

**J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
B. TECH. ELECTRONICS AND COMPUTER ENGINEERING  
(COURSE STRUCTURE 2013-2014) R12 REGULATIONS**

**I YEAR**

<b>CODE</b>	<b>Subject Name</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	English	2	0	4
	Mathematics - I	3	1	6
	Mathematic methods	3	1	6
	Engineering physics	2	1	4
	Engineering chemistry	2	0	4
	Computer Programming & data structures	3	0	6
	Engineering drawing	2	3	4
	Computer programming lab	-	3	4
	Engineering physics/engineering chemistry lab	-	3	4
	English language communication skills lab	-	3	4
	IT Workshop/Engineering workshop	-	<b>3</b>	<b>4</b>
	<b>Total</b>	<b>17</b>	<b>18</b>	<b>50</b>

**II YEAR I – SEMESTER**

<b>CODE</b>	<b>Subject Name</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	Mathematics-III	3	1	3
	Electronic Devices & Circuits	4	0	4
	Fundamentals of Electrical Engineering	3	1	3
	Object Oriented Programming	4	1	4
	Switching Theory and Logic Design	4	1	4
	Fundamentals operating systems	3	1	3
	Electronic Devices and Circuits Lab	-	0/3/0	2
	Object oriented programming lab	-	0/3/0	2
	Total	21	5/6/0	25

**II YEAR II – SEMESTER**

<b>CODE</b>	<b>Subject Name</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	Environmental studies	3	1/0/0	3
	Electronic circuit analysis	4	0/0/0	4
	Computer organization & architecture	4	1/0/0	4
	Analog & digital IC applications	4	1/0/0	4
	Structured digital system design	4	1/0/0	4
	Analog & digital IC applications lab	0	0/3/0	2
	Electronic circuit analysis lab	0	0/3/0	2
	Advanced data structures lab	0	0/3/0	2
	Total	18	0/9/0	25

**III YEAR I – SEMESTER**

<b>CODE</b>	<b>Subject Name</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	Managerial economics and financial analysis	4	1	4
	Data Base Management Systems	4	1	4
	Software Engineering	3	1	3
	Digital signal processing	4	0	4
	Compiler design	3	1	3
	Design & analysis of algorithms	3	1	3
	Compiler design lab	0	3	2
	Digital signal processing lab	0	3	2
	<b>Total</b>	<b>21</b>		<b>25</b>

**III YEAR II – SEMESTER**

<b>CODE</b>	<b>Subject Name</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	Management Science	3	1	3
	Microprocessors and Microcontrollers	4	1	4
	<u>Open Elective</u> 1. Embedded systems 2. Intellectual property rights 3. Nano technology	4	1	4
	Data warehousing and data mining	4	0	4
	Principles of Communications	4	1	4
	Microprocessors and Microcontroller Lab	0	3	2
	Advanced English communication skills lab	0	3	2
	Computer networks & operating systems Lab	0	3	2
	<b>Total</b>	<b>19</b>		<b>25</b>

#### IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
	VLSI Design	4	-	4
	Computer Networks	3	1	3
	Digital Image Processing	4	1	4
	Web technologies	3	1	3
	<b>Elective — I</b> 1. Artificial Intelligence 2. Artificial neural networks 3. Design patterns 4. Computer Graphics	<b>3</b>	<b>1</b>	<b>3</b>
	<b>Elective — II</b> 1. Mobile Computing 2. Distributed systems	4	1	4
	Software engineering Lab	0	3	2
	Web technologies Lab	0	3	2
	<b>Total</b>	<b>21</b>	<b>9</b>	<b>25</b>

#### IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	<b>ELECTIVE - IV</b> 1. Information retrirval systems 2. Coding theory & techniques 3. Network security	3	1	3
	<b>Elective – IV</b> 1. Multimedia & rich internet applications 2. Cellular and mobile communications 3. Data communication systems	3	1	3
	Reliability engineering	3	0	3
	Industry Oriented Mini Project	0	-	2
	Seminar	0	<b>6</b>	2
	Project Work	0	15	10
	Comprehensive Viva	0	-	2
	<b>Total</b>	<b>9</b>	<b>24</b>	<b>25</b>

**Note:** All End Examinations (Theory and Practical) are of three hours duration.

**T-Tutorial            L — Theory            P — Practical    0-Drawing    C — Credits**

Note: Candidate will register for 200 credits and shall obtain 194 credits for award of Degree  
**HOD-ECM**

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MATHEMATICS – III

**UNIT – I: Special Functions I**

Gamma and Beta Functions, Series solutions to differential equations, – Their properties – evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality.

**UNIT-II: Special Functions II**

Legendre polynomials – Properties – Rodrigue’s formula – Recurrence relations – Orthogonality. Chebycher’s polynomials – properties – recurrence relations - Orthogonality

**UNIT-III: Functions of a complex variable**

Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann conditions, Maxima – Minima principle, Harmonic and conjugate harmonic functions – Milne – Thompson method. Elementary functions, general power  $Z^c$  principal value Logarithmic function.

**UNIT-IV: Complex integration**

Line integral – evaluation along a path and by indefinite integration – Cauchy’s integral theorem – Cauchy’s integral formula – Generalized integral formula.

**UNIT-V: Complex power series**

Radius of convergence – Expansion in Taylor’s series, Maclaurin’s series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. (Distinction between the real analyticity and complex analyticity)

**UNIT-VI: Contour Integration**

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem.

**UNIT-VII: Evaluation of integrals of the type**

(a) Improper real integrals  $\int_{-\infty}^{\infty} f(x)dx$       (b)  $\int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$

(c)  $\int_{-\infty}^{\infty} e^{imx} f(x)dx$       (d) Integrals by indentation.

MATLAB/R introduction

**UNIT-VIII: Conformal mapping**

Transformation by  $e^z$ ,  $\text{Im}z$ ,  $z^2$ ,  $z^n$  (n positive integer),  $\text{Sin } z$ ,  $\text{cos } z$ ,  $z + a/z$ . Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points .

**TEXT BOOKS:**

1. Engineering Mathematics by B.V.Ramana, Tata Mc.Grawhill Publications
2. Engineering Mathematics – III by T.K.V. Iyengar, B.Krishna Gandhi and Others – S.Chand.
3. Introduction to MATLAB by Rudragupta

**REFERENCES:**

1. Higher Engineering Mathematics by B.S. Grewal Khanna Publications.
2. Advance Engineering Mathematics by Jain & S.R.K. Iyengar, Narasa Publications.
3. Complex Variables by R.V. Churchill.
4. Advanced Engineering Mathematics by Allen Jaffrey Academic Press.
5. Engineering Mathematics – III by P.B. Bhaskara Rao, S.K.V.S.Rama Chary, M.Bhujanga Rao & Others.  
Engineering Mathematics – III by C. Shankaraiah, V.G.S. Book Links.

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ELECTRONIC DEVICES AND CIRCUITS

**Unit- I: p-n Junction Diode**

Qualitative Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics.

**Unit- II: Rectifiers and Filters**

The p-n junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters,  $\pi$ - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

**Unit- III: Bipolar Junction Transistor**

The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications.

**Unit- IV: Transistor Biasing and Stabilization**

Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

**Unit- V: Small Signal Low Frequency BJT Models**

BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Analysis of a Transistor Amplifier Circuit using h-Parameters, Comparison of CB, CE, and CC Amplifier Configurations.

**Unit-VI: Field Effect Transistor**

The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

**Unit VII: FET Amplifiers**

FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.



### **Unit VIII: INDUSTRIAL ELECTRONIC DEVICES & APPLICATIONS:**

Negative resistance Devices, Uni junction Transistor(UJT), UJT Relaxation Oscillator, Programmable UJT(PUT), Silicon Controlled Rectifier(SCR), Transient Effect in SCR, Light Activated SCR(LASCR), SILICON Controlled Switch(SCS), Schottky Barrier Diode, DIAC, TRIAC Diodes & Their characteristics.

### **TEXT BOOKS**

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2ed., 1998, TMH.

Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 ed., 2006, PEI/PHI.

Introduction to Electronic Devices and Circuits - Rober T. Paynter, PE.

### **REFERENCES**

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 ed., 2008, TMH.

2. Electronic Devices and Circuits - K. Lal Kishore, 2 ed., 2005, BSP.

3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 ed., 2009, Wiley India Pvt. Ltd.

4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2008, TMH.

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**FUNDAMENTALS OF ELECTRICAL ENGINEERING**

**Unit – I – Transient Analysis (First and Second Order Circuits)**

Transient Response of RL , RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

**Unit – II – Two Port Networks**

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

**Unit – III – Filters**

Classification of Filters, Filter Networks, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-k Low Pass Filter, High Pass Filter, m-derived T-Section, Band Pass filter and Band Elimination filter, Illustrative Problems.

**Unit – IV – Symmetrical Attenuators**

Symmetrical Attenuators – T-Type Attenuator,  $\pi$ -Type Attenuator, Bridged T type Attenuator, Lattice Attenuator.

**Unit –V – DC Generators**

Principle of Operation of DC Machines, EMF equation, Types of Generators, Magnetization and Load Characteristics of DC Generators.

**Unit –VI – DC Motors**

DC Motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne's Test, Speed Control of DC Shunt Motor, Flux and Armature Voltage control methods.

**Unit –VII – Transformers and Their Performance**

Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses and Efficiency of Transformer and Regulation, OC and SC Tests , Predetermination of Efficiency and Regulation ( Simple Problems).

**Unit – VIII – Single Phase Induction Motors**

Principle of Operation, Shaded Pole motors, Capacitor motors, AC Servomotor, AC Tachometers, Synchronos, Stepper Motors, Characteristics.

**Text Books :**

- 1.Fundamentals of Electric Circuits – Charles K. Alexander, Mathew N. O. Sadiku, 3 ed., 2008,TMH.
2. Network Analysis – A Sudhakar ,Shyammohan S.Palli, 3 ed., 2009, TMH.
3. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, 2008, TMH.

**Reference Books :**

1. Networks, Lines and Fields – John.D.Ryder, 2 ed.,, 2008 (Reprint), PHI.
2. Engineering Circuit Analysis - W.H.Hayt and J. E Kemmerly and S.M.Durbin, 6 ed., 2008, TMH.
3. Network analysis and Synthesis – C L Wadhwa, 3 ed., 2007, New Age International Publishers.

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OOP (JAVA PROGRAMMING)

**UNIT I :**

**Object oriented thinking** :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

**UNIT II :**

**Java Basics** History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class.

**UNIT III :**

**Inheritance** – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

**UNIT IV :**

**Packages and Interfaces** : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Exploring java.io.

**UNIT V :**

**Exception handling** - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

String handling, Exploring java.util

**UNIT VI :**

**Multithreading**- Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

Enumerations, autoboxing, annotations ,generics.

**UNITVII :**

**Event Handling** : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

## **UNIT VIII :**

**Applets** – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

**Swing** – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

### **TEXT BOOKS :**

1. Java; the complete reference, 7<sup>th</sup> editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson education.

### **REFERENCES :**

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, third edition, T. Budd, pearson education.
3. Introduction to Java programming , Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya,S.T.Selvi,X.Chu,TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
9. Maurach's Beginning Java2 JDK 5 , SPD.
10. Programming and Problem Solving with Java, JM Slack, B S Publications.

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SWITCHING THEORY & LOGIC DESIGN

**UNIT I**

**Number Systems & Codes :** Philosophy of Number Systems, Complement Representation of Negative Numbers, Binary Arithmetic, Binary Codes, Error Detecting & Error Correcting Codes, Hamming codes.

**UNIT II**

**Boolean Algebra and Switching Functions :** Fundamental Postulates of Boolean Algebra, Basic theorems and Properties, Switching Functions, Canonical and Standard forms, Algebraic simplification Digital Logic Gates, Properties of XOR gates, Universal Gates, Multilevel NAND/NOR Realizations.

**UNIT III**

**Minimization of Switching Functions :** Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, Simplification rules.

**UNIT IV**

**Combinational Logic Design**

Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and Hazard free Realizations.

**UNIT V**

**Programmable Logic Devices & Threshold Logic :** Basic PLD's-ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's, Capabilities and Limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

**UNIT VI**

**Sequential Circuits - I :** Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Steps in Synchronous Sequential Circuit Design, Design of modulo-N Ring & Shift counters, Serial binary adder, Sequence detector.

**UNIT VII**

**Sequential Circuits - II:** Finite State Machine-Capabilities and Limitations, Mealy and Moore models, Minimization of Completely specified and Incompletely Specified Sequential Machines, Partition Techniques and Merger chart methods, Concept of Minimal cover table.

**UNIT VIII**

**Algorithmic State Machines:** Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, Control implementations, Examples of Weighing Machine and Binary multiplier.

**TEXTBOOKS:**

1. Switching & Finite Automata theory – Zvi Kohavi, 2 ed., TMH.
2. Digital Design – Morris Mano, 3 ed., 2006, PHI.
3. Switching Theory and Logic Design – A. Anand Kumar, 2008, PHI.

**REFERENCES:**

1. An Engineering Approach to Digital Design – Fletcher, PHI.
2. Fundamentals of Logic Design – Charles H. Roth, 5 ed., 2004, Thomson Publications.
3. Digital Logic Applications and Design – John M. Yarbrough, 2006, Thomson Publications.

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ADVANCED DATA STRUCTURES

**Unit-1**

**Basic Concepts**

Algorithm specification-introduction,recursive algorithms,data abstraction.

Performance analysis-Time complexity,space complexity,asymptotic notation-big O,Omegaa &theta notations,introduction to linear & non-linear data structures.

**Singly Linked Lists**

SLL operations(insertion,deletion,concatenation),circularly linked list operations,DLL operations(insertion, deletion),representation of single, two dimensional arrays,sparse matrices(array,linked representations).

**Unit-2**

**Stacks**

Stack ADT, Definitions, Operation, Arrays & Linked implementation in C, Applications- infix to postfix conversion, postfix expression evaluation, Recursion implementation.

**Queue**

Queue ADT, Definition, Operation, Array & Linked implementation in C, Circular Queues-insertion & deletion operations, dequeuer (double ended queue) ADT, Array & Linked implementation.

