons Inc., New York, 1992.
4. C.M.Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.
5. R.O.Duda, P.E.Hart and D.G.Stork, "Pattern Classification", John Wiley, 2001
6. Andrew Webb, "Stastical Pattern Recognition", Arnold publishers, London,1999.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TOE14	3	0	0	3 HOURS	40	60	0

WIRELESS & MOBILE COMMUNICATION

UNIT-I Introduction To Mobile & Wireless Devices:
Mobile and Wireless Devices, Simplified Reference Model; Wireless Transmission, Frequencies for Radio Transmission, Regulations, Technology ; Cellular Systems, Specialized MAC; SDMA; FDMA; TDMA; CDMA.

UNIT-II Telecommunication & Broadcast Systems Gsm:
Satellite Systems, Applications, GEO, LEO, MEO, Routing, Localization, Handover; Broadcast Systems, Cyclic Repetition of Data, Digital Audio Broadcasting.

UNIT-III Wireless Networks Wireless Lan:
IEEE 802.11, HIPERLAN, Wireless ATM, Services, Reference Model, Functions, Handover, Location Management, Addressing, QOS.

UNIT-IV Mobile Network And Transport Layers:
Mobile Network Layer; Mobile IP, Transport Layer; Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP; Fast Transmit/Fast Recovery, Transmission/Time Out Freezing, Selective Retransmission, Transaction Oriented TCP.

UNIT-V: Mobile Ad Hoc Networks (MANETs)
Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs. Protocols and Tools: Wireless Application Protocol-WAP. Bluetooth and J2ME.

Text Book

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia-Addison Wesley Longman PTE. Ltd.

Reference Books:

1. Mobile Data Wireless LAN Technologies – Dayem, Rifaat A.; Prentice Hall International.
2. The Essential Guide To Wireless Communication Applications – Dornan, A.; 1st Indian Reprint, Pearson Education Asia.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT6TOE15	3	0	0	3 HOURS	40	60	3

MACHINE LEARNING

Unit – I

Introduction: overview of machine learning, related areas, applications, software tools, course objectives
Parametric regression: linear regression, polynomial regression, locally weighted regression, numerical optimization, gradient descent, kernel methods.

Unit – II

Generative learning: Gaussian parameter estimation, maximum likelihood estimation, MAP estimation, Bayesian estimation, bias and variance of estimators, missing and noisy features, nonparametric density estimation, Gaussian discriminant analysis, naive Bayes.
Discriminative learning: linear discrimination, logistic regression, logit and logistic functions, generalized linear models, softmax regression.

Unit – III

Neural networks: the perceptron algorithm, multilayer perceptron's, backpropagation, nonlinear regression, multiclass discrimination, training procedures, localized network structure, dimensionality reduction interpretation.
Support vector machines: functional and geometric margins, optimum margin classifier, constrained optimization, Lagrange multipliers, primal/dual problems, and KKT conditions, dual of the optimum margin classifier, soft margins, kernels, quadratic programming, and SMO algorithm.

Unit- IV

Graphical and sequential models: Bayesian networks, conditional independence, Markov random fields, inference in graphical models, belief propagation, Markov models, hidden Markov models, decoding states from observations, learning HMM parameters.
Unsupervised learning: K-means clustering, expectation maximization, Gaussian mixture density estimation, mixture of naive Bayes, model selection

Unit – V

Q Learning , RL Learning , Advantages of ML , Application of ML

Reference Books :

1. Elements of Statistical Learning, T. Hastie, R. Tibshirani and J. Friedman, Springer, 2001.
2. Machine Learning, E. Alpaydin, MIT Press, 2010.
3. Pattern Recognition and Machine Learning, C. Bishop, Springer, 2006.
4. Machine Learning: A Probabilistic Perspective, K. Murphy, MIT Press, 2012.
5. Pattern Classification, R. Duda, E. Hart, and D. Stork, Wiley-Interscience, 2000.
6. Machine Learning, T. Mitchell, McGraw-Hill, 1997.

**********End of VI Sem Scheme & Syllabus**********

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
FOURTH YEAR, INFORMATION TECHNOLOGY
SEMESTER VII
EFFECTIVE FROM SESSION 2018-19

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	IT7TPC01	INTERNETWORKING AND NETWORK PROGRAMMING	3	0	0	40	60	100	3
2	IT7TPC02	WIRELESS SENSOR NETWORK	3	0	0	40	60	100	3
3		PROFESSIONAL ELECTIVE-5	3	1	0	40	60	100	4
4		PROFESSIONAL ELECTIVE-6	3	1	0	40	60	100	4
5		OPEN ELECTIVE- 3	3	0	0	40	60	100	3
PRACTICAL									
1	IT7LPC01	INTERNETWORKING AND NETWORK PROGRAMMING LAB	0	0	3	30	20	50	2
2	IT7LPC02	WIRELESS SENSOR NETWORK LAB	0	0	3	30	20	50	2
3	IT7LPC03	PROJECT	0	0	6	60	40	100	4
4	IT7LPC04	INTERNSHIP	0	0	0	30	20	50	2
		TOTAL						750	27
IA – INTERNAL ASSESSMENT ESE – END SEMESTER EXAM. L- LECTURE T-TUTORIAL P-PRACTICAL									

PROFESSIONAL ELECTIVE-5		PROFESSIONAL ELECTIVE-6	
Subject Code	Name	Subject Code	Name
IT7TPE11	COMPILER DESIGN	IT7TPE21	ADVANCE INFORMATION SYSTEMS
IT7TPE12	INFORMATION STORAGE & MANAGEMENT	IT7TPE22	MOBILE COMPUTING
IT7TPE13	ADVANCE COMPUTER ARCHITECTURE	IT7TPE23	INFORMATION RETRIVAL
IT7TPE14	BIG DATA	IT7TPE24	SOFTWARE ARCHITECTURE
IT7TPE15	COMBINATIONAL OPTIMIZATION	IT7TPE25	VLSI DESIGN