**Unit-3**

**Trees**

Terminology, representation of trees, Binary tree ADT, properties of binary tree, binary tree representation-array & linked representation, binary tree traversals, threaded binary trees, max priority queue ADT-implementation-max heap-definition, insertion into max heap, deletin from max heap.

**Graph**

Introduction, definition, terminology, Graph ADT, Graph representations- adjacency matrices, adjacency lists, graph traversals-DFS & BFS.

**Unit-4**

**Searching**

Linear search, Binary search, static hashing- Introduction, hash tables, hash functions, overflow handling.

**Sorting**

Insertion sort, Radix sort, Selection sort, quick sort, Heap sort, Comparison of sorting methods.

**Unit-5**

**Search Trees**

Binary search trees-, definition, operations- searching, insertion & deletion, AVL trees-definition & examples, insertion into an AVL tree, B-trees, definition, B-tree of order m, operations- insertion & searching, introduction to red-black & splay trees (elementary treatment-only definitions & examples).

**Pattern Matching Algorithms**

The Knuth-Morris-Pratt Algorithm, Tries (Examples Only).

**TEXT BOOKS:**

1. Fundamentals Of Data Structures in C, 2<sup>nd</sup> edition, E. Horowitz, S. Sahni & Susan Aderson-Freed, University Press.
2. Data Structures - A. A. Puntambekar, Technical Publications.



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**ADVANCED DATA STRUCTRES LAB**

**WEEK-1**

write a c program that uses functions to perform the following:

- a) Create a single linked list of integers:
- b) Delete a given integer from the above linked list
- c) display the contents of the above list after deletion

**WEEK -2**

Write a c program that uses functions to perform the following :

- a) create doubly linked list of integers
- b) delete a given integer from the above doubly linked list
- c) display the contents of the above list after deletion

**WEEK -3**

write a c program that uses stack operations to convert a given infix expression to its postfix equivalent, implement the stack using array

**WEEK -4**

write a c program to implement a double ended queue ADT using

- a) array
- b) doubly linked list

**WEEK -5**

write a c program that uses functions to perform the following:

- a) create a binary search tree of characters
- b) traverse the above binary search tree recursively in post order

**WEEK -6**

write a c program that uses functions to perform the following:

- a) create binary search tree of integers
- b) traverse the above binary search tree non-recursively in order

**WEEK -7**

write a c program for implementing the following sorting methods to arrange the list of integers in ascending order:

- a) insertion sort
- b) merge sort

**WEEK -8**

write a c program for implementing the following sorting methods to arrange the list of integers in ascending order :

- a) quick sort
- b) selection sort

**WEEK -9**

write a c program to perform the following operations:

a)insertion into a B-Tree  
b)write a c program for implementing heap sort algorithm for sorting a given list of integers in ascending order

**WEEK -10**

Write a c program to implement all the functions of a dictionary (ADT) using Hashing

**WEEK -11**

Write a c program for implementing with knuth morris prath pattern matching algorithm

**WEEK -12**

Write c program for implementing the following graph traversal algorithms :

- a) depth first traversal
- b) breadth first traversal

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**ELECTRONIC DEVICES AND CIRCUITS LAB**

**PART A: (Only for Viva-voce Examination)**

**ELECTRONIC WORKSHOP PRACTICE** (in 3 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
  - Multimeters (Analog and Digital)
  - Function Generator
  - Regulated Power Supplies
  - CRO.

**PART B: (For Laboratory Examination – Minimum of 10 experiments)**

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CE Amplifier.
10. Frequency Response of Common Source FET amplifier
11. SCR characteristics.
12. UJT Characteristics
13. Triac Characteristics
14. Application in Power control Triac.

**PART C:**

**Equipment required for Laboratories:**

1. Regulated Power supplies (RPS) - 0-30 V
2. CRO's - 0-20 MHz.
3. Function Generators - 0-1 MHz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) - 0-20  $\mu$ A, 0-50 $\mu$ A, 0-100 $\mu$ A, 0-200 $\mu$ A, 0-10 mA.
8. Voltmeters (Analog or Digital) - 0-50V, 0-100V, 0-250V
9. Electronic Components - Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, diodes Ge & Si type, Transistors – npn, pnp type)

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**ENVIRONMENTAL STUDIES**

**UNIT-I: ECOSYSTEMS:**

Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, structure and structural components of ecosystem, Functions of eco system, Food chains, Food webs and ecological pyramids, Flow of energy, Biogeochemical cycles, Homeostasis cybernetics, Food chain concentration, Bio magnification, Ecosystem value, Services and carrying capacity.

**UNIT-II: NATURAL RESOURCES:**

Classification of resources: living and non-living resources, renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, dams: benefits and problems. Minerals resources: use and exploitation, environment effects of extracting and using mineral resources case studies. Energy resources: growing energy needs, renewable and non-renewable energy resources, use of alternate energy sources case studies. Land as a resource, land degradation, man induced landslides and land use/land cover mapping.

**UNIT-III: BIODIVERSITY AND BIOTIC RESOURCES:**

Introduction, definition, genetic, species and ecosystem diversity, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values, Hotspots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, conservation of biodiversity: in-situ and ex-situ conservation. Food and fodder resources, timber and non-timber forest products.

**UNIT-IV: ENVIRONMENTAL POLLUTION AND CONTROL:**

Classification of pollution and pollutants, causes, effects and control technologies, Air pollution: primary and secondary pollutants, automobile and industrial pollution, ambient air quality standards, water pollution: point and non-point sources of pollution, major pollutant of water and their sources, drinking water quality standards, water waste treatment methods: effluent treatment plants (ETP), sewage treatment plants(STP), common and combined effluent treatment plants(CETP). Soil pollution: soil as sink for pollutants, impact of modern agriculture on soil, degradation of soil. Marine pollution: misuse of international water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise pollution: sources, industrial noise. Occupational health hazards, standards, methods of control of noise. Thermal pollution: thermal comforts, heat island effect, radiation effects, nuclear pollution: nuclear power plants, nuclear radiation, disasters and impacts, genetically disorders. Solid waste: types, collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-waste and its management.

**UNIT-V: GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS:**

Greenhouse effect, greenhouse gases (GHG), global warming, sea level rise, climate change and their impacts on human environment. ozone depletion and ozone depleting substances(ODS). Deforestation and desertification. International conventions/protocols: earth summit. Kyoto protocol and Montreal protocol.

**UNIT-VI: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN:**

Definition of impact: classification of impacts, positive and negative, reversible and irreversible, light, moderate and serve, methods of baseline data acquisition. Impacts on different components: such as

human health resources, air, water, flora, fauna and society. Prediction of impacts and impact assessment methodologies. Environmental impact statement (ESI), environmental management plan (EMP): technological solutions, preventive methods, control technologies, treatment technologies: green-belt-development: rain water harvesting, remote sensing and GIS methods.

**UNIT-VII: ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS:**

national environmental policy, environmental protection act, legal aspects air (prevention and control of pollution ) act- 1981, water(prevention and control of pollution ) act- 1974, water pollution cess act- 1977, forest conservation act, municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules.

**UNIT-VIII: TOWARDS SUSTAINABLE FUTURE:**

Concept of sustainable development, threats to sustainability, population and its explosion, crazy consumerism, over-exploitation of resources,, strategies for achieving sustainable development, environmental education. Conservation of resources, urban sprawl, sustainable cities and sustainable communities, human health, role of IT in environment, environmental ethics, environmental economics, concept of green building, clean development mechanism (CDM).

**TEXT BOOKS:**

1. Environmental studies, from crisis to cure by R.Rajagopalan, 2005.
2. Environmental studies by Erach Bharucha 2005, university grants commission, university press.
3. Text book of environmental science and technology by M.Anji Reddy 2007

**REFERENCE BOOKS:**

1. Environmental science towards a sustainable future by Richard t. Wright 2008 PHI learning private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Master and Wendel P.Ella 2008 Learning Pvt.Ltd

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ELECTRONIC CIRCUIT ANALYSIS

**Unit-I: Single Stage Amplifiers**

Classification of Amplifiers – Distortion in Amplifiers, Analysis of CE, CC and CB Configurations with simplified Hybrid Model, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Miller’s Theorem and its dual, Design of Single Stage Amplifier using BJT.

**Unit-II: Multi Stage Amplifiers**

Analysis of Cascaded RC Coupled BJT Amplifiers, Cascode Amplifier, Darlington Amplifier, Different Coupling Schemes in Amplifiers- RC Coupled Amplifier, Transformer Coupled Amplifier, Direct Coupled Amplifier.

**Unit-III: BJT Amplifiers-Frequency Response**

Logarithms, Decibels, General Frequency considerations, Frequency Response of BJT Amplifier, Analysis at Low and High Frequencies, Effect of coupling and bypass capacitors, The Hybrid-pi- Common Emitter Transistor Model, CE Short Circuit Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

**Unit-IV: MOS Amplifiers [3]:**

Basic concepts, MOS Small signal model, Common source amplifier with Resistive load. Diode connected Load and Current Source Load. Source follower, Common Gate stage Cascode and Folded Cascode Amplifier and their Frequency response.

**Unit-V: Feedback Amplifiers:**

Concepts of Feedback, Classification of Feedback Amplifiers, General characteristics of Negative Feedback Amplifiers, Effect of Feedback on Amplifier Characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations, Illustrative Problems.

**Unit-VI: Oscillators:**

Classification of Oscillators, Conditions for Oscillations, RC Phase Shift Oscillator, Generalized analysis of LC Oscillators - Hartley and Colpitts Oscillators, Wein-Bridge & Crystal Oscillators, Stability of Oscillators.

**Unit-VII: Large Signal Amplifiers:**

Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Distortion in Power Amplifiers, Thermal Stability and Heat Sinks.

## **Unit-VIII: Tuned Amplifiers**

Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers.

### **TEXTBOOKS:**

1. Integrated Electronics – Jacob Millman and Christos C Halkias, 1991 2<sup>nd</sup> ed., 2008, TMH.
2. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2009, TMH.
3. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.

### **REFERENCES:**

1. Electronic Devices and Circuit Theory – Robert L. Boylestad, Louis Nashelsky, 9 ed., 2008 PE.
2. Introductory Electronics Devices and Circuits – Robert T.Paynter, 7ed. 2009, PEI.
3. Electronic Circuit Analysis – K.Lal Kishore, 2004, BSP.
4. Electronic Devices and Circuits, David A. Bell - 5 ed., Oxford University Press.
5. Micro electric Circuits - Sedra and Smith – 5 ed., 2009, Oxford University Press.

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COMPUTER ORGANIZATION AND ARCHITECTURE

**UNIT I:**

**BASIC STRUCTURE OF COMPUTERS:** Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Data Representation, Fixed Point Representation. Floating – Point Representation, Error Detection code, Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations, Decimal Arithmetic unit Decimal Arithmetic operations.

**UNIT II:**

**REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS:** Register Transfer language, Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit, Instruction codes, Computer Registers Computer instructions– Instruction cycle.

**UNIT III:**

**Memory** – Reference Instructions, Input – Output and Interrupt, STACK organization. Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction set computer.

**UNIT IV:**

**MICRO PROGRAMMED CONTROL:** Control memory, Address sequencing, micro program example, design of control unit hard wired control. Micro programmed control

**UNIT V:**

**THE MEMORY SYSTEM:** Basic concepts semiconductor RAM memories, Read-only memories Cache memories performance considerations, Virtual memories secondary storage, Introduction to RAID.

**UNIT-VI**

**INPUT-OUTPUT ORGANIZATION:** Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, and IEEE1394.

**UNIT VII:**

**PIPELINE AND VECTOR PROCESSING:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

**UNIT VIII: MULTI PROCESSORS:** Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherence. Shared Memory Multiprocessors.

**TEXT BOOKS:**



1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

**REFERENCES:**

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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ANALOG AND DIGITAL IC APPLICATION

**UNIT I: INTEGRATED CIRCUITS**

Classification, Chip Size and Circuit Complexity, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics, 741 Op-Amp and its Features, Modes of operation-inverting, Non-inverting, differential

**UNIT II: OP-AMP APPLICATIONS**

Basic Applications of Op-Amp, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits, Multipliers & dividers, Differentiators and Integrators, Comparators, Schmitt Trigger, Multivibrators, Introduction to Voltage Regulators, Features of 723 Regulators.

**UNIT III: ACTIVE FILTERS & OSCILLATORS**

Introduction, 1st Order LPF, HPF Filters. Band pass, Band reject and all pass filter, Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators—triangular, sawtooth square and VCO

**UNIT IV: TIMERS & PHASE LOCKED LOOPS**

Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger. PLL- Introduction, Block Schematic, Principles and Description of individual Blocks of 565.

**UNIT V: D-A AND A- D CONVERTERS**

Introduction, Basic DAC Techniques - Weighted Resistor DAC, R-2R Ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - Parallel Comparator Type ADC, Counter ADC, Successive Approximation Register ADC and Dual Slope Type DAC and ADC Specifications.

**UNIT VI: DIGITAL INTEGRATED CIRCUITS INTRODUCTION**

Classification of Integrated Circuits, Comparison of Various Logic Families, Standard TTL NAND Gate-Analysis & Characteristics, TTL Open Collector Outputs, Tristate TTL, MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL

**UNIT VII: COMBINATIONAL CIRCUITS**

Design using TTL-74XX Series & CMOS 40XX Series ICs, TTL ICs - Code Converters, Decoders, Demultiplexers, Decoders & drives for LED & LCD display, Encoders, Priority Encoders, multiplexers & their applications, Priority Generators, Arithmetic Circuit ICs-Parallel Binary Adder/Subtractor Using 2's Complement System, Digital Comparator Circuits.

**UNIT VIII: SEQUENTIAL CIRCUITS**

Flip-Flops & their Conversions, Design of synchronous counters, Decade counters, Shift Registers & applications, familiarities with commonly available 74XX & CMOS 40XX Series of IC counter.

**Memories:** ROM architecture, types & applications, RAM architecture, Static and Dynamic Rams, synchronous DRAM.

**TEXT BOOKS:**

1. Linear Integrated Circuits -D. Roy Chowdhury, New Age International (p)Ltd, 3<sup>rd</sup> Ed., 2008.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 1987.

**REFERENCES:**

1. Operational Amplifiers & Linear Integrated Circuits – R.F. Coughlin & Fredrick F. Driscoil, PHI, 1977.
2. Operational Amplifiers & Linear Integrated Circuit: Theory & Applications – Denton J. Daibey, TMH.
3. Design with Operational Amplifier & Analog Integrated circuits – Sergio Franco, McGraw Hill, 3rd Ed., 2002.
4. Digital Fundamental – Floyd and Jain, Pearson Education,8<sup>th</sup> Edition,2005.

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**STRUCTURED DIGITAL SYSTEM DESIGN**

**UNIT I**

Introduction, Concepts of digital design, the logic operators, Hardware Aspects related to not-asserted, Mechanical switches for signal sources, Concept of inverter, General implementation procedures, Arithmetic circuits, comparators, multiplexers, Code converters.

**UNIT II**

Wired logic, Practical aspects of wired logic and Bus-oriented Structures, Tristate Bus Systems, Practical aspects related to Combinational logic Design, Fan-in Fan out, Propagation Delay.

**UNIT III**

Introduction Sequential Machine Design, The need for sequential circuits, Basic Architectural Distinctions between Combinational and Sequential circuits, Fundamental differences between Sequential machines, Fundamental of Sequential Machine operation, Clock and Oscillators, The design of a Clocked Flip-Flop conversion from one type to another ,Practical clocking Aspects Concerning Flip-Flops, Timing and Triggering Considerations, Clock Skew

**UNIT IV**

Introduction Sequential Analysis and Design, The State Diagram, Analysis of Synchronous Sequential Circuits, A Synchronous Analysis Process, Approaches to the Design of Synchronous Sequential finite State machines, Design steps For Traditional Synchronous sequential circuits, State reduction, Minimizing the next door Decoders with JK or T Flip-Flop, Output Decoder Design.

**UNIT V**

Counters, Design of Single-Mode counters, Design of Specialized Multi-mode counters, Ripple Counters, Shift Register, Shift Registers and Memory

**UNIT VI**

Introduction Multi-Input System controller design, System Controllers, Controller Design Phases and System Documentation, Defining the purpose and role of the system, Defining the Basic Operational Characteristic of the system, The controlling Systems and the controlled system, Timing and Frequency considerations, Functional partition and detailed Flow Diagram Development, System Controller state Specification(MDS diagram Generation).

**UNIT VII**

Synchronous two Systems and Controller Architecture, The State Assignment, The next state decoder, Next State Decoder Maps, The output decoder, Clock Frequency Determination, Power Supply requirements, Control and Display, concepts related to the use of conditional Outputs.

**UNIT VIII**

Introduction, Using MSI decoder in System Controllers, Using MSI Multiplexers in System Controller with more Complexity Indirect Addressed Multiplexers configuration, Read Only Memories, ROM's, PROM's and Applications, Using a PROM for Random Logic, Programmed Logic Arrays, Applications of PLA's and FPLA's.

**TEXT BOOKS:**

1. An Engineering Approach to Digital Design- by William I .Fletcher. Prentice-Hall of India Pvt.Ltd.
2. Logic design Theory-N.N. Biswas. PHI

**REFERENCES:**

1. Digital Systems Testing & Testable Design-Miron Abramoviu. Melvin Breuer and Arthur D.Friedman-Jaico Books.
2. Switching & Finite Automata Theory. Z.Kohavi, 2<sup>nd</sup> Edition. THI
3. Digital .Design Morris Mano- PHI, 3<sup>rd</sup> Edition 2006. Digital Circuits & Logic design –by Samuel C.Lee. PHI

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OPERATING SYSTEM

**UNIT- I**

**Operating Systems overview:** Operating systems functions, Overview of computer operating systems, protection and security distributed systems, special purpose systems, operating systems structures-operating system services and systems calls, system programs, operating systems structure, operating systems generation.

**UNIT-II**

**Process Management:** Process concepts, threads scheduling-criteria, algorithms, their evaluation, thread scheduling, case studies UNIX, Linux, Windows

**UNIT- III**

**Concurrency:** Process synchronization, the critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Atomic transactions, Case studies UNIX, Linux, Windows.

**UNIT-IV**

**Memory Management:** Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation, Virtual memory, Demand paging, Page-Replacement, Algorithms, Case studies UNIX, Linux Windows.

**UNIT-V**

**Principles of Deadlock:** System model, Deadlock characterization, Deadlock prevention, Detection and avoidance, Recovery form deadlock.

**UNIT- VI**

**File System Interface:** The concept of a file, Access methods, Directory structure, file system mounting, File sharing protection.

**File System Implementation:** File system structure, File system implementation, Directory implementation, Allocation methods, Free-space management, Efficiency and performance, Case studies, UNIX, Linux, Windows.

**UNIT-VII**

**Mass-storage structure:** Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable storage implementation, Tertiary storage structure.

**I/O systems:** Hardware, Application interface. Kernel I/O subsystem, Transforming I/O requests, hardware operation, STREAMS, Performance.

**UNIT-VIII**

**Protection:** Protection, Goals of protection, Principles of protection, domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights, Capability-based systems, Language-based protection.

**Security:** The security problem, Program threats, System and network threats cryptography as a security tool, User authentication, Implementation security defenses, Firewalling to protect systems and networks, Computer-security classifications, Case studies UNIX, Linux, Windows.

**TEXT BOOKS:**

1. Operating System Concepts- Abraham Silberchartz, Peter B. Galvin Greg Gagne., 8th edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M Dhamdhare, 2<sup>nd</sup> Edition, TMH

**REFERENCES:**

1. Operating System- Internals and Design Principles, Stallings, sixth Edition-2009, Pearson education.
2. Modern Operating Systems, Andrew S Tancubaum 2<sup>nd</sup> edition PHI.
3. Principles of Operating Systems, B.I.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P, Bhatt, PHI.
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, 3rd Edition, Pearson Education.
7. Operating Systems, R.Elmasari,A.g Carrick and D.Levine, Mc Graw Hill.

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**ANALOG AND DIGITAL IC APPLICATION LAB**

1. 741 OPAMP Characteristics
2. Adder, Integrator and differentiator using 741 OPAMP
3. Function Generator using 741 OP AMP
4. IC 555 Timer- Astable Operation
5. IC 555 Timer- Monostable Operation.
6. Study of Logic Gates
7. Study of Flip-Flops using Ics
8. Half Adder, Full Adder and Subtractor
9. Counters and Shift Registers & 7490 Counter
10. BCD to 7 Segment decoder using IC 7447
11. Voltage Regulation using IC 723
12. D/A Converter
13. A/D Converter
14. Multiplexer and Demultiplexer



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**ELECTRONIC CIRCUIT ANALYSIS LAB**

**I) Design and Simulation in Simulation Laboratory using any Simulation Software**

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Two Stage RC Coupled CE Amplifier
4. RC Phase Shift Oscillator Using Transistor
5. Class A Series Fed Power amplifier (without transformer)
6. Class B Complementary Symmetry Push Pull Power Amplifier

**II) Testing in the Hardware Laboratory (6 Experiments)**

- A) Any Three Circuits Simulated in Simulation Laboratory
- B) Any three of the following
1. Class A Power Amplifier (with transformer load)
  2. Class C power Amplifier
  3. Single Tunnel Voltage Amplifier
  4. Hartley & Colpitt's Oscillator
  5. Darlington Pair
  6. MOS Amplifier

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DESIGN AND ANALYSIS OF ALORITHMS

**UNIT I: Introduction:**

Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation-Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amotized analysis.

**UNIT II: Disjoint:**

Sets-disjoint set operations, union and find algorithms, spanning trees, conneted components and biconnected components.

**UNIT III: Divide and conquer:**

General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

**UNIT IV: Greedy method:**

General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

**UNIT V: Dynamic Programming:**

General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability Design.

**UNIT VI: Backtracking:**

General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**UNIT VII: Branch and Bound:**

General method, applications-Travelling sales person problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution.

**UNIT VIII: NP-Hard and NP-Complete problems:**

Basic concepts, non deterministic algorithms, NP-Hard and NP Complete classes, cook's theorem.

**TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekhara, Galgotia publications pvt.Ltd.
2. Design and Analysis Algorithms-Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher: Pearson
3. Algorithm Design: Foundation, Aalysis and Internet examples, M.T. Goodrich and R. Tomassaia wiley and sons.

**REFERENCES:**

1. Introduction to Alogrithm, 3<sup>rd</sup> edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, PHI.
2. Introduction to Design and Analysis of Algorithm a strategic approach, R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4. Design and analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5. Algorithms- Richard Johnson baugh and Marcus Schaefer, Pearson Education.

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**DIGITAL SIGNAL PROCESSING**

**UNIT I**

Introduction: introduction to digital signal processing: discrete time signals & sequences, linear shift invariant systems, stability, and domain representation of discrete time signals and systems

**UNIT II**

Discrete fourier series: DFS representation of periodic sequenes.properties of discrete fourier series. Discrete fourier transforms: properties of DFT, linear convolution of sequences using DFT, computation of DFT : over-lap add method< over-lap save method,relation between DTFT ,DFS, DFT AND z-transform.

**UNIT III**

Fast fourier transform: fast fourier transforms (FFT) – Radix-2 decimation-in-time and decimation-in-frequency FFT algorithms, inverse FFT, and FFT with general radix-N

**UNIT IV**

Realization of digital filters: aplications of Z-transforms,solutions of difference equation of digital filters,system function,stabilitycriterion,frequency response of stable systems,relalization of digital filters-direct,canonic,cascade and parallel forms

**UNIT V**

IIR digital filters: analog filter approximation-butterworth and chebyshev,design of IIR digital filters from analog filters,step and impulse invariant techniques,bilinear transformation method ,spectral transformations

**UNIT VI**

FIR digital filters:characteristics of FIR digital filters,frequency response,design of FIR filters:fourier method,digital filters using window techniques,frequency sampling technique,comparision of IIR&FIR filters.

**UNIT VII**

MULTIRATE DIGITAL SIGNAL PROCESSING:introduction down sampling,decination,upsampling,interpolation,sampling rate conversion,conversion of band pass signal,cocept of resampling,applications of multi rate signal processing.

**UNIT VIII**

Finite Word Length Effets:Limit cycles,Overflow oscillations,Roundoff noise in IIR digital filters,Computaional output round off noise,Methods to prevent overflow,Trade off between round off and overflow noise,Measurement of coefficient quantization effects through pole zero movement,Dead band effects.

**TEXT BOOKS:**

- 1.Digital Signal Processing,principles,Algorithms,and Applications:John G.proakis,Dimitris G Manolakis,Pearson Education/PHI 2007.
- 2.Discrete Time Signal Processing –A.V.Oppenheim and R.W.Schaffer,PHI,2009.
- 3.Fundamentals of Digital Signal Processing- Loney Ludeman, John Wiley,2009.

**REFERENCE BOOKS:**

- 1.Digital Signal Processing- Fundamentals and Applications-Li Tan,Elsevier,2008
2. Digital Signal Processing –S.Salivahanan, A.Vallavaraj and C.Gnanapriya,TMH,2009.

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**COMPILER DESIGN**

**UNIT-I Overview of Compilation:**

Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

**UNIT– II Top down Parsing :**

Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

**UNIT – III Bottom up parsing :**

Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

**UNIT – IV Semantic analysis :**

Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

**UNIT – V Symbol Tables :**

Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

**UNIT – VI Code optimization :**

Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

**UNIT – VII Data flow analysis :**

Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

**UNIT – VIII Object code generation :**

Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

**TEXT BOOKS :**

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

**REFERENCES :**

1. lex &yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Loudon, Thomson.

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**DATA BASE MANAGEMENT SYSTEMS**

**UNIT-1:**

Database system applications ,data base system VS file system-view of data-data abstraction-instances and schemas-data Models-the ER model-Relational model-Other Models-Database languages-DDL-DML-database Access for applications programs-database Users and administrator-Transaction management-data base systems structure-storage manager-the query processor.

**UNIT-2:**

History of data base systems ,data base design and ER diagrams-beyond ER design Entities , Attributes and Entity sets-Relationship and relationship sets-Additional features of ER Model-Concept Design with the ER Model-Conceptual Design for large enterprises.

**UNIT 3:**

Introduction to the Relational Model-Integrity Constraint Over relations-Enforcing Integrity constraints-Querying relational data-Logical data base Design-Introduction to vieWs-Destroying /altering tables and views.

Relational Algebra-Selection and projection set operations-renaming-joins-Division-Examples of Algebra overviews-Relational calculus-Tuple relational calculus-Domain relational calculus-Expressive Power of Algebra and calculus.

**UNIT 4:**

Form of Basic SQL Query-Examples of basic SQL Queries-Introduction to Nested Queries-Correlated Nested Quries Set-Comparison Operators-Aggregative Operators-NULL values-Comparison using Null values-Logical connectivity's-AND,OR and NOT-Impact SQL Constructs-Outer Joins-Disallowing NULL values-Complex integrity constraints in SQL Triggers and active Data and bases.

**UNIT 5:**

Schema refinement-Problems Caused by redundancy-Decompositions-Problems related to decomposition-reasoning about FDS-FIRST,SECOND,THIRD Normal forms-BCNF-Losseless joint decomposition-dependency preserving Decomposition-Schema refinement in Data base Design- Multi valued Dependecies-FOURTH Normal Form.

**UNIT 6:**

Transaction Concept-Transaction State-Implementantation of Atomicity and Durability-Concurrent-Executions-serializiblity-Recoverability-implementation of Isolation-Testing for serializiblity-Lock-Based Protocols-Timestamp Based Protocols-Validation-Based Protocols-Multiple Granularity.

**UNIT 7:**

Recovery and Atomicity-Log-Based Recovery-Recovery with Concurrent Transactions-Buffer Management-Failure with loss of nonvolatile storage-Advance Recovery systems-Remote Backup systems.

**UNIT 8:**

Data on External Storage-File Organization and Indexing-Cluster Indexes. Primary and secondary Indexes-Index Data Structure-Hash Based – tree baseIndexing-comparison of File

Organizations-Indexes and Performance Tuning-Intuitions for tree indexes-Indexed SEquential Access Methods (ISAM)-B+Trees:A Dynamic Index Structure.