OPEN ELECTIVE-3	
Subject Code	Name
IT7TOE11	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
IT7TOE12	DIGITAL IMAGE PROCESSING
IT7TOE13	REAL TIME SYSTEM
IT7TOE14	WEB TECHNOLOGY
IT7TOE15	DISASTER MANAGEMENT

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
FOURTH YEAR, INFORMATION TECHNOLOGY
SEMESTER VIII
EFFECTIVE FROM SESSION 2018-19

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	IT8TPC01	CYBER SECURITY	3	0	0	40	60	100	3
2	IT8TPC02	SOFT COMPUTING	3	0	0	40	60	100	4
3		PROFESSIONAL ELECTIVE-7	3	1	0	40	60	100	3
4		PROFESSIONAL ELECTIVE-8	3	1	0	40	60	100	4
5		OPEN ELECTIVE- 4	3	0	0	40	60	100	3
PRACTICAL									
1	IT8LPC01	CYBER SECURITY LAB	0	0	3	30	20	50	2
2	IT8LPC02	SOFT COMPUTING LAB	0	0	3	30	20	50	2
3	IT8LPC03	PROJECT	0	0	6	60	40	100	4
4	IT8LPC04	SEMINAR	0	0	3	30	20	50	2
		TOTAL						750	27

IA – INTERNAL ASSESSMENT ESE – END SEMESTER EXAM. L- LECTURE T-TUTORIAL P-PRACTICAL

PROFESSIONAL ELECTIVE-7		PROFESSIONAL ELECTIVE-8	
Subject Code	Name	Subject Code	Name
IT8TPE11	OPEN SOURCE SYSTEM & PROGRAMMING	IT8TPE21	INTRODUCTION TO .NET TECHNOLOGY
IT8TPE12	GAME THEORY	IT8TPE22	INFORMATION SECURITY AUDIT AND RISK ASSESSMENT
IT8TPE13	OBJECT ORIENTED ANALYSIS AND DESIGN	IT8TPE23	DATA MINING
IT8TPE14	COMPUTER VISION	IT8TPE24	SOFTWARE TESTING AND QUALITY MANAGEMENT
IT8TPE15	HUMAN COMPUTER INTERFACE	IT8TPE25	IOT

OPEN ELECTIVE-4	
Subject Code	Name
IT8TOE11	DIGITAL SIGNAL PROCESSING
IT8TOE12	SUPPLY CHAIN MANAGEMENT
IT8TOE13	MANAGING INNOVATION AND ENTERPRENEURSHIP
IT8TOE14	GLOBAL STRATEGY AND TECHNOLOGY
IT8TOE15	COMPUTER APPLICATION IN SOCIAL SCIENCES

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPC01	3	0	0	3 hours	40	60	3

INTERNETWORKING AND NETWORK PROGRAMMING

UNIT I

Networking & TCP/IP: Protocols, Network architecture, IPv4 & IPv6 address structures, Subnetting and IP Addressing, Transport layer: TCP / UDP Ports, Sockets.

UNIT II

Internetworking: Routing and Switching, basic switching concepts and the operation of Cisco Switches and Router, STP, VLAN, PVSTP, IP Routing Technologies: Cisco IOS, OSPF, EIGRP, DHCP, ACL, NAT, SNMP.

UNIT III

Socket Programming: Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Programming Applications: Time & date routines, Chat, Email, Web server working method & programming.

UNIT IV

Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls – socket, connect, bind, listen, accept, fork, exec, close, I/O asynchronous & multiplexing models.

UNIT V

APIs & Winsock Programming, ASP, Java network programming, RMI, JSP, CORBA, HTTP server, FTP server, CGI programming.

List of Books:

1. Behrouz A. Forouzan: Data Communications And Networking, TMH
2. Todd Lammle: CCNA Routing and Switching Study Guide, SYBEX
3. Steven.W.R: UNIX Network Programming, PHI (VOL I& II)
4. Window Socket Programming by Bobb Quinn and Dave Schutes
5. Elliotte Rusty Harold: Java Network Programming, O'Reilly

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPC02	3	0	0	3 hours	40	60	3

WIRELESS SENSOR NETWORK

UNIT I – FUNDAMENTALS OF SENSOR NETWORKS
Introduction to computer and wireless sensor networks , Motivation for a network of Wireless Sensor nodes- Sensing and sensors-challenges and constraints - node architecture-sensing subsystem, processor subsystem-communication interfaces- prototypes, Application of Wireless sensors

UNITII- COMMUNICATION CHARACTERISTICS AND DEPLOYMENT MECHANISMS Wireless Transmission Technology and systems-Radio Technology Primer-Available Wireless Technologies - Hardware- Telosb, Micaz motes- Time Synchronization-Clock and the Synchronization Problem - Basics of time synchronization-Time synchronization protocols - Localization- Ranging Techniques- Range based Localization-Range Free Localization- Event driven Localization

UNIT III- MAC LAYER Overview-Wireless Mac Protocols-Characteristics of MAC protocols in Sensor networks – Contention free MAC Protocols- characteristics- Traffic Adaptive Medium Access-Y-MAC, Low energy Adaptive Clustering - Contention based MAC Protocols- Power Aware Multi-Access with signalling

UNIT IV- ROUTING IN WIRELESS SENSOR NETWORKS
Design Issues in WSN routing- Data Dissemination and Gathering-Routing Challenges in WSN - Flooding-Flat Based Routing – SAR, Directed Diffusion, Hierarchical Routing- LEACH, PEGASIS - Query Based Routing- Negotiation Based Routing- Geographical Based Routing-Transport layer- Transport protocol Design issues- Performance of Transport Control Protocols.

UNIT V - MIDDLEWARE AND SECURITY ISSUES WSN middleware principles-Middleware architecture-Existing middleware - operating systems for wireless sensor networks-performance and traffic management - Fundamentals of network security-challenges and attacks - Protocols and mechanisms for security.