**TEXT BOOKS:**

1: Data base Management Systems,Raghurama Krishnan,Johannes Gehrke,TATA McGraw Hill 3<sup>rd</sup> Edition.

2: Data base System Concepts,Silberschatz,Korth,McGrawhill,5<sup>th</sup> Edition.

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III Year B.Tech – I Sem.

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

**Unit-I Introduction to Managerial Economics:**

Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

**Unit-II Elasticity of Demand:**

Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

**Unit-III Theory of Production and Cost Analysis:**

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

**Unit-IV Introduction to Markets & Pricing Policies:**

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

**Unit-V Business & New Economic Environment:**

Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

**Unit-VI Capital and Capital Budgeting:**

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

**Unit-VII Introduction to Financial Accounting:**

Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

**Unit-VIII Financial Analysis through ratios:**

Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

**TEXT BOOKS:**

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

**REFERENCES:**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
11. Dwivedi:Managerial Economics, 6th Ed., Vikas.



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SOFTWARE ENGINEERING

**UNIT-I**

**Introduction to Software Engineering:**

The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering-A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**UNIT-II**

**Process models:**

The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

**Software Requirements:**

Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirement document.

**UNIT-III**

**Requirements Engineering Process:**

Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**System Models:**

Context models, Behavioral models, Data models, Object models, Structured methods.

**UNIT-IV**

**Design Engineering:**

Design process and design quality, Design concepts, the design model, pattern based software design.

**Creating an Architectural Design:**

Software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

**UNIT-V**

**Modeling Component-Level Design:**

Designing class-based components, conducting component-level design.

Object constraint language, designing conventional components.

**Performing User Interface Design:**

Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

**UNIT-VI**

**Testing Strategies:**

A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, validation testing, System testing, the art of Debugging.

**Product Metrics:**

Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

## **UNIT-VII**

### **Metrics for Process and Products:**

Software Measurement, metrics for software quality.

### **Risk Management:**

Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

## **UNIT-VIII Quality Management:**

Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability. The ISO 9000 quality standards.

### **TEXT BOOKS:**

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition, McGrawHill International Edition, 2005.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

### **REFERENCE BOOKS:**

1. Software Engineering, A precise Approach. Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008.
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering 1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering 2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans van vliet, 3rd edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering. R.J. Leach, CRC Press.

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COMPILER DESIGN LAB

**Objective :**

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.
- To provide an understanding of the design aspects of operating system

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- C++ compiler and JDK kit

Consider the following mini Language, a simple procedural high-level language, only operating on integer data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is defined by the following BNF grammar:

```
<program> ::= <block>
<block> ::= { <variabledefinition> <slist> }
| { <slist> }
<variabledefinition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
<vardec> ::= <identifier> | <identifier> [ <constant> ]
<slist> ::= <statement> | <statement> ; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
| <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression>
| <identifier> [ <expression> ] = <expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
| if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print ( <expression> )
<expression> ::= <expression> <addingop> <term> | <term> | <addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression> ]
| ( <expression> )
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty> has the obvious meaning
```

Comments (zero or more characters enclosed between the standard C/Java-style comment brackets /

\*...\*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration

int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2]. Note also that you should worry about the scoping of names.

A simple program written in this language is:

```
{ int a[3],t1,t2;
t1=2;
a[0]=1; a[1]=2; a[t1]=3;
t2=-(a[2]+t1*6)/(a[2]-t1);
if t2>5 then
print(t2);
else {
int t3;
t3=99;
t2=-25;
print(-t1+t2*t3); /* this is a comment
on 2 lines */
} endif }
```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant

spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.

2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.

3. Design Predictive parser for the given language

4. Design LALR bottom up parser for the above language.

5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.

6. Write program to generate machine code from the abstract syntax tree generated by the parser. The

following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct

internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed

below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the

range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction.

The

numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows :

**R**

specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).

**L**

specifies a numerical label (in the range 1 to 9999).

**V**

specifies a “variable location” (a variable number, or a variable location pointed to by a register - see below).

**A**

specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register. So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed). The instruction set is defined as follows:

**LOAD A,R**

loads the integer value specified by A into register R.

**STORE R,V**

stores the value in register R to variable V.

**OUT R**

outputs the value in register R.

**NEG R**

negates the value in register R.

**ADD A,R**

adds the value specified by A to register R, leaving the result in register R.

**SUB A,R**

subtracts the value specified by A from register R, leaving the result in register R.

**MUL A,R**

multiplies the value specified by A by register R, leaving the result in register R.

**DIV A,R**

divides register R by the value specified by A, leaving the result in register R.

**JMP L**

causes an unconditional jump to the instruction with the label L.

**JEQ R,L**

jumps to the instruction with the label L if the value in register R is zero.

**JNE R,L**

jumps to the instruction with the label L if the value in register R is not zero.

**JGE R,L**

jumps to the instruction with the label L if the value in register R is greater than or equal to zero.

**JGT R,L**

jumps to the instruction with the label L if the value in register R is greater than zero.

**JLE R,L**

jumps to the instruction with the label L if the value in register R is less than or equal to zero.

**JLT R,L**

jumps to the instruction with the label L if the value in register R is less than zero.

**NOP**

is an instruction with no effect. It can be tagged by a label.

**STOP**

stops execution of the machine. All programs should terminate by executing a STOP instruction.

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**DIGITAL SIGNAL PROCESSING LAB**

The program shall be implemented in software (Using MATLAB/Lab view/C programming/Equivalent) and hardware (Using TI/Analog devices/Motorola/Equivalent DSO processors).

1. Generation of Sinusoidal waveform / signal based on recursive difference equations
2. To find DFT / ID FT of given DT signal
3. To find frequency response of a given system given in (Transfer Function/Differential equation form).
4. Implementation of FFT of given sequence
5. Determination of Power Spectrum of a given signal(s).
6. Implementation of LP FIR filter for a given sequence
7. Implementation of HP FIR filter for a given sequence
8. Implementation of LP IIR filter for a given sequence
9. Implementation of HP IIR filter for a given sequence
10. Generation of Sinusoidal signal through filtering
11. Generation of DTMF signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D sampling rate converters
15. Audio application such as to plot a time and frequency display of microphone plus a cosine using DSP. Read a .wav file and match with their respective spectrograms.
16. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
17. Impulse response of first order and second order systems.

NOTE: Minimum of 12 experiments has to be conducted.

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III Year B.Tech – II Sem.

(56041) MANAGEMENT SCIENCE

**Unit-I Introduction to Management:**

Entrepreneurship and organization -Nature and Importance of Management, Functions of Management. Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

**Unit-II Designing Organisational Structures:**

Departmentation and Decentralisation. Types of Organisation structures - Line organization, Line and staff organization. Functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundary less organization, inverted pyramid structure, lean and flat organization structure and their merits , Demerits and suitability.

**Unit-III Operations Management:**

Principles and Types of Plant Layout – Methods of production (Job, batch and Mass Production), Work study- Basic procedure involved in Method Study and Work measurement – Statistical Quality control :X chart, R chart, p chart, (simple problems), Acceptance sampling, Deming's contribution to quality.

**Unit-IV**

**Materials Management:**

Objectives, Need for inventory control, EOQ, ABC Analysis, purchase procedure, Stores management and stores records- Supply chain management.

**Marketing:**

functions of Marketing, Marketing mix, marketing strategies based on product life cycle, channels of distribution.

**Unit-V Human Resources management(HRM):**

Evolution of HRM, concepts of HRM, Basic functions of HR Manager, Manpower planning, Recruitment, Selection, Training and development, Placement, Wage and salary Administration, Promotion, Transfer, Separation, performance Appraisal, Grievance Handling and Welford Administration, Job Evaluation and Merit Rating.

**Unit-VI Project Management (PERT/CPM):**

Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of completing the project within given time, Project Cost analysis, Project cost analysis, project crashing, (simple problems)

**Unit-VII Strategic Management:**

Mission Goals, Objectives, Policy, Strategy, Programmes , Elements of Corporate planning process, Environmental Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

**Unit-VIII Contemporary Management Practices :**

Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process



Re-engineering 5S Model, Deming's PDCA, Kiazen, Poka-Yoke, Muda, Benchmarking, Balanced score card.

**TEXTBOOK:**

1. Aryasri: Management Science, TMH, New Delhi, 2009

**REFERENCE BOOKS:**

1. Stoner, Management, Pearson. 2009

2. Kotler Philip & Keller, Kevin Lane: Marketing Management PHI. 2009.

3. Koontz. Weihrich, & Aryasri: Principles of Management, TMH, 2009.

4. Thomas N. Duening & John Mivancevich Management--Principles and Guidelines. Cengage, 2009.

5. Kanishka Bedi. Production and Operations Management. Oxford University Press. 2009.

6. Memoria & S.V. Ganker, Personnel Management. Himalaya. 2009

7. Schermerhorn: Management. Wiley, 2009.

8. Parnell: Strategic Management, Biztantra, 2009.

9. L.S. Srinath: PERT/CPM, Affiliated East-West Press. 2009.

10. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science. TMH. 2007.

Pre-requisites: Managerial Economics

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III Year B.Tech – II Sem.

(56012) MICROPROCESSORS AND MICROCONTROLLERS

**Unit-I 8086 Architecture:**

Introduction to 8085 Microprocessor, 8086 Architecture Functional diagram, Register Organisation, Memory Segmentation, Programming model, memory addresses, physical memory organization, Architecture of 8086, signal descriptions of 8086- common function signals, minimum and Maximum mode signals, Timing diagrams, Interrupts of 8086.

**Unit-II Instruction Set and Assembly Language Programming of 8086:**

Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

**Unit III I/O Interface:**

8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

**Unit-IV Interfacing with advanced devices:**

Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

**Unit-V Communication Interface:**

Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS- 232, IEEE- 488, Prototyping and trouble shooting.

**Unit-VI Introduction to Microcontrollers:**

Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

**Unit-VII 8051 Real Time Control:**

Interrupts, timer/Counter and serial Communication, programming Timer Interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 timers and counters.

**Unit-VIII The AVR RISC microcontroller architecture:**

Introduction, AVR Family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory. EEPROM, 110 ports, Timers, UART, Interrupt Structure.

**TEXTBOOKS:**

1. D. V. Hall, Micro processors and Interfacing, TMGH, 2nd edition 2006.
2. Kenneth. J. Ayala. The 8051 microcontroller, 3<sup>rd</sup> edition Cengage learning, 2010

**REFERENCES:**

1. Advanced Microprocessors and Peripherals — A. K. Ray and K.M. Bhurchandani, 2nd edition 2006.
2. The 8051 Microcontrollers, Architecture and programming and Applications –K. Uma Rao, Andhe Pallavi ,Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,
4. Microcontrollers and application, Ajay. V. Deshmukh, TMGH, 2005

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III Year B.Tech – II Sem.

EMBEDDED SYSTEMS (OPEN ELECTIVE)

**Unit-I Introduction:**

Embedded systems overview, design challenge, processor technology, IC technology, Design technology, Trade-offs, single purpose processors RT-level combinational logic, sequential logic(RT-level),

Custom single purpose processor design (RT-level), optimizing custom single purpose processor.

**Unit-II General purpose Processors :**

Basic architecture, operation, pipelining, programmers view, development environment, application specific instruction set processor (ASIPs)-micro controllers and digital signal processors.

**Unit-III State Machine and concurrent process models :**

Introduction, models Vs, languages , finite state machines with data path model (FSMD),using state machines, program state machines, program state machine model(PSM),concurrent process model, concurrent processes, communication among processes. synchronization among processes,implementation,data flow model, real-time systems.

**Unit-IV Communication Interface :**

Need for communication interface, RS232/UART, RS422/RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

**Unit-V Introduction to real-time operating systems :**

Tasks and task states, task and data, semaphores and shared data, message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in anRTOS environment.

**Unit-VI: Basic design using a real-time operating system:**

Principles, semaphores and queues, HardReal-Time scheduling considerations, saving memory and power, an example RTOS like Uc-OS (Open source), embedded software development tools, host and target machines, linker/locators for embedded software, getting embedded software into the target system, debugging techniques: testing on host machine, using laboratory tools, an example system.

**Unit VII: Introduction to advanced Architectures:**

ARM and SHARC, processor and memory organization and instruction level parallelism, network embedded systems, bus protocols, I2C bus and CAN bus, internet-enabled systems, design example-elevator controller.

**Unit-VIII Design technology:**

Introduction, automation, synthesis, parallel evolution of compilation and synthesis, logic synthesis, RT synthesis, behavioral synthesis, system synthesis and hardware/software co-design, verification, hardware/software co-simulation, reuse of intellectual property codes.

**TEXT BOOKS:**

1. Embedded system design – a unified hardware/software introduction – Frank Vahid, Tony D.Givargis, John Wiley, 2002.
2. An Embedded software primer – David E Simson, Pearson Ed., 2005.
3. Computers and components, wayne Wolf, Elseveir.

**REFERENCES:**

1. Embedded microcomputer systems – Jonathan W.Valvano, Books/cole.Thompson learning.
2. Embedded/real time systems – KVKK Prasad, Dremtech Press, 2005.
3. Introduction to Embedde Systems – Raj Kamal, TMS, 2002.

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III Year B.Tech – II Sem.

INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE)

**Unit-I Introduction to intellectual property :**

Introduction, types of intellectual property, intellectual organization, agencies and treaties, importance of intellectual property rights.

**Unit-II Trademarks :**

Purpose and function of traded marks, acquisition of trade mark right, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

**Unit-III Law of copy rights :**

Fundamental of copy right law, originally of material, rights of reproduction, rights to perform the work publicly, copy right ownership issue, copy right registration, notice of copy right , international copy right law.

**Unit-IV Law of patents :**

Foundation of patent law, patent searching process, ownership rights and transfer.