REFERENCES
1. Waltenegus Dargie, Christian Poellabauer , "Fundamentals of Wireless Sensor Networks, Theory and Practice", Wiley Series on wireless Communication and Mobile Computing, 2011
2. Kazem Sohraby, Daniel manoli , "Wireless Sensor networks- Technology, Protocols and Applications", Wiley InterScience Publications 2010.
3. Bhaskar Krishnamachari , " Networking Wireless Sensors", Cambridge University Press, 2005
4. C.S Raghavendra, Krishna M.Sivalingam, Taiebznati , "Wireless Sensor Networks", Springer Science 2004.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPE11	3	1	0	4 hours	40	60	4

COMPILER DESIGN

UNIT I

INTRODUCTION: Introduction to Compiler, single and multi-pass compilers, Translators, Phases of Compilers, Compiler writing tools, Bootstrapping, Backpatching. Finite Automata and Lexical Analyzer: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata transition diagrams, Implementation of lexical analyzer Tool for lexical analyzer LEX, Error reporting.

UNIT II

SYNTAX ANALYSIS AND PARSING TECHNIQUES: Context free grammars, Bottom-up parsing and top down parsing. Top down Parsing : elimination of left recursion, recursive descent parsing, Predicative Parsing ,Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, the parser generator – YACC, error recovery in top down and bottom up parsing.

UNIT III

SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION : Synthesized and inherited attributes, dependency graph, Construction of syntax trees, bottom up and top down evaluation of attributes, Sattributed and L-attributed definitions ,Postfix notation: Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

UNIT IV

RUNTIME ENVIRONMENT: Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

UNIT V

CODE OPTIMIZATION & CODE GENERATION: Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.

Text Books:

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley, 2 nd Ed.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

Reference Books:

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design, Kakde.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPE13	3	1	0	4 hours	40	60	4

ADVANCED COMPUTER ARCHITECTURE

UNIT I : FUNDAMENTALS OF COMPUTER DESIGN

Review of Fundamentals of CPU, Memory and IO – Trends in technology, power, energy and cost, Dependability – Performance Evaluation

UNIT II : INSTRUCTION LEVEL PARALLELISM

ILP concepts – Pipelining overview – Compiler Techniques for Exposing ILP – Dynamic Branch Prediction – Dynamic Scheduling – Multiple instruction Issue – Hardware Based Speculation – Static scheduling – Multi-threading – Limitations of ILP – Case Studies.

UNIT III : DATA-LEVEL PARALLELISM

Vector architecture – SIMD extensions – Graphics Processing units – Loop level parallelism.

UNIT IV: THREAD LEVEL PARALLELISM

Symmetric and Distributed Shared Memory Architectures – Performance Issues – Synchronization – Models of Memory Consistency – Case studies: Intel i7 Processor, SMT & CMP Processors

UNIT V : MEMORY AND I/O

Cache Performance – Reducing Cache Miss Penalty and Miss Rate – Reducing Hit Time – Main Memory and Performance – Memory Technology. Types of Storage Devices – Buses – RAID – Reliability, Availability and Dependability – I/O Performance Measures.

TEXT BOOK:

- John L. Hennessey and David A Patterson, "Computer Architecture A Quantitative Approach", Morgan Kaufmann/ Elsevier, Fifth Edition, 2012.

REFERENCES:

- Kai Hwang and Faye Briggs, "Computer Architecture and Parallel Processing", Mc Graw-Hill International Edition, 2000.
- Sima D, Fountain T and Kacsuk P, "Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 2000.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPE14	3	1	0	4 hours	40	60	4

BIG DATA

UNIT I

CONCEPTS OF BIG DATA: Concept of Big Data Platform – Evolution and Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools- Applications of big data.

UNIT II

MINING DATA STREAMS :Introduction To Streams Concepts – characteristics, Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window, Role of high speed mass storage.

UNIT III

HADOOP: History of Hadoop- The Hadoop Distributed File System – Components of HadoopAnalyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Map Reduction Working - Anatomy of a Map Reduce Job run Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features.

UNIT IV

HADOOP ENVIRONMENT: Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks Hadoop in the cloud.

UNIT V

FRAMEWORKS: Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper. Visualizations - Visual data analysis techniques, interaction techniques.

Text Books:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Anand Rajaraman and Jeffrey David Ullman,"Mining of Massive Datasets", Cambridge University Press, 2012.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPE22	3	1	0	4 hours	40	60	4

MOBILE COMPUTING

UNIT I INTRODUCTION

Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

UNIT II MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

UNIT III MOBILE TELECOMMUNICATION SYSTEM

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

UNIT-III WIRELESS NETWORKS Wireless LAN:

IEEE 802.11, HIPERLAN, Wireless ATM, Services, Reference Model, Functions, Handover, Location Management, Addressing, QOS.

UNIT-V MOBILE SYSETEM DEVELOPMENT & SUPPORT:

File Systems; World Wide Web, HTTP; HTML; System Architectures; WAP; Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Environment.

Text Book

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia-Addison Wesley Longman PTE. Ltd.

Reference Books:

1. Mobile Data Wireless LAN Technologies – Dayem, Rifaat A.; Prentice Hall International.
2. The Essential Guide To Wireless Communication Applications – Dornan, A.; 1st Indian Reprint, Pearson Education Asia.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPE24	3	1	0	4 hours	40	60	4

SOFTWARE ARCHITECTURE

Unit-1

Basic Concepts: Concepts of Software Architecture, Models, Processes, Stakeholders.

Designing Architectures: The Design Process, Architectural Conception, Refined Experience in Action: Styles and Architectural Patterns, Architectural Conception in Absence of Experience.

Unit-2

Connectors: Connectors in Action: A Motivating Example, Connector Foundations, Connector Roles, Connector Types and Their Variation Dimensions, Example Connectors.

Unit-3

Modeling: Modeling Concepts, Ambiguity, Accuracy, and Precision, Complex Modeling: Mixed Content and Multiple Views, Evaluating Modeling Techniques, Specific Modeling Techniques.

Unit-3

Analysis: Analysis Goals, Scope of Analysis, Architectural Concern being Analyzed, Level of Formality of Architectural Models, Type of Analysis, Analysis Techniques.

Implementation and Deployment: Concepts, Existing Frameworks, Software Architecture and Deployment, Software Architecture and Mobility.

Unit-4

Conventional Architectural styles: Pipes and Filters, Event- based, Implicit Invocation, Layered systems, Repositories, Interpreters, Process control

Unit-5

Applied Architectures and Styles: Distributed and Networked Architectures, Architectures for Network-Based Applications, Decentralized Architectures,Service-Oriented Architectures and Web Services.

Text Books:

1. "Software Architecture: Foundations, Theory, and Practice" by Richard N. Taylor, NenadMedvidovic, Eric Dashofy , ISBN: 978-0-470-16774-8

2. M. Shaw: Software Architecture Perspectives on an Emerging Discipline, Prentice-Hall.

3. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, Pearson

References:

1. "Pattern Oriented Software Architecture" by Frank Buchnanetal, Wiley India.
2. "The Art of Software Architecture" by Stephen T. Albin

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TPE25	3	1	0	4 hours	40	60	4

VLSI Design

Unit-I: Overview of VLSI Design Methodology

VLSI design process-Architectural design-Logical design-Physical design-Layout styles-Full customsemi custom approaches. Basic Electrical properties of MOS & CMOS circuits: NMOS enhancement transistor- PMOS enhancement transistor-threshold voltage-threshold voltage equations-MOS devices equations-Basic DC equations-Second order effects-MOS modules-small signal AC characteristics - NMOS inverter-Steered input to an NMOS modules-Depletion mode & enhancement mode pull upsCMOS inverter-DC characteristics-Inverter delay-pass transistor- transmission gate

Unit-II: VLSI Fabrication Techniques

An overview of wafer fabrication -wafer Processing-Oxidation-Patterning- Diffusion -Ion implantation- Deposition-Silicon gate NMOS process-CMOS processes-Nwell-Pwell-Wintub-Silicon on insulator- CMOS process enhancement-Interconnect-Circuit elements.

Unit-III: Layout Design Rules

Need for design rules-Mead Conway design rule for the silicon gate NMOS process-CMOS Nwell/Pwell design rules-Simple layout examples-sheet resistance-area Capacitance-Wiring Capacitance-drive large capacitive loads

Unit-IV: Logic Design

Switch logic-pass transistor & transmission gate-Gate logic-Inverter-two point, NAND gate-NOR gate-other forms of CMOS logic-Dynamic CMOS logic-clocked CMOS logic-Precharged domino CMOS logic-structured design-simple combinational logic design examples-Parity generatorMultiplexes-clocked sequential circuits- two phase clocking-charge storage-dynamic register elementNMOS &CMOS- dynamic shift register-semi static register-JK flip flop circuit.

Unit-V: Subsystem Design Process

Design of a 4 bit shifter-General arrangement of a 4 bit arithmetic processor-Design of a ALU subsystem- Implementing ALU functions with an adder-Carry look ahead adders-Multipliers-serial parallel multipliers- Pipelined multiplier array-Modified Booth's Algorithm

Text Books:

1. Douglas A.Pucknell & Kamran Eshranghian,"Basic VLSI Design", Prentice Hall of India, New Delhi,3rd edition 1994.
2. Neil H.E.West & Kamran Eshranghian,"Principles of CMOS VLSI Design: A system perspective", Addison-Wesley, 2nd edition, 1993.
3. Amar Mukherjee, "Introduction to NMOS & CMOS VLSI system design" Prentice Hall, USA, 1986

Reference books:

1. Caver Mead & Lynn Conway, "Introduction to VLSI system," Addison Wesley. Eugene D.Fabricus,"Introduction to VLSI design", McGraw Hill International edition, 1990.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TOE11	3	0	0	3 hours	40	60	3

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

UNIT I Overview & Search Techniques:
Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

UNIT II Knowledge Representation (KR):
Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning: Use of Back tracking, Structured KR: Semantic Net - slots, inheritance, Frames- exceptions and defaults attached predicates, Conceptual Dependency formalism and other knowledge representations.

UNIT III Handling uncertainty & Learning:
Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve Bayesian system, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer Theory, Fuzzy Logic, Fuzzy function, Fuzzy measure, Non monotonic reasoning: Dependency directed backtracking, Truth maintenance systems. Learning: Concept of learning, Learning model, learning decision tree, Paradigms of machine learning, Supervised & Unsupervised learning, Example of learning, Learning by induction, Learning using Neural Networks.

UNIT IV Natural Language Processing (NLP) & Planning:
Overview of NLP tasks, Parsing, Machine translation, Components of Planning System, Planning agent, State-Goal & Action Representation, Forward planning, backward chaining, Planning example: partial-order planner, Block world.

UNIT V Expert System & AI languages:
Need & Justification for expert systems- cognitive problems, Expert System Architectures, Rule based systems, Non production system, knowledge acquisition, Case studies of expert system. AI language: Prolog syntax, Programming with prolog, backtracking in prolog, Lisp syntax, Lisp programming.

Text Books:-
1. Artificial Intelligence by Elaine Rich and Kevin Knight, Tata MeGraw Hill. 2. Introduction to Artificial Intelligence and Expert Systems by Dan W.Patterson, Prentice Hall of India.

Reference Books:-
1. Principles of Artificial Intelligence by Nils J.Nilsson, Narosa Publishing house.
2. Programming in PROLOG by Clocksin & C.S. Melish, Narosa Publishing house. 3. Rule based Expert Systems-A practical Introduction by M. Sasikumar, S.Ramani, et. al., Narosa Publishing House.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TOE12	3	0	0	3 hours	40	60	3

DIGITAL IMAGE PROCESSING

UNIT – I

Introduction: Digital Image Representation, Components of Digital Image Processing System. Elements of Visual Perception, Image Sensing and Acquisition, Simple Image Formation Model, Image Sampling and Quantization, Basic Relationship between Pixels, Image Transforms.

UNIT –II

Intensity Transformation and Filtering: Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing and Sharpening Spatial Filters, Fundamentals of Frequency Domain Filtering, Smoothing and Sharpening Frequency Domain Filters.