**Unit-V Trade secrets :**

Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation

**Unit-VI Unfair competition:**

Misappropriation right of publicity, false advertising

**Unit-VII New development of intellectual property:**

New development in trade mark law, copy right law, patent law, intellectual property audits

**Unit-VIII International overview on intellectual property, international:**

trade mark law, copy right law, international patent law, international development in trade secrets law

**REFERENCES & TEXT BOOKS:**

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning.
2. Intellectual property right – nleashmy the knowledge economy, prabudda ganguli, Tate Mc Graw Hill Publishing company ltd.,

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III Year B.Tech – II Sem.

NANO TECHNOLOGY (OPEN ELECTIVE)

**Unit-I Introduction to nano technology :**

Importance of nanoscale, nanostructure types, electronic, magnetic, optical properties of nanomaterials, top-down and bottom-up approach to nanostructures.

**Unit-II Quantum Mechanical phenomenon in nano structure :**

Quantum confinement of electrons in semiconductor nano structures, one dimensional confinement (quantum wells), three dimensional confinements (quantum dots).

**Unit-III Carbon Nanostructures :**

Carbon nano tubes (CNTs), fullerenes, C60, C80 and C240 Nanostructures, properties (mechanical, optical and electrical) and applications.

**Unit-IV Fabrication of Nano materials :**

Physical methods: insert gas condensation, arc discharge, Rfplasma, plasma arc technique, ion sputtering, laser pyrolysis, molecular beam epitaxy, chemical vapor deposition method.

**Unit-V Nano scale characterization techniques :**

Scanning probe techniques (AFM, MFM, STM, SEM, TEM, XRD)

**Unit-VI Nano devices and Nano medicine :**

Lab on chip for bio analysis, core/shell nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

**Unit-VII Nano and molecular electronics :**

Resonant-Tunneling structures, single electron tunneling, single electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto treatment.

**Unit-VIII Nanolithography and Nano Manipulation :**

E -beam lithography and SEM based nanolithography and nanomanipulation, ion beam lithography, oxidation and metallization, mask and application, deep UV lithography, X-ray based lithography.

**TEXT BOOKS:**

1. Charles.p.pode, introduction to nanotechnology, Springer publications
2. Springer handbook of nanotechnology – Bharat Bushan
3. Phani kumar, principles of nanotechnology, scitech publications

**REFERENCE BOOKS:**

1. David ferry “Transport in nano structures” Cambridge university press 2000
2. Nanotechnology: ed. C.M.Niemeyer, C.A.Mirkin
3. Nanofabrication towards biomedical application: techniques, tools. Applications and impact – ed. Challa S.,S.R.Kumar, J.H. Carola
4. Encyclopedia of nanotechnology – Hari singh nalwa
5. Carbon nanotubes: properties and applications – Michel J o’connel
6. S.Dutta “electron transport in mesoscopic systems” Cambridge university press
7. H.Grabert and M.Devoret “single charge tunneling” plenum press 1992.

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III Year B.Tech – II Sem.

DATA WAREHOUSING AND DATA MINING

**UNIT-I**

**Introduction:**

Fundamentals of data mining. Data mining functionalities ,classification of data mining systems, Data mining task primitives, Integration of a data mining system with database or a data warehouse system, major issues in data mining.

**Data Preprocessing:**

Need for preprocessing the data, data cleaning, Data integration, and transformation, Data reduction , discretization and concept of hierarchy generation .

**Unit-II**

**Data Warehouse And OLAP Technology for Data mining:**

Data Warehouse, multidimensional Data model, data Warehouse Implementation Further development of Data cube technology, From Data warehousing to Data mining.

**Data Cube Computation and Data Generalization:**

Efficient Methods for Data computation, Further Development of data cube and OLAP Technology, attribute-oriented induction.

**Unit-III Mining Frequent Patterns, Associations and Correlations:**

Concepts, efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of association rules, From Association Mining to Correlation Analysis ,Constraint-Based association mining.

**Unit-IV Classification and Prediction:**

Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian classification, Classification by Back propagation, Support Vector Machines, Associative Classification by Lazy Learners ,Other Classification methods, Prediction, accuracy and Error measures, Evaluating the accuracy of or a classifier or a predictor, ensemble methods.

**Unit-V Cluster Analysis Introduction:**

Types of data in cluster analysis, Categorization of Major Clustering Methods, Partitioning methods, Destiny- based methods, Grid –Based Methods, Model based Clustering High dimensional Data, Constraint-Based cluster Analysis, outlier analysis.

**Unit-VI Mining streams, Time Series and Sequence Data:**

Mining data Streams, Mining Time –series Data, Mining Sequence Patterns in Biological Data ,Graph Mining, Social network Analysis and Multirelational Data Mining.

**UNIT-VII Mining Object, Spacial, Multimedia , Text and Web Data:**

Multidimensional Analysis and descriptive Mining of Complex Data Objects , Spacial Data mining, Text Mining, Mining the world wide web.

**Unit-VIII Applications Trends in Data Mining:**

Data Mining Applications, Data mining system products and Research prototypes, Additional Themes on Data mining and Social Impacts of data mining.

**TEXT BOOKS:**

- Data mining – concepts and techniques – Jiawei Han & Micheline Kamber , Morgan Kaufmann Publishers ,Elsevier ,2<sup>nd</sup> Edition 2006

- Introduction to data mining- Pang-Ning Tan, Micheal Steinbach and Vipin Kumar, pearson educations .

**REFERENCE BOOKS:**

1. Data mining techniques: Arun K Pujari , 2<sup>ND</sup> edition, universities press.
2. Data Warehousing in Real World- Sam Aanhory& Dennis Murray Pearson Edn Asia.
3. Insight into data mining ,K.P.Soman , S.Diwakar , V.ajay ,PHI,2008.
4. Data Warehousing Fundamentals –Paulraj Ponnaiah Weily Student edition.
5. The Data Warehouse Life cycle Tool Kit- Ralph Kimball Wiley student edition.
6. Building the Data Warehouse By William H.Inmon, John Wiley & sons Inc 2005
7. Data mining Introductory and advanced Topics –Margaret H Dunham, Pearson education.
8. Data mining V.Pudi and P.Radha Krishna ,oxford university press.
9. Data mining :Methods and Techniques A.B.M Shawkat Ali and S.A. Wasimi Cengage Learning.
10. Data Warehouse 2.0, The architecture for the next generation of Data Warehousing , W.H.Inmon D. Strauss, G.Neushloss ,Elsevier, Distributed by SPD.



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PRINCIPLES OF COMMUNICATIONS

**Unit-I Introduction:**

Block Diagram of Electrical communication systems, Radio communications, Analog, Pulse and digital, Types of signals, Fourier transform for various signals. Fourier Spectrum, Power spectral density, autocorrelation, correlation, convolution.

**Unit-II Amplitude Modulation:**

Need for modulation, Types of Amplitude modulation AM, DSB SC, SSB SC, power and BW requirements, generation of AM, DSB SC, SSB SC, demodulation for DSB SC & SSB SC.

**Unit-III Angle Modulation:**

Frequency & Phase modulation, advantages of FM over AM, bandwidth consideration, Narrow band and Wide band FM, comparison of FM & PM.

**Unit-IV Pulse Modulation:**

Sampling, Nyquist rate of sampling, Sampling theorem for band limited signals, PAM, regeneration of base band signal, PMW and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

**Unit-V Digital Communications:**

Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.

**Unit-VI Digital Modulation:**

ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.

**Unit-VII Information theory:**

Concept of information, rate of information and entropy, Source coding for optimum rate of information. Coding efficiency, Shannon- Fano and Huffman coding.

**Unit-VIII Error control coding:**

Introduction, error detection and correction codes, block codes, convolution codes.

**TEXT BOOKS:**

1. Communication Systems Analog and digital-R.P Singh and SD Sapre, TMH 20<sup>th</sup> reprint 2004
2. Principles of communications-H.Taub and D.Schilling, TMH, 2003.

**REFERENCE BOOKS:**

1. Electronic Communication Systems-Kennedy and Dayis, TMH, 4<sup>th</sup> edition 2004.
2. Communication system engineering- John G. Proakis and Masoud Saheli, PHI, 2<sup>nd</sup> Ed 2004.

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**ADVANCED ENGLISH COMMUNICATION SKILLS LAB**

**1. Introduction:**

The introduction of the English language is considered essential at third year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and inter personal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates
- Participate in group discussions
- Face interviews
- Write project/research reports/technical reports.
- Make oral presentations
- Write formal letters
- Transfer information from non verbal to verbal and vice versa'
- To take part in social and professional communication.

**2. Objectives:**

This lab focuses on using computer-aided multimedia instructions for language development to meet the following targets:

- To improve the student's fluency in English, through a well developed vocabulary and enable them to listen English at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional context.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

**3. Syllabus:**

The following course content is prescribed for the Advanced Communication Skills Lab:

- **FUNCTIONAL ENGLISH:**

Starting a conversation-responding appropriately and relevantly –using the right body language- role play in different situations.

- **VOCABULARY BUILDING:**

Synonyms, antonyms, word roots, one word substitutes, prefixes & suffixes ,study of word origin, analogy, idioms and phrases.

- **READING THE COMPREHENSION:**

Reading for facts , gussing meanings from context, scanning, skimming, inferring meaning, critical reading.

- **WRITING SKILLS:**

Structure and presentation of different types of writing-Resume writing/e-correspondence/technical report writing/portfolio writing/planning for writing-research abilities/data collection/organizing data/tools/analysis/improving one's writing.

- **GROUP DISCUSSION:**

Dynamics of group discussion intervention, summarizing, modulation of voice,body language, relevance, fluency and coherence.

- **Presentation skills:**

Oral presentation(individual & group)through jam sessions/seminars and written presentations through posters/projects/reports/PPT's/e-mails/assignments

- **Interview skills:**

Concept and process, pre interview planning, opening strategies, answering strategies, interview through telly and video conferencing.

#### **4.MINIMUM REQUIREMENT:**

The English Language Lab shall have two parts:

- a. The Computer aided Language Lab for 60 students with 60 systems, one master console,LAN facility and English language software for self study by learners.
- b. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System a T.V. a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component);

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- c. P – fourth processor
  - Speed-2.8 GHZ
  - RAM-512 MB Minimum
  - Hard disk- 80GB
- d. Headphones of High quality

#### **5.SUGGESTED SOFTWARE:**

The software consisting of the prescribed topic elaborated above should be procedure and used.

Suggested software:

- Clarity pronunciation power-part 2
- Oxford Advanced learners compass, seventh edition
- DELTA'S key to the next generation TOEFL Test: Advance skill practice
- Lingua TOEFL CBT insider, by dreamtech
- TOEFL&GRE(KAPLAN, AARCO & BARRONS, USA, cracking GRE by CLIFS)
- The following software from 'train2success.com'.
  - Preparing for being interviewed,

- Positive thinking,
- Interviewing skills,
- Telephone skills,
- Time management
- Team building,
- Decision making.

### **6.Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeetha Sharma, Oxford University Press 2009.
2. Advanced communication skills laboratory manual by sudha rani, D.Pearson Education 2011.
3. English Language Communication: A Reader cum lab manual Dr.A.Ramakrishna Rao , Dr.G.NATANAM & Prof SA.Sankaranarayana, Anuradha publications, Chennai 2008.
4. English Vocabulary in Use series ,Cambridge university press 2008.
5. Mangement Shapers Series by universities press (india)Pvt Ltd. , Himayathnagar, Hyderabad 2008.
6. Communication Skills by leena sen, PHI Learning Pvt LTD., New Delhi 2009.
7. Handbook For Technical Writing by David A MuMurrey & Joanne Buckley CENCAGE Learning 2008.
8. Job Hunting by colm Downes, Cambridge university press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO publishing House 2006.
10. English For Technical Communication For Engineering Students, Aysha vishmohan ,Tata Mc Graw-Hil 2009.
11. Books on TOEFL/GRE/GMAT/CAT/IELTS by Barron's/DELTA/Cambridge university press.
12. International English For Call Centers by Barry Tomalin and suhashini Thomas ,Macmillan publishers,2009.

### **DISTRIBUTION AND WEIGHTAGE OF MARKS:**

1. The practical examinations for the English language Laboratory Practice shall be conducted as per the University norms prescribed for the core Engineering Practicle sections.
2. For the English language Lab sessions, their shall be a continuous evaluation during the year for 25 sessional marks and 50 end Examination marks of the 25 marks, 15 marks shall be awarded for day to day work and 10 marks to be awarded by conducting internal lab tests. The end examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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COMPUTER NETWORKS AND OPERATING SYSTEMS LAB

**Objective:**

- To understand their functionalities of various layers of OSI model
- To understand the operating system functionalities

**System/Software requirement :**

- Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space

**Part-A**

1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials -CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra's algorithm to compute the shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain routing table at each node using distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding
8. Using RSA algorithm Encrypt a text data and Decrypt the same.

**Part-B**

1. Simulate the following CPU scheduling algorithms
  - a) Round Robin
  - b) SJF
  - c) FCFS
  - d) Priority
2. Simulate all file allocation strategies
  - a) Sequential
  - b) SJF
  - c) Linked
3. Simulate MVT and MFT
4. Simulate all Files Organization Techniques
  - a) Single level directory
  - b) Two level
  - c) Hierarchical
  - d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
  - a) FIFO
  - b) LRU
  - c) LFU
8. Simualte paging technique of memory management.

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**MICROPROCESSOR AND MICROCONTROLLERS LAB**

**List of Experiments:**

**Note:-** Minimum of 12 experiments to be conducted.

The following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using various addressing Modes).
2. Program for sorting array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulation for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two micro processors using kit 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/keyboard to 8051.
17. Data transfer from peripheral to memory through DMA controller 8237/8257.

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DIGITAL IMAGE PROCESSING

**Unit-1 Digital Image Fundamentals & Image Transforms**

Digital image fundamentals,sampling & quantization, relationship between pixels,image transforms- 2-D FFT,properties, Walsh transform, Hadamardtransform,Discrete cosine transform, Haar transform, Slant transform, Hostelling transform.

**Unit-2 Image Enhancement (Spatial Domain)**

Introduction, image enhancement in special domain,enhancement through point operation, types of point operation, histogram manipulation, linear & non-linear gray level transformation, local & neighborhood operation, median filter,spatial domain high-pass filtering.