UNIT – III

Image Enhancement: Spatial and Frequency domain methods, Contrast Stretching, Bit Extraction, Range Compression, Algebraic Operations on an Image, Histogram Modelling, Image Smoothing, Multispectral Image Enhancement, Color Image Enhancement.

UNIT – IV

Image Restoration and Compression: Image Restoration: Image Degradation Model, Restoration in the Presence of Noise only, Periodic Noise Reduction by Frequency Domain Filtering, Inverse & Wiener Filtering. Image Compression: Basics of Image Compression, Image Compression Models, Basic Compression Methods- Huffman Coding, LZW Coding, Bit Plane Coding, Predictive Coding, Wavelet Coding.

UNIT – V

Image Analysis and Applications: Image Analysis: Edge Detection, Segmentation, Texture, Image Features and its Extraction. Applications of Image Processing: Fingerprint Recognition, Face Recognition, Iris Recognition, Speaker Recognition, Medical Image Processing, Image Processing in Remote Sensing, Digital Watermarking.

Text Books:

1. Digital Image Processing, R C Gonzalez & R E Woods, Pearson.
2. Digital Image Processing- An Algorithm Approach, Madhuri A. Joshi, PHI.

Reference Books:

1. Digital Image Processing- W K Pratt, Wiley International.
2. Digital Image Processing & Analysis- B. Chanda & D. Dutta Majumder, PHI.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TOE13	3	0	0	3 hours	40	60	3

REAL TIME SYSTEMS

Unit-I

Basic Real- Time Concepts, Computer Hardware, Language Issues: Basic component Architecture, terminology, Real Time Design Issues, CPU, Memories, Input- Output, Other Devices Language Features, Survey of Commonly Used Programming Languages, Code Generation

Unit-II

Software life cycle, Real Time Specification and Design Techniques, Real Time Kernels: Phases of software life cycle, Non-temporal Transition in the software life cycle, Spiral model, Natural languages, Mathematical Specification, Flow Charts, Structure Charts, Pseudocode and programmable Design Languages, Finite state Automata, Data Flow Diagrams, Petrinets, Statecharts, Polled Loop Systems, phase/State Driven Code, Coroutines, Interrupt Driven System, Foreground/Background Systems Full Featured Real Time OS

Unit-III

Intertask Communication and Synchronization, Real Time memory Management, System Performance Analysis and Optimization: Buffering Data, Mail boxes Critical Region, Semaphores, Event Flags and Signals, Deadlock, Process Stack Management, Dynamic Allocation, Static Schemes, Response Time Calculation, Interuupt Latency, Time Loading and its Measurement, Scheduling NP Complete, Relocating Response Times And time Loading, Analysis of Memory Requirements, Reducing Memory Loading, I/O Performance.

Unit-IV

Queuing Models, Reliability, Testing, And Fault Tolerance, Multiprocessing Systems: Basic Buffer size Calculation, Classical Queuing Theory, Little's Law, Faults, Failures ,bugs AND effects. Reliability, Testing, Fault Tolerence, Classification of Architectures, Distributed Systems, Non Von Neumann Architectures.

Unit-V

Hardware/ Software Integration, Real Time Applications: Goals of Real Time System Integration, Tools, Methodology, The Software HesisenbergUncertainity Principle, Real Time Systems As Complex System, First Real Time Application Real Time Databases, Real time Image Processing Real Time UNIX, building Real Time Applications with Real Time Programming Languages.

Text Books :

1. Real Time System, Jane W.S.Liu 2. Real Time Systems Design and Analysis by Phillip A. Laplante,PHI

Reference Books:

1 Hard Real Time Computing Systems Predictable Scheduling Algorithms and applications by Giorgio C. Buttazzo

2 Real Time Design Patterns: Robust Scalable Architecture for Real Time System by BrucePowel Douglass 3. Real Time System: Scheduling, Analysis and Verification by Albert M.K. Change

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT7TOE14	3	0	0	3 hours	40	60	3

WEB TECHNOLOGY

UNIT 1

Concept of WWW, Concepts of effective web design, Designing effective navigation Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5

UNIT 2

Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3 JavaScript : Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations, DHTML : Combining HTML, CSS and Javascript, Events and buttons

UNIT 3

Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT

UNIT 4

Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP

UNIT 5

PHP and MySQL : Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP mydmin and database bugs

Reference Books:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press
4. Web Design, Joel Sklar, Cengage Learning
5. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
6. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPC01	3	0	0	3 hours	40	60	3

CYBER SECURITY

UNIT I

A Model for Network Security Services, Mechanisms, and Attacks, Viruses & Worms, The OSI Security Architecture, symmetric cipher model, substitution techniques Transposition techniques, Steganography.

UNIT II

Block ciphers and the data encryption standard , simplified DES , Block cipher principles , The data Encryption Standard , Differential and Linear Cryptanalysis ,Block Cipher Design principles , The AES cipher , Triple DES , blowfish , RC5, Rc4 Stream Cipher

UNIT III

principles of public –Key Cryptosystems , public –Key cryptosystems , Requirements for public –Key Cryptosystems, The RSA Algorithm , Key management , key Distribution ,Hash Functions SHA, MD5. Diffie-Hellman Key Exchange Algorithm

UNIT IV

WEB & IP Security: Web Security Threats, SSL Architecture, SSL Record Protocol, Alert Protocol , Handshake Protocol , Transport Layer Security , Secure Electronic Transaction , IP Security

UNIT V

Intruders : Intrusion Techniques , Firewall Design principles , Block Chain Technology, BitCoin, Types of Firewalls .

List of Books:

1. Cryptography and Network Security, Principles and Practice Third edition , William Stallings .
2. Atul Kahate, " Cryptography and Network Security," TMH
3. Introduction to network security, Krawetz, Cengage

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE11	3	0	0	3 hours	40	60	3

OPEN SOURCE SYSTEMS AND PROGRAMMING

UNIT 1

Open Source System Fundamentals: Open Source Operating Systems, Linux, GNU, POSIX standards, open source software development, open source licenses.Kernel, shell, memory management, Inter-process communication, file system, device drivers, Networking, modules and debugging.