**Unit-3 Image Enhancement (Frequency Domain)**

Filtering in frequency domain,obtaining frequency domain filters from special filters, generating filters directly in the frequency domain,low pass(smoothinging)& high pass(sharpening) filters in frequency domain.

**Unit-4 Image Restoration**

Degradation model, Algebraic approach to restoration, inverse filtering,least mean square filters,constrained least squares restoration,interactive restoration.

**Unit-5 Image Segmentation**

Detection of discontinuities,edge linking & boundary detection,thresholding,region oriented segmentation.

**Unit-6 Image Compression**

Redundancies & their removal methods,fidelity criteria,image compression models,source encoder& decoder, error free compression, Lossy compression, JPEG 2000 standards.

**Unit-7 Wavelet Based Image Processing**

Introduction to wavelet transform, continuous wavelet transform, Discrete wavelet transform, filter banks,wavelet based image compression, wavelet based de-noising & wavelet thresholding methods.

**Unit-8 Morphological Image Processing**

Dilation & erosion:Dilation, Structuring element decomposition, the strel function, erosion.combining dilation & erosion: Opening & closing, the hit or miss transformation, Overview of digital image water making methods.

**TEXT BOOKS**

- 1.Digital image processing – rafeal C, Gonzalez, Rechar E. Woods, 3<sup>rd</sup> edition, pearson, 2008.
2. Digital image processing- S Jayaraman, S Esakkirajan, T veeakumar- TMH,2010.

**REFERENCES**

- 1.Digital image processing using MATLAB- RafealC.Gonzalez,Richard E. Woods &steven L. Eddings, 2<sup>nd</sup> edition, TMH,2010.
2. Fundamentals of digital image processing-A.K.Jain,PHI,1989.
- 3.Digital image processing & Computer version- Somka, hlavac, Boyle- Cengage learning (Indian editipn)2008.
- 4.Introductory computer version imaging techniques & solutions- Adrain low,2008, 2<sup>nd</sup> edition.
5. Introduction to image processing & analysis- John C. Russ, Christain Russ, CRC Press, 2010.

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IV Year B.tech- I Sem.

ARTIFICIAL INTELLIGENCE  
(ELECTIVE-1)

**UNIT I**

**Introduction:** AI problems, foundations of AI, history of AI, intelligent agents-Agents and Environments. The concepts of rationality, the nature of environments, structure of agents.

**UNIT II**

**Problem-solving:** Solving problems by searching- Problem solving agents, searching for solutions, uninformed search strategies-Breadth first search, Depth first search. Depth limited search, iterative deepening, depth first search, bidirectional search. informed (Heuristic) search strategies-Greedy best first search, A\* search, Heuristic functions, Local search algorithms-Hill climbing, simulated, annealing search, local beam search, genetic algorithms.

**UNIT III**

**CSP and Adversarial search:** Constraint satisfaction problems, Backtracking search for CSPs- Variable and value ordering, Propagating information through constraints, intelligent backtracking; looking backward, local search for constraint satisfaction problems, Games, Optimal decisions in games-Optimal strategies, Minimax algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Imperfect Real-time decisions-Evaluation functions, cutting off search.

**UNIT IV**

**Knowledge representation and reasoning:** Logic Agents, Knowledge-Based Agents, Logic, Propositional logic-Syntax, Semantics, a simple knowledge base, Inference, Equivalence, validity and satisfiability, Resolution patterns in Propositional logic-resolution, Forward and Backward chaining. First order logic -Representations, Syntax and semantics, models for first-order logic, symbols and interpretational, terms, atomic sentences, complex sentences, quantifiers, equality. Inference in first-order logic: Propositional vs first-order inference-inference rules for quantifiers, reduction to propositional inference, unification and lifting-A first-order inference rule, Unification, forward chaining-first-order definite clauses, a simple forward-chaining algorithm, Backward chaining - a backward chaining algorithm, Resolution-conjunctive normal form for first-order logic, the resolution inference rule, example proofs.

**UNIT V**

**Planning:** Classical planning problem-language of planning problems, Expressiveness and extension, planning with state-space search - forward state-space search, Backward state-space search, Heuristics for state-space search. Partial-order planning-an example, Planning Graphs-The graphplan algorithm.

**UNIT VI**

**Learning:** Forms of learning-Induction learning, Learning Decision Trees-decision trees as performance elements, expressive of decision trees, inducing decision trees from examples, choosing attributes tests, assessing the performance of the learning algorithm. Neural Networks-Units in neural networks, network structures, single layer feed-forward neural networks (perceptrons), Multilayer feed-forward neural networks, learning neural network structures.

**UNIT VII**

**Communication:** Communication as Action, Fundamentals of language, the component steps of



Communication, A formal grammar for a Fragment of English-the lexicon of a', the Grammar of a'. Syntactic Analysis(Parsing)-Efficient Parsing. Augmented Grammars-Verb subcategorization, Generative capacity of augmented grammars. Semantic Interpretation-The semantics of an English fragment, Time and tense, Quantification, Pragmatic Interpretation

### **UNIT VIII**

**Perception:**Introduction, Image Formation-Images without lenses: the pinhole camera, Lens systems, Light: the photometry of image formation, Color: the spectrophotometry of image formation, Early Image Three-Dimensional Information-Motion, Binocular stereopsis, Texture gradients, Shading, Contour. Object Recognition-Brightness-based recognition, Feature-based recognition, Pose Estimation.

### **TEXT BOOK:**

1. Stuart Russell and Peter Norvig,"Artificial Intelligence-A Modern Approach-2ed", Pearson Education.

### **REFERENCE BOOKS:**

1. Elaine Rich and Kevin Knight, "Artificial Intelligence-2ed", TMH, 1991, rp2008.
2. Dan W. Patterson "Introduction to Artificial Intelligence and Expert Systems-PHI/Pearson Education, 1990, rp2007.
3. Michael Negnevitsky,"Artificial Intelligence-A guide to Intelligent Systems-2ed", Pearson Edition, 2002, rp2008.
4. Patrick Henry Winston, "Artificial Intelligence-3ed", Pearson Edition, 1992.
5. Patrick Henry Winston and Berthold Klaus Paul Horn, "LISP-3ed, Pearson Edition, 1989, rp2004.
6. Ivan Bratka, "PROLOG Programming for Artificial Intelligence-3ed", Pearson Education.
7. Nilis J. Nilson, "Artificial Intelligence-A New Synthesis", Elsevier, 1998, rp2003.
8. N.P. Padhy, "Artificial Intelligence and Intelligent Systems", Oxford University Press, 2005.

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ARTIFICIAL NEURAL NETWORKS  
(ELECTIVE-1)

**UNIT I**

**Introduction:**What is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks.

**UNIT II**

**Learning Process:**Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process.

**UNIT III**

**Single layer perceptrons:**Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception-convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment.

**UNIT IV**

**Multilayer Perceptron:**Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, computer experiment, feature detection.

**UNIT V**

**Back Propagation:**Back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

**UNIT VI**

**Self-Organization Maps:**Two basic feature mapping models, Self organisation map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive pattern classification.

**UNIT VII**

**Neuro Dynamics:**Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors as a recurrent network paradigm.

**UNIT VIII**

**Hopfield models:**Hopfield models, computer experiment.

**TEXTBOOK:**

1. Neural networks A comprehensive foundations, Simon Haykin, PHI edition.

**REFERENCE BOOKS:**

1. Artificial neural networks-B.Vegnanarayana Prentice Hall of India P Ltd 2005.
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003.
3. Neural networks James A Freeman David M S kapurapearson education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

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DESIGN PATTERNS  
(ELECTIVE-1)

**UNIT I**

**Introduction:** What is a Design Pattern?, Design patterning in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How design Patterns Solve Design Problems, How to select a Design Pattern, How to Use a Design Pattern.

**UNIT II**

**A Case Study:** Designing a Document Editor: Design problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Windows Systems, User Operations Spelling Checking and Hyphenation, Summary.

**UNIT III**

**Creating Patterns:** Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT IV**

**Structural Pattern Part-I:** Adapter, Bridge, Composite.

**UNIT V**

**Structural Pattern Part-II:** Decorator, Facade, Flyweight, Proxy.

**UNIT VI**

**Behavioral Patterns Part I:** Chain of Responsibility, Command, Interpreter, Iterator.

**UNIT VII**

**Behavioral Patterns Part II:** Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

**UNIT VIII**

What to Expect from design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOKS:**

1. Design Patterns By Erich Gamma, Pearson Education.
2. Head First Design Pattern By Eric Freeman-Oreilly-spd.

**REFERENCES:**

1. Pattern's in JAVA Vol-I Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II Mark Grand, Wiley DreamTech.
3. JAVA Enterprise design Patterns Vol-III By mark Grand, Wiley DreamTech.
4. Design Patterns Explained By Alan Shalloway, Pearson Education.
5. Pattern Oriented Software Architecture, F.Buschmann& others, John Wiley & Sons.

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**COMPUTER GRAPHICS  
(ELECTIVE-II)**

**Unit-1 Introduction**

Application areas of computer graphics,overview of graphic systems,video-display devices,raster-scan systems, random scan systems,graphics monitors,work stations & input devices.

**Unit-2 Output Primitives**

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

**Unit-3 2-D Geometric Transforms**

Translation, scaling, rotation, reflection&sheartransformations, matrix representation & homogeneous coordinates, composite transforms,transformations between coordinate systems.

**Unit-4 2-D viewing**

The viewing pipeline,viewing coordinate reference frame>window to view port coordinate transformation, viewing functions, Cohen I Sutherland &cyrus-beck line clipping algorithms, Sutherland-hodgeman polygon clipping algorithm.

**Unit-5 3-D Object Representation**

Polygon surfaces,quadric surfaces, spline representation, Hermite curve,Bezier curve & B-spline curves,Bezier & B-spline surfaces,basic illumination models,polygon rendering methods.

**Unit-6 3-D Geometric Transformations**

Translation,rotation,scaling,reflection, & shear transformations, composite, transformations, 3-D viewing: viewing pipeline, viewing coordinates, view volume, &general projection,transforms & clipping.

**Unit-7 Visible Surface Detection Methods**

Classification, back-face detection, depth-buffer,scan-line,depth sorting,BSP-tree methods, area subdivision & octree methods.

**Unit-8 Computer Animation**

Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

## **TEXT BOOKS**

1. Computer graphics C version-Donald hearn& M. Pauline Baker, Pearson education.
2. Computer graphics principles & practice-second edition in C, Foley, van dam, feiner& Hughes, Pearson education.

## **REFERENCE BOOKS**

- 1.Computer graphics Second edition-Zhigandxiang,royplastock,schaum's outlines, Tata MC graw hill edition.
- 2.Procedural elements for computer graphics-David F Rogers, Tata MC Graw Hill, 2<sup>nd</sup> Edition.
3. Principles of Interactive Computer Graphics-Neuman&Sproul, TMH.
4. Principles of Computer Graphics-Shalini, Govil-Pai, Springer.
5. Computer Graphics-Sтивен Harrington, TMH.
6. Computer Graphics- F.S.Hill,S.M.Kelley,PHI.
7. Computer Graphics- P.Shirley, Steve Marschner& Others, Cengage Learning.
8. Computer Graphics & Animation-M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics & Geometric Modelling, R.Goldman,CRC Press, Taylor & Francis Group.
10. Computer Graphics-Rajesh K. Maurya, Wiley India.

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IV Year B.tech- I Sem.

(57053)MOBILE COMPUTING  
(ELECTIVE-II)

**Unit-1 Introduction**

Mobile communication, mobile computing-paradigm,promises/Novel Applications & impediments& architecture, mobile & hand held devices,Limitations of mobile &hand held devices,GSM-services, system architecture, radio interfaces, protocols, localization,calling handover, security, new data services, GPRS, CSHSD,DECT.

**Unit-2 (Wireless) Medium Access Control (MAC)**

Motivation for a specialized MAC(hidden & exposed terminals, near & far terminals), SDMA,FDMA,TDMA,CDMA,MAC protocols for GSM, wireless LAN(IEEE802.11), collision Avoidance (MACA,MACAW) protocols.

**Unit-3 Mobile IP Network Layer**

IP & Mobile IP network layers, packet delivery & handover management, location management, registration, tunneling & encapsulation, route optimization, DHCP.

**Unit-4 Mobile Transport Layer**

Conventional TCP/IP protocols, indirect TCP, snooping TCP, Mobile TCP, other transport layer protocols for mobile networks.

**Unit-5 Database Issues**

Database hoarding & caching techniques, C-S computing & adaptation, transactional models, query processing, data recovery, process &Qos Issues.

**Unit-6 Data Dissemination & Synchronization Communications Asymmetry**

Classification of data delivery mechanisms, data dissemination broadcast models, selective tuning & indexing methods, digital audio & video broadcasting (DAB & DVB).

Data synchronization- introduction, software, protocols.

**Unit-7 Mobile Ad Hoc Networks (MANET'S)**

Introduction, applications, & challenges of a MANET, routing, classification of routing algorithms, algorithms such as DSR,AODV,DSDV,Etc..., mobile agents, service discovery.

**Unit-8 Protocols & Platforms For Mobile Computing WAP**

Bluetooth, XML,J2ME, Java card, Palm OS, Windows CE, Symbian OS , LINUX for mobile devices.

**TEXT BOOKS**

Mobile Computing-raj kamal, Oxford university press, 2007,ISBN:0195686772.

**REFERENCE BOOKS**

- 1.Jochen Schiller-Mobile Communications, Addison-Wesley, Second Edition, 2004.
2. Stojmenovic&acute-Hand Book Of Wireless Networks & Mobile Computing-Wiley,2002,ISBN 0471419028.
3. Reza Behravanfar-Mobile Computing Principles: Designing & Developing Mobile Applications with UML & XML, ISBN: 0521817331, Cambridge University Press, Oct 2004.



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(57108) DISTRIBUTED SYSTEMS  
(ELECTIVE-II)

**Unit-1**

**Characterization Of Distributed Systems-**

Introduction, examples of distributed systems, resource sharing & web, challenges.

**System Models-**

Introduction, Architectural & Fundamental models, Networking & Internet working, interprocess communication.

**Unit-2**

**Distributed Objects & Remote Invocation-**

Introduction, communication between distributed objects, RPC, events & notifications, case study-java RMI.