UNIT 2

System Programming: System Calls, Library Functions, GNU C library, error handling, File I/O handling, process, IDs, memory layout, virtual memory, stack, command line arguments, memory allocation, user and groups, time, system limits and options, system and process information,

UNIT 3

File Systems: File I/O buffering, devices, I-nodes, Virtual file system, Mount point, file attributes, access control list, directories and links, monitoring file events, file locking

UNIT 4

Process: creation, termination, monitoring, execution, signals, handlers, timers, threads, process control, priorities and scheduling, daemons, secure privileged programs, capabilities, login accounting, shared libraries, pipes,

UNIT 5

Security: Security Policies, SE Linux,GRsecurity, tripwire, firewalls, network access control, authorization control, SSH, openSSH, protecting files and emails, testing and monitoring.

References

1. "The Linux Programming Interface", Michael Kerrisk, nostarch press,
2. "Linux kernel programming", Michael Beck ET. Al., Pearson Education
3. "Linux Security Cookbook", Daniel j. Barrett ET. Al., O'Reilly publication,

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPC02	3	1	0	4 hours	40	60	4

SOFT COMPUTING

Unit I: Introduction to Neural Network:
Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervise & Unsupervised) and activation function ,Models of ANNFeed forward network and feedback network, Learning Rules- Hebbian, Delta, Perceptron Learningand Windrow-Hoff,winnertakeall.

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

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

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

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

Text Book
1. S.N. Shivnandam, "Principle of soft computing", Wiley.
2. S. Rajshekaran and G.A.V. Pai, "Neural Network , Fuzzy logic And Genetic Algorithm", PHI.

References Book: -
1. Jack M. Zurada, "Introduction to Artificial Neural Network System" JAico Publication.
2. Simon Haykins, "Neural Network- A Comprehensive Foudation"
3. Timothy J.Ross, "Fuzzy logic with Engineering Applications", McGraw-Hills 1

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE12	3	1	0	4 hours	40	60	4

GAME THEORY

Unit 1

Introduction to game theory, routing games and mechanism design, Strategies, cost and payoffs; prisoner's dilemma, nash equilibrium, Strategic games; Best response; dominant Strategies; pure Strategy v/s mixed Strategy.

Unit 2

Repeated games; Bayesian games Routing games; Selfish routing; Quantifying inefficiency of equilibria; Price of Anarchy

Unit 3

Social optimum; price of stability; Scheduling games.
Population games; Evolutionary game theory;

Unit 4

Evolutionary stable Strategy; Replicator dynamics. Non cooperative games , cooperative game theory

Unit 5

Nash bargaining Mechanism design,Algorithmic mechanism design, distributed algorithmic mechanism design

Text Books:

1.Game Theory,by D. Fudenberg and j.Tirole, MIT press 1991.
2.Algorithmic Game Theory, edited by N.nisan, T. Roughgarden, E. Tardos, and v.v. vazirani,Cambridge University press 2007.

References books:

1.Auction Thoery, by v. Krishna, academic press,2002.
2.A course in Game theory, by M.J . Osborne,A.Rubinstein,MIT press,1994.
3.Dynamic Non cooperative Game Theory, byT Basar and G.J. Olsder,1999
4. Evolutionary Game Theory, Jorgen W.Weibull,The MIT presss 1997.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE13	3	1	0	4 hours	40	60	4

OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I INTRODUCTION TO UML
Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II OBJECT MODELING :
Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, candidates keys, constraints.

UNIT III DYNAMIC MODELING :
Events and states, operations, nested state diagrams and concurrency, advanceddynamic modeling concept, a sample dynamic model.

UNIT IV FUNCTIONAL MODELING :
Data flow diagram, specifying operations, constraints, a sample functional model. OMT (Object modeling techniques) methodologies, SA/SD, JSD

UNIT V: ARCHITECTURAL MODELING
Architectural Modeling : Component, Deployment, Component diagrams and Deployment diagrams.

Text Books

1. James Rumbaugh et al " object Oriented Modeling and design" PHI
2. Herbert Schieldt " The complete Reference : Java" TMH
3. E. Balagurusamy " Programming in Java", TMH

Reference Books :

1. Booch Grady, " Object Oriented Analysis & design with application 3/e", Person
2. Bjarne Stroustrup " C++ Programming Language" Addison Wesley
3. E Balagurusami " Object Oriented Programming with C++, TMH

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE14	3	1	0	4 hours	40	60	4

COMPUTER VISION

Unit-1

Recognition Methodology: Conditioning, Labeling, Grouping,Extracting, Matching.
Morphological Image Processing: Introduction, Dilation, Erosion,Opening, Closing,Hit-or-Miss transformation, Morphologicalalgorithm operations on binary images, Morphological algorithm
Operations on gray-scale images, Thinning, Thickining, Regiongrowing, region shrinking.

Unit-2

Image Representation and Description: Representation schemes,Boundary descriptors, Region descriptors
Binary Machine Vision: Thresholding, Segmentation, Connectedcomponent labeling, Hierarchal segmentation, Spatial clustering,Split & merge, Rule-based Segmentation, Motion-based
segmentation.

Unit-3

Area Extraction: Concepts, Data-structures, Edge, Line-Linking,Hough transform, Line fitting, Curve fitting (Least-square fitting).
Region Analysis: Region properties, External points, Spatialmoments, Mixed spatial gray-level moments, Boundary analysis:Signature properties, Shape numbers.

Unit-4

Facet Model Recognition: Labeling lines, Understanding linedrawings,Classification of shapes by labeling of edges, Recognition ofshapes, Consisting labeling problem, Back-tracking AlgorithmPerspective Projective geometry, Inverse perspective
Projection, Photogrammetry - from 2D to 3D, Image matching:Intensity matching of ID signals, Matching of 2D image,Hierarchical image matching.

Unit-5

Object Models And Matching: 2D representation, Global vs. Localfeatures
General Frame Works For Matching: Distance relational approach,Orderedstructural matching, View class matching, Modelsdatabase organization.