**Operating System Support-**

Introduction, OS layer, protection process, & threads, communication & invocation, OS architecture, Distributed File Systems-Introduction, file services architecture, case study-SUN network file systems.

**Unit-3**

**Name Services-**

Introduction, name services & the domain name system, case study of the global name service, case study of the X.500 directory service.

**Peer To Peer Systems-**

Introduction, Napster & it's legacy, peer to peer middle ware, routing overlays, overlay case studies-pastry, tapestry, application case studies-squirrel, store.

**Unit-4**

**Time & Global States-**

Introduction, clocks, events & process states, synchronizing physical clocks, logical time & logical clocks, global states, distributed debugging.

**Coordination & Agreement-**

Introduction, distributed mutual exclusion, elections, multicast communication, consensus & related problems.

**Unit-5 Transactions & Concurrency Control**

Introduction, transactions, nested transactions, locks, optimistic concurrency control, timestamp ordering, comparison of methods for concurrency control.

**Unit-6 Distributed Transactions**

Introduction, Flat & Nested Distributed transactions, Atomic commit protocols, Concurrencycontrol in distributed transactions, distributed dead locks, Transaction recovery, transactions with replicated data.

**Unit-7 Security**

Introduction, overview of security techniques, cryptographic algorithms, digital signatures, case studies-kerberos, TLS, 802.11 Wifi.

## **Unit-8 Distributed Shared Memory**

Design & implementation issues, sequential consistency & Ivy case study, release consistency & munin case study, other consistency model, COBRA case study-Introduction, COBRA RMI, COBRA services.

### **TEXT BOOKS**

1. Distributed system concepts & design-G.coulouris, J.Dollimore& T kindberg, 4<sup>th</sup> edition, Pearson education.
2. Distributed Systems- S.Ghosh, chapman & Hall/CRC, Taylor &Fransis Group,2010.

### **REFERENCES**

1. Distributed Computing-S.Mahajan&S.Shah, Oxford University Press.
2. Distribute Operating Systems Concepts & Design- Pradeep K. Sinha, PHI.
3. Advanced Concepts In Operating Systems- M Singhal, N.G. Shivarathri, Tata MC Graw Hill Edition.
4. Reliable Distributed Systems- K.P. Birman, Springer.
5. Distributed Systems- Principles & paradigms, A.S.Tanenbaum&M.V.stean, Pearson Education.
6. Distributed Operating Systems - Algorithms &Analysis , R. Chow, T.Johnson, pearson.
7. Distributed Operating Systems- A.S. Tanenbaum, Pearson Education.

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VLSI DESIGN

**Unit 1**

**Introduction:** introduction to ic technology-CMOS,MOS PMOS NMOS& BICMOS Technologies ;Oxidation, Lithography,Diffusion, Ion implantation ,Metallization,Encapsulatoin, Probe testing, Integrated Resistorsand Capacitors, CMOS Nano technology

**Unit 2**

**Basic electrical properties:** Basic electrical properties of MOS and BICMOS circuits:I-V relationships ,MOS transistor threshold voltage , Gds , figure of merit ;W pass transistor, NMOS inverter , various pull ups ,CMOS inverter analysis and design, BI CMOS invertors

**Unit 3**

**VLSI circuit design process:** VLSI design flow , MOS Layres ,stick diagrams design rules and layout , 2 micro CMOS Design rules for wires ,contacts and transistors layout diagrams for NMOS and CMOS Invertors and gates ,scaling of MOS circuits

**UNIT**

**4**

**Gate level design:** logic gates and other complex gates, switch logic,alternate gate circuits ,time delays ,driving large capacitive loads , wiring capacitance , fanin fan –out, chopice layers

**UNIT 5**

**Data path subsystems:** subsystem design,shifters adders ,ALU”s multipliers , parity generators , comparator ,zero\one detectors , counters

**UNIT 6**

**Array subsystems:**SRAM,DRAM,ROM,Serial access memories ,content addressable memory

**UNIT 7**

**Semiconductor integrated circuit design:** PLA”S FPG”s CPLD”s ‘ standard cells ,programmable array logic, design approach , parametrsinfluencing low power design

**UNIT 8**

**CMOS testing:** CMOS testing, needs for testing,testprinciples,design strategies for test, chip level test techniques, system level test techniques, layout design for improved testability

**TEXT BOOKS:**

1. Essentials of VLSI circuits and systems –Kamran eshaghian,Eshraghiandoughles and A,Pucknell,PHI,2005 edition
2. VLSI design- K. LalKishore,V.S.Vprabhakar,I.K international ,2009
3. CMOS VLSI DESIGN-A circuits and systems perspective ,neilH.EWeste,Davidharris,Ayanbenerjee, person 2009

**REFERENCES:**

1. CMOS logic circuit design –John.P uyemura,springer,,2007
2. Modern VLSI design-Wayne wolf, pearson education,3<sup>rd</sup> edition,1997
3. VLSI design-A.albertraj,latha PHI,2008
4. Introduction to vlsi-Mead &Convey,BS publications ,2010
5. VLSI Design-M.michealval ,crc press,2009.

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COMPUTER NETWORKS

**UNIT 1**

Introduction to networks, internet, protocols and standards, the OSI model, layers in OSI model, TCP/IP suite, addressing, analog and digital signals

**UNIT 2**

**Physical layer:** digital transmission, multiplexing, transmission media, circuit switched networks, datagram networks, virtual circuit networks, switch and telephone network

**UNIT 3**

**Data link layer:** Introduction block coding, cyclic codes, checksum framing, flow and error control, noiseless channels, noisy channels, HDLC, point to point protocols

**UNIT 4**

**Medium access sub layer:** random access, control access, channelization, IEEE standards, Ethernet, fast Ethernet, giga byte Ethernet, wireless LANS

**UNIT 5**

**Connecting LANS:** backbone networks and virtual LANS, wireless WANS, SONET, frame relay and ATM

**UNIT 6**

**Network layer:** logical addressing, interworking, tunnelling, addressing mapping, ICMP, IGMP, forwarding, uni-cast routing protocols, multi cast routing protocols

**UNIT 7**

**Transport layer:** process to process delivery, UDP and TCP protocols, SCTP, data traffic, congestion, congestion control, QoS, integrating services, differentiated services, QoS in switched networks

**UNIT 8**

**Application layer-** Domain name space, DNS in internet, electronic mail, FTP, WWW, HTTP, SNMP, multimedia, network security

**TEXT BOOK**

1. Data Communications & networking- Behrouz A. Forouzan, Fourth Edition TMH, 2006.
2. Computer Networks- Anrew S Tenenbaum, 4<sup>th</sup> Edition, Pearson Education

**REFERENCE BOOKS**

1. An Engineering Approach To Computer Networks- S.Keshav. 2<sup>nd</sup> Pearson Education.
2. Understanding Communications & Networks- 3<sup>rd</sup> edition, W.A.Shay, Cengage Learning.
3. Computer Communication Networks, Nader F. Mir, Pearson Education.
4. Computer Networking: A Top-Down Approach Featuring The Internet, James F. Kurose, K.W.Ross, 3<sup>rd</sup> Edition, Pearson Education
5. Data & Computer Communications- G.S.Hura&M.Singhal, CRC Press, Taylor & Francis Group.
6. Data Communications & Computer Networks- P.C.Gupta, PHI.

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WEB TECHNOLOGIES

**UNIT-I:HTML Common tags:**

List,Tables,images,forms,frames,cascading style sheets;

**UNIT-II:**

Introduction to java scripts, Objects in Java Script, Dynamic HTML with Java Script.

**UNIT-III: XML:**

Document type definition,XML schemes,Document Object model,Presenting XML,Using XML Processors,DOM and SAX.

**UNIT-IV: Java Beans:**

Introduction to java beans,Advantages of Java Beans,BDK Introspection,Using Bound properties,Bean Info Interface,Constrained Properties Persistence, Customizes,Java Beans API,Introduction to EJB's.

**UNIT-V: Web Servers and Servlets:**

Tomcat web server,Introduction to Servlets,Lifecycle of a Servlet,JSDK,TheServlet API,The javaxservlet Package,Reading Servlet parameters,Reading Initialization parameters. The javax.servlet HTTP package,Handling Http Request & Responses,Using Cookies-session tracking, Security Issues.

**UNIT-VI: Introduction to JSP:**

The problem with Servlet,The Anatomy of a JSP page, JSP Processing,JSP Application Design with MVC Setting Up and page, JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

**UNIT-VII: JSP Application Development:**

Generating Dynamic Content,Using Scripting Elements Implicit JSP Objects,Conditional Processing Displaying Values Using an Expression to Set an Attribute,Declaring Variables and Methods Error Handling and debugging Sharing Data Between JSP pages, Requests and Users Passing Control and Data between Pages – Sharing Session and Application Data- Memory Usage Considerations.

**UNIT-VIII: Database Access:**

Database Programming using JDBC,Studying javax.sql.\* package,Accessing a Database from a JSP page, Application- specific database actions, Developing JAVA beans in a JSP page, Introduction to status frame work.

**TEXT BOOKS**

- 1.Programing world wide web-sebesta, pearson.
2. Java: the complete reference, 7<sup>th</sup> edition, Herbert Schildt, TMH.
3. Core SERVELETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (Units-5,6,7,8).

## **REFERENCE BOOKS**

1. Web programing, building internet applications, Chris Bates 2<sup>nd</sup> edition, WILEY Dreamtech (Units-1,2,3).
2. Internet & World Wide Web- How to program by Dietel& Nieto PHI/Pearson Education Asia.
3. Jakarta struts cookbook, BillSiggelkow, S P D O'Reilly for chapter 8.
4. Murach's beginning JAVA JDK 5, Murach, SPD.
5. An introduction to Web design & programming- Wang-Thomson.
6. Web applications technologies concepts-knuckles, John Wiley.
7. Programing World Wide Web-sebesta,pearson.
8. Web Warrior Guide toweb programming-Bai/Ekedaw-Thomas.
9. Beginning Web Programming- Jon Duckett WROX.
10. Java server pages, Pekowsky, Pearson.

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**WEB TECHNOLOGIES LAB**

Week-1:

Design the following static web pages required for an online book store web site.

1)HOMEPAGE:

The static home page must contain three frames.

Top frame, left frame, right frame.

2)LOGIN PAGE:

3)CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

Week-2:

4)CART PAGE:

The cart page contains the details about the books which are added to the cart.

5)REGISTRATION PAGE:

create a “registration form” with the following fields

1)Name(text fields)

2>Password(password field)

3)E-mail id(text field)

4)Phone number(text field)

5)Sex(radio button)

6)Date of birth(3 select boxes)

7)Languages known(hek boxes-english,telugu,hindi,tamil)

8)Address(text area)

Week-3:

VALIDATION:

Write JavaScript to validate the following fields of the above registration page.

1)name

2)password

3)E-mail id

4) Phone number

Week-4:

Design a webpage using CSS(cascading style sheets)which includes the following:

1) Use different font,styles:

2)Set a background image for both the page and single elements on the page.

3)Control the repetition of the image with the background –repeat property.

4)Define styles for links as

A:link

A:visited

A:ative

A:hover

5)Work with layers

6)Add a customized cursor

Week-5:

Write an XML file which display the book information which includes the following:

- 1)Title of the book
- 2)Author Name
- 3)ISBN number
- 4)Publisher name
- 5)Edition
- 6)Price

Write a document Type Definition(DTD) to validate the above XML file. Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Week-6:

VISUAL BEANS:

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle,if it is false.

The color of the area should be changed dynamically for every mouse click.

The color should also be changed if we change the color in the “property window”.

Week-7:

1)Install TOMCAT web server and APACHE.

While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2)Access the aboe developed sati web pages for books web site,using these serers by putting the web pages developed in week-1 and week-2 in the doumen root.

Access the pages by using the urls: <http://localhost:4040/rama/books.html> (for tomcat)

<http://localhost:8080/books.html> (for Apache)

Week-8:

USER Authentication:

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.

1.Create a Cookie and add these four user id’s and passwords to this Cookie.

2.Read the user id and passwords entered in the Login form (week1)and authenticate with the values(user id and passwords) available in the cookies.If he is a valid user (ie.,user-name and password match) you should welcome him by name(user-name) else you should display. “ You are not an authenticated user”.Useinit- parameters to do this. Store the user-names and passwords in he webinf.xml and access them in the servelet by using the getInitParameters() method.

Week-9:

Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields:name,password,email-id,phone number(these should hold the data from the registration form)

Practice ‘JDBC’ connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.



Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week 2).

Week-10:

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week 9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week 8 instead of cookies)

Week-11:

Create tables in the database which contain the details of items (books in our case like book name, price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

Week-12:

HTTP is a stateless protocol. Session is required to maintain the state. The user may add some items to cart page for the selected items. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart.

Multiple users can do the same thing at a time (ie., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method `session.invalidate()`).

Modify your catalogue and all JSP pages to achieve the above mentioned functionality using sessions.

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SOFTWARE ENGINEERING LAB

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagram to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram.
6. Activity Diagram.
7. Component Diagram.
8. Deployment Diagram.
9. Test Design.

**Description for an ATM System**

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for deposition envelopes, a dispenser for cash (in multiples of Rs.100, Rs.500 and Rs.1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN)-both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned- except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiple of Rs.100 or Rs.500 or Rs.1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two

accounts linked to the card.

4. A customer must be able to make a balance inquiry of any account linked to the card.

5. A customer must be able to abort a transaction in progress by pressing the cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction.

The ATM will have a key-operated switch that will allow an operator to start and atop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts etc.

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(58082)INFORMATION RETRIEVAL SYSTEMS  
(ELECTIVE - III)

**UNIT-I**

**Introduction:** Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, Information Retrieval System Capabilities: Search, Browse, Miscellaneous.