BOOKS

Text Books:

1.RobertHaralick and Linda Shapiro, "Computer and Robot Vision", Vol I, II, Addison-Wesley, 1993.
2. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach"

References:

3. 1. Milan Sonka,VaclavHlavac, Roger Boyle, "Image Processing, Analysis, and Machine Vision" Thomson Learning

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE15	3	1	0	4 hours	40	60	4

HUMAN COMPUTER INTERFACE

UNIT1: Introduction0 The human, The computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles, and Theories

UNIT2: Design Process- Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User support

UNIT3: Models and Theories0 Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models,Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction

UNIT4: Interaction Styles- Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation

UNIT5: Design Issues- Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization

Text Books:

1,"Human Computer Interaction" by Alan Dix, Janet Finlay , ISBN :9788131717035, Pearson Education (2004)

2."Designing the User Interface - Strategies for Effective Human Computer Interaction", by Ben Shneiderman

ISBN : 9788131732557, Pearson Education (2010).

Reference Books:

1.Usability Engineering: Scenario-Based Development of Human-Computer Interaction , by Rosson, M. and
Carroll, J. (2002)

2.The Essentials of Interaction Design, by Cooper, et al. , Wiley Publishing(2007)

3.Usability Engineering, by Nielsen, J. Morgan Kaufmann, San Francisco, 1993. ISBN 0-12-518406-9

4.The Resonant Interface: HCI Foundations for Interaction Design , by Heim, S. , Addison-Wesley. (2007)

5.Usability engineering: scenario-based development of human-computer interaction, By Rosson, M.B &
Carroll, J.M. , Morgan Kaufman.(2002)

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE21	3	1	0	4 hours	40	60	4

INTRODUCTION TO .NET TECHNOLOGY

UNIT I

Introduction to .NET framework, Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation, Automatic Memory Management, CLR, The Framework Class Library, IDE of .Net, Introduction to C# Language

UNIT II

.Net Elements, Variables and constants, Data types, Operators , Loops and Program flow, Decision statements Type, Arrays with various types , Collections , Windows Forms , Windows controls – Button, Check box, Combo box, Label, List box, Radio Button, Text box, Various Events , Creating menus – menu items – context menu - Common dialog boxes & MDI

UNIT III

Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset. Connecting to Data Source, Accessing Data with Data set and Data Reader - Create an ADO.NET application - Using Stored Procedures.

UNIT IV

ASP.NET Features, IIS Configuration, ASP.Net Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding Web controls to a Page.

UNIT V

XML Serialization in the .NET Framework, Introduction to Web services and AJAX, Crystal Reports.

List of Books:

1. Introduction to Visual basic.NET - NIIT Prentice Hall of India,2005
2. Introducing Microsoft .NET- David S. Platt Microsoft Press", Saarc Edition, 2001
3. Introduction to Microsoft® ASP.NET Work Book - Microsoft- Microsoft Press
4. Developing XML Web Services Using Microsoft® ASP.NET -Microsoft- Microsoft Press
5. Designing Microsoft ASP.NET Applications-Douglas J. Reilly-Microsoft Press
6. ASP.NET-Danny Ryan and Tommy Ryan-Hungry Minds Maran Graphics

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE22	3	1	0	4 hours	40	60	4

INFORMATION SECURITY AUDIT AND RISK ASSESSMENT

UNIT I - INTRODUCTION

Information Security Assessments, security audit process, Information Security Risk Assessment Overview- Drivers, Laws and Regulations- Risk Assessment Frame work and methodology, Generations of risk assessment techniques

UNIT II – VULNERABILITIES and PENETRATION TESTING

Information gathering methodologies,security threats, DNS Enumerations SocialEngineering attacks, Port Scanning, Network Scanning, Vulnerability Scanning,OS Fingerprinting, Enumeration attacks, Active and passive sniffing, ARP Poisoning, Session Hijacking, DNS Spoofing, SQL Injection attack, Countermeasures.

UNIT III – DATA COLLECTION and ANALYSIS

Data Collection Mechanisms, IT Assets, Profile & Control Survey Consolidation, Compiling Observations, Preparation of catalogues, System Risk Computation, Impact Analysis Scheme, Final Risk Score.

UNIT IV - RISK ASSESSMENT

System Risk Analysis, Risk Prioritization, System Specific Risk Treatment, Issue Registers, Methodology, Result, Risk Registers Post Mortem.

UNIT V - SECURITY AUDIT PROCESS

Pre-planning audit, Audit Risk Assessment, Performing Audit, Internal Controls, Audit Evidence, Audit Testing, Audit Finding, Follow-up activities

REFERENCES

1. Mark Talabis, "Information Security Risk Assessment Toolkit: PracticalAssessments through Data Collection and Data Analysis", Syngress; st1 edition,ISBN: 978-1-59749-735-0, 2012.
2. David L. Cannon, "CISA Certified Information Systems Auditor Study Guide",John Wiley & Sons, ISBN: 978-0-470-23152-4, 2009.
3. Shakeel Ali &TediHeriyanto, "Backtrack -4: Assuring security by penetrationtesting", PACKT Publishing., ISBN: 978-1-849513-94-4, 2011.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE23	3	1	0	4 hours	40	60	4

DATA MINING

UNIT I

Data ware Housing: What is a data warehouse?, definition, Multidimensional data model, OLAP operation, warehouse schema, data ware housing architecture, warehouse serve, metadata, OLAP, engine, Data warehousing backend process, other features.

Data Mining: what is data mining? KDD Vs. data mining, DBMS Vs DM other related areas, DM techniques, other mining problem, issues & challenges in DM, Dm application areas.

UNIT II

Association rules: Methods to discover association rules, apriori algorithm ,partition algorithm, pincer –search algorithm, Dynamic Item set counting algorithm, FP-tree Growth algorithm, Incremental algorithm, Border algorithm, hierarchical association rule, generalized association rules, Association rules with item constraints.

UNIT III

Clustering Techniques: Introduction, clustering paradigms, partitioning algorithms, k-Medoid Algorithm, CLARA, CLARANS, Hierarchical clustering, DBSCAN, BIRCH, CURE, Categorical clustering algorithms , STIRR, ROCK , CACTUS.

UNIT IV

Decision trees: Tree construction principal, Best spilt splitting indices, splitting criteria, Decision tree construction algorithm, CART, ID3, C4.5, CHAID, Decision tree construction with pre-sorting, rainforest, approximate method, CLOUDS, BOAT, pruning technique, integration of pruning & construction, Hierarchcal associtation rule.

UNIT V

Web Mining: Web mining ,web content mining ,web structure mining ,web usage mining ,text mining , unstructured text , Episode rule discovery for texts , Hierarchy of categories , text clustering , Paging algorithm.

List of Books:

1. Data Mining techniques – Arun K Pujari Universities press
2. Data Mining concepts & techniques – Jiawei han , Micheline kamber Morgan Kaufmann publisher Elsevier India –2001
3. Data Mining methods for knowledge Discovery –Cios , Pedrycz , swiniarski Kluwer academic publishers London –1998

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE24	3	1	0	4 hours	40	60	4

SOFTWARE TESTING & QUALITY MANAGAEMENT

Unit-I

Quality Revolution, Software Quality, Role of Testing, Objectives of Testing, Concept of Complete Testing, Central Issue of Testing, Sources of Information for Test Case selection, Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management.

Unit-II

Basic Concepts of Testing Theory, Theory of Goodenough and Gerhart, Theory of Weyuker and Ostrand, Theory of Gourlay, Adequacy of Testing, Limitations of Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Debugging.

Unit-III

Outline of Control Flow Testing, Control Flow Graph, Paths in Control Flow Graphs, Path Selection Criteria, Data Flow Testing criteria, Comparison of Data Flow and Test Selection Criteria, Domain Error, Testing of Domain Errors.

Unit-IV

System Test design, Test design Factors, Requirement Identification, Test Objective Identification, Structure of a System Test Plan, Assumptions, Test Approach, Test Suite Structure, Types of Acceptance Testing

Unit-V

Five Views of Software Quality, Quality Control, Quality assurance, Cost of quality, Software Quality Assurance, SQA Plan, ISO 9000, Capability Maturity Model, McCall s Quality Factors.

Text Books

1. KshirasagarNaik, "Software Testing and Quality Assurance", John Wiley & Sons.
2. William Perry, "Effective Methods for Software Testing", John Wiley & Sons.

Reference Books

1. CemKaner and Jack Falk, "Testing Computer Software", Wiley.
2. Ron Patton, "Software Testing", SAMS Publications.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TPE25	3	1	0	4 hours	40	60	4

IOT

UNIT I – OVERVIEW IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

UNIT II – REFERENCE ARCHITECTURE IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints-Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

UNIT III – IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), WirelessHART, Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP

UNIT IV – TRANSPORT & SESSION LAYER PROTOCOLS Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT

UNIT V – SERVICE LAYER PROTOCOLS & SECURITY Service Layer -oneM2M, ETSI M2M, OMA, BBF – Security in IoT Protocols – MAC 802.15.4 , 6LoWPAN, RPL, Application Layer

REFERENCES

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118- 47347-4, Willy Publications
5. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014. 6. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.htm

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
IT8TOE11	3	0	0	3 hours	40	60	3

DIGITAL SIGNAL PROCESSING

UNIT I

Analysis of Discrete Time Signals and Systems: Discrete Fourier analysis, Classification, Discrete Time Fourier Transform (DTFT) & its properties, Inverse DTFT. Discrete Fourier Transform (DFT) & its Properties, Inverse DFT. Fast Fourier Transform, Properties, Types of FFT, N-point Radix-2 FFT, Inverse FFT. Discrete Linear Convolution, Circular Convolution, Fast Convolution, Frequency Response of LTI system using Discrete Fourier Analysis. Discrete Cosine Transform.

UNIT II

Implementation of Discrete-time Systems: Structures for the Realization of discrete-time systems, Structures for FIR systems: Direct, Cascade, Frequency Sampling & Lattice structures. Structures for IIR systems: Direct, Signal Flow Graphs & Transposed, Cascade, Parallel, Lattice & Lattice-Ladder structures. State space system analysis and structures.

UNIT III

FIR Filter Design: Symmetric and Anti-symmetric FIR filters, FIR Filter design by window method (Rectangular, Bartlett, Hamming, Hanning, Blackman and Kaiser window), Frequency Sampling method, Optimum approximation of FIR filters, Design of FIR differentiators, Design of Hilbert transformers.

UNIT IV

IIR Filter Design: Design of Discrete-time IIR filters from Continuous-time Filters: Filter design by Impulse invariant and bilinear transformation method: Butterworth, Chebyshev& Elliptic approximation Filter, Frequency transformation.

UNIT V

Multirate Digital Signal Processing: Introduction, Decimation, Interpolation, Sampling rate conversion by rational factor, Filter design and implementation for sampling rate conversion: Direct form FIR digital filter structure, Polyphase filter structure, Time varying digital filter structure, Sampling rate conversion by an arbitrary factor.

Name of Text Books:

1.Discrete Time Signal Processing by A.V. Oppenheim, R. W. Schafer, & John R. Buck. , 2nd Edition, Prentice Hall, 1999. (Unit I, Unit II, Unit III, Unit IV)
2.Digital Signal Processing: Principles, Algorithms and Applications by John G. Proakis& D.G. Manolakis, Prentice Hall, 1997. (Unit II, Unit III, Unit IV, Unit V)
3.Digital Signal Processing by S. K. Mitra, 3rd edition, McGraw-Hill, 2007. (Unit V)

Name of Reference Books:

1. Signals and Systems by A. V. Oppenheim, A. S. Willsky& S. H. NAWAB, 2nd edition, Prentice Hall, 1996.
2. Digital Signal Processing by S. Salivahanan, A. Vallavaraj, C. Gnanapriya, Tata McGraw-Hill, 2000.
3. Digital Signal Processing by A. Anand Kumar, PHI Learning Pvt. Ltd, 2012.