**UNIT-II**

**Cataloging and Indexing:** Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

**UNIT-III**

**Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

**UNIT-IV**

**Document and Term Clustering:** Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

**UNIT-V**

**User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext.

**Information Visualization:** Introduction, Cognition and perception, Information visualization technologies.

**UNIT-VI**

**Text Search Algorithms:** Introduction, Software text search algorithms, Hardware text search systems.

**Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

**UNIT-VII**

**Multimedia Information Retrieval:** Models and Languages-Data Modeling, Query Languages, Indexing and Searching.

**UNIT-VIII**

**Libraries and Bibliographical Systems:** Online IR Systems, OPACs, Digital Libraries.

**TEXTBOOK:**

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury , Springer.
2. Modern Information Retrieval By Ricardo Baeza-Yates, Pearson Education,2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder,2<sup>nd</sup> Edition, Springer.

**REFERENCE BOOKS:**

- 1.Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education,1992,
2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.
3. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press,2008.
4. Natural Language Processing and Information Retrieval, T. Siddiqui and U.S.Tiwary,Oxford Univ.Press.

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3    1/-/-    3

(58083)CODING THEORY AND TECHNIQUES  
(ELECTIVE-III)

**UNIT –I:**

**Coding for Reliable Digital Transmission and Storage:** Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

**UNIT-II:**

**Single Detection:** Gaussian channel, MAP and ML detection, Binary Detection, Probability of Error for Binary Detection, Bounds on performance, BSC channel, Memory less channel, Energy considerations for coded signals.

**UNIT-III:**

**Source Coding:** Source Code Theorems, Huffman code, Modified Huffman Code, Lempel Ziv codes, Shannon Fano code and Applications.

**UNIT –IV:**

**Linear Block Codes:** Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC.

**UNIT –V:**

**Cyclic Codes:** Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding of Cyclic codes, Error-trapping decoding.

**UNIT-VI:**

**Hamming Codes:** Hard-Input Decoding Hamming Codes, Other Representations of the Hamming code, Binary CRC codes, Shortend Cyclic codes.

**UNIT-VII:**

**Convolutional Codes-I:** Definition of Codes, Generator matrices, Generator polynomials, Structural and Distance Properties, Graphical representation of Convolution codes, tree and trellis structures.

**UNIT-VIII:**

**Convolutional Codes-II:** Decodes, Viterbi Algorithm, performance Bounds for convolutional Codes, Implementation of the Viterbi Algorithm, Stack Algorithm, Fano Algorithm, performance Characteristics of sequential Decoding, feedback decoding, Error Propagation and Definite Decoding.

**TEXT BOOKS:**

1. Error Control Coding- Fundamentals and Applications–Shu Lin, Daniel J. Costello, Jr, 2<sup>nd</sup> Edition,2004,Pearson.
2. Error Correcting Coding Theory-Man Young Rhee- 1989, McGraw-Hill Publishing.

## **REFERENCE BOOKS:**

1. Digital and Analog Communication Systems- K. Sam Shanmugam-wiley 2008
2. Digital Communications- John G. Proakis, 5th Ed., 2008, TMH.
3. Introduction to Error Control Codes-Salvatore Gravano-oxford 2001
4. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, Wiley India.
5. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Ed, 2009, TMH.

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(58030)NETWORK SECURITY  
(ELECTIVE - III)

**UNIT – I:**

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

**UNIT – II:**

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

**UNIT - III :**

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

**UNIT – IV:**

Email privacy: Pretty Good Privacy (PGP) and S/MIME.

**UNIT - V:**

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

**UNIT – VI:**

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

**UNIT – VII:**

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats.

**UNIT - VIII :**

Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

**TEXT BOOKS :**

- 1.Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permech, wiley Dreamtech



**REFERENCE BOOKS:**

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.
7. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
8. Information Systems Security, Godbole, Wiley Student Edition.
9. Cryptography and network Security, B.A. Forouzan, D. Mukhopadhyay, 2<sup>nd</sup> edition, TMH.

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CELLULAR AND MOBILE COMMUNICATIONS  
(ELECTIVE-IV)

**UNIT 1:**

**Introduction To Cellular Mobile Radio Systems:**

Limitations of conventional mobile telephone systems, Basic Cellular Mobile systems , First, Second, Third and Fourth generation cellular wireless systems , , Uniqueness of Mobile radio environment- Long term fading ,Factors influencing short term fading, Parameters of mobile multipath fading –Time dispersion Parameters ,Coherence bandwidth, Doppler spread and coherence time, Types of small scale fading.

**UNIT 2:**

**Fundamentals Of Cellular Radio System Design:**

Concept of frequency reuse , co-channel interface, co-channel interface reduction factor, Desired C/I from a normal case in a omni directional antenna system, system capacity, Trunking and grade of service Improving coverage and capacity in cellular systems-Cell splitting, Sectoring ,Microcell zone concept.

**UNIT3:**

**Co-Channel Interference:**

Measurement of real time co-channel interference, Design of antenna system, Antenna parameters and their effects, Diversity techniques, space diversity, Polarization diversity, frequency diversity, time diversity.

**UNIT 4:**

**Non-co-channel Interference:**

Adjacent Channel interference, Near end and far end interference, Cross talk, Effects on coverage and interference by power decrease, Antenna height decrease, Effects of cell site components, UHF TV interference.

**UNIT5:**

**Cell Coverage For Signal and Traffic:**

Signal reflection in flat and hilly terrain, effect of human made structures, Phase difference between direct and reflected paths, Constant standard deviation, Straight line path loss slope, general formula for mobile propagation, path loss from a point to point prediction model in different conditions, merits of Lee model.

## **UNIT6:**

### **Cell Site and Mobile Antennas:**

Sum and difference patterns and their synthesis, Coverage – omni directional antennas, interference reduction-directional antennas for interference reduction ,Space diversity antennas, Umbrella pattern antennas and Minimum separation of cell site of antennas, mobile antennas.

## **UNIT7:**

### **Frequency Management and Channel Assignment:**

Numbering and grouping, Setup access and Paging channels, Channel assignments to cell sites and mobile units, channel sharing and Borrowing, Sectorization , Overlaid cells, Non fixed channel assignment.

## **UNIT8:**

### **Handoffs and Dropped Cells:**

Handoff initiation, Types of handoff ,Delaying handoff, Advantages of handoff, Power difference handoff, Forced handoff, Mobile assisted and soft handoff. Intersystem handoff, Introduction to dropped call rates and their evaluation.

## **TEXT BOOKS:**

1. Mobile Cellular Telecommunications-W.C.Y. Lee, Mc Graw Hill,2<sup>nd</sup> Edn.1989.
2. Wireless Communications- Theodore .s. Rapport , Pearson education, 2<sup>nd</sup> Edn.2002.

## **REFERENCES:**

- 1.Priciples of Mobile communications-Gordon L. Stuber , Springer International ,2<sup>nd</sup> Edn.2001

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IV Year B.tech- II Sem.

MULTIMEDIA AND RICH INTERNET APPLICATIONS  
(ELECTIVE-IV)

**Unit I**

Introduction to multimedia : Internet and multimedia communications, Multimedia Networks, Multimedia Applications, Multimedia Information representation-Digitization principles, Text, Images, Audio and Video, Compression Methods.

**Unit II**

Basic Coding Methods: Run Length coding, Huffman coding, Arithmetic coding, Discrete Cosine Transform, Differential PCM, Motion Compensated Prediction, Video Compression- JPEG, H.261, MPEG-1 Video, MPEG 2 and 3 Video, H.263, Wavelet and Fractal Image Compression, Audio Compression.

**Unit III**

Multimedia Applications in Networks : Introduction, Application Level framing, Audio/Video conferencing-session Directories, Audio/Video Conferencing, Adaptive Applications, Receiver Heterogeneity, Real Time Application with Resource Reservation, Video server.

**Unit IV**

Application requiring reliable multicast- White Board, Network Text Editor for Shared Text Editing, Multi Talk, Multicast file transfer, Multimedia Applications on the World Wide Web – Multicast Web Page Sharing, Audio/Video Streams in the www, Interactive multiplayer Games.

**Unit V**

Web 2.0 : What is web 2.0, Search, Content Networks, User Generated content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet applications, Web services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VOIP, Web 2.0 Monetization and Business Models, Future of the Web.

**Unit VI**

Rich Internet Applications (RIAs) with Adobe Flash : Adobe Flash-Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with flash, Creating a website splash screen, action script, web sources.

**Unit VII**

Rich Internet Applications (RIAs) with Flex 2 : Introduction, Flex Platform Overview, Creating a simple User Interface, Accessing XML data from your application, Interacting with Server Side Applications, Customizing your User Interface, Creating Charts and Graphs, Connecting Independent RIAs on the desktop- Adobe Integrated Runtime (AIR), Flex 3 Beta.

**Unit VIII**

Ajax-Enabled Rich Internet Application : Introduction, Traditional web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using XMLHttpRequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo Toolkit.

**TEXTBOOKS:**

1. Multimedia Communications: Protocols and Applications, Franklin F Kuo, J. Joaquin Garcia, Wolfgang Effelsberg, Prentice Hall Publications.
2. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Addison Wesley Publications.
3. AJAX, Rich Internet Applications and web Development for Programmers, Paul J Deitel and Harey M Deitel, Deitel Developer Series, Pearson Education.

**REFERENCES:**

1. Professional Adobe Flex 2, Rich Tretola, Simon Barber and Renaum Erickson, Wrox, Wiley India Edition.
2. Multimedia Information Networking, Nalin K Sharda, PHI Learning.
3. Multimedia Computing, Communication & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education.
4. Multimedia Communication Systems: techniques, standards and networks, K.R. Rao, Bojkovic and Milovanovic., PHI Learning.
5. Programming Flex 3, C. Kazoun and J. Lott, SPD.
6. Dojo, J.E. Harmon, Pearson Education.
7. Adobe Flex 3: Training from the source, Trapper & others, Pearson Education.
8. Principles of Multimedia, R. Parekh, TMH.
9. Mastering Dojo, R. Gill, C. Riecke and A. Russell, SPD.

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IV Year B.tech- II Sem.

DATA COMMUNICATION SYSTEMS  
(ELECTIVE-IV)

**UNIT I**

**INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING:** Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks, Alternate Protocol Suites.

**SIGNALS, NOISE, MODULATION, AND DEMODULATION :** Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and M-ary Encoding, Digital Modulation.

**UNIT II:**

**METALLIC CABLE TRANSMISSION MEDIA :** Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Equivalent Circuit, Wave Propagation on Metallic Transmission Lines, Metallic Transmission Line Losses.

**OPTICAL FIBER TRANSMISSION MEDIA :** Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, The Physics of Light, Velocity of Propagation, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

**UNIT III:**

**DIGITAL TRANSMISSION :** Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ration, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.

**MULTIPLEXING AND T CARRIERS :** Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy, Digital Line Encoding, T Carrier systems, European Time- Division Multiplexing, Statistical Time – Division Multiplexing, Frame Synchronization, Frequency- Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network

**UNIT IV:**

**WIRELESS COMMUNICATIONS SYSTEMS :** Electromagnetic Polarization, Rays and Wavefronts, Electromagnetic Radiation, Spherical Wavefront and the Inverse Square Law, wave Attenuation and Absorption, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

**UNIT V: TELEPHONE INSTRUMENTS AND SIGNALS:** The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

**THE TELEPHONE CIRCUIT:** The Local Subscriber Loop, Telephone Message- Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Voice-Frequency Circuit Arrangements, Crosstalk.

**UNIT VI: CELLULAR TELEPHONE SYSTEMS:** First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, North American Cellular and PCS Summary, Global system for Mobile Communications, Personal Communications Satellite System.

**UNIT VII:**

**DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:** Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

**DATA COMMUNICATIONS EQUIPMENT:** Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems- Compatible Voice- Band Modems, Voice- Band Modem Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice- Band Modems, Synchronous Voice- Band Modems, Modem Synchronization, ITU-T Voice- Band Modem Specifications, 56K Modems, Modem Control: The AT Command Set, Cable Modems, Probability of Error and Bit Error Rate.

**UNIT VIII:**

**DATA –LINK PROTOCOLS**

Data –Link Protocol Functions, Character –and Bit- Oriented Protocols, Data Transmission Modes, Asynchronous Data – Link Protocols, Synchronous Data – Link Protocols, Synchronous Data – Link Control, High – Level Data – Link Control.

**TEXT BOOKS:**

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

**REFERENCE BOOKS:**

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition. TMH.
2. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
3. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education

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(58017)RELIABILITY ENGINEERING

**UNIT – I:**

**Basics of Probability theory & Distribution:** Basic probability theory - rules for combining probabilities of events – Bernoulli's trials – probabilities density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.

**UNIT – II:**

**Network Modeling and Evaluation:** Analysis of Series, Parallel, Serial – Parallel networks, Redundant System Conditional Probability Approach, Cut Set method.

**UNIT – III:**

**Reliability Functions:** Reliability functions  $f(t)$ ,  $F(t)$ ,  $R(t)$ ,  $h(t)$  and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution.

**UNIT – IV:**

**Reliability Evaluation:** Reliability Characteristics, Component Reliability and Hazard Models, Component Reliability from Test Data, Evaluation Using Markov Model and Improvement Techniques.

**UNIT – V:**

**Reliability Testing:** Life Test Objectives, Types of Reliability, Test Specifications, Tolerance Test Conditions, Tolerance of Instrument, Specifications.

**UNIT – VI:**

**Accelerated Life Testing:** Methods for ALT Data Quantifications, Temperature Stress and Failures Rates, Stress Combinations in ALT, ALT on sub – Assemblies, Limitations, Accelerated Test for Evaluation Life, Compressed Time Testing, Cumulative Damage Model.

**UNIT – VII:**

**Data Analysis and Estimation :** Graphical Representation of Statistical Data. Point and Interval Estimation, Goodness of Fit Test, Moment, Maximum, Likelihood and Least Square Estimators.

**UNIT – VIII:**

**Monte Carlo Stimulation:** Random variates, Simulation output, Application of MCS Techniques: Tossing a coin, Throwing a die, Simulating a two component system, Time Depended Reliability Assessment. Two component non repairable system. Reliability, Availability of Repairable and standby systems, Number of Simulations.

**TEXT BOOKS:**

1. Reliability Evaluation of Engg. Systems – Concepts and Techniques, by Roy . Billinton, R. N. Allan, 2nd Edition Springer Publications, - (Reprint 2008).
2. Reliability Engineering and Life Testing by V. N. A. Naikan, PHI Publications – 2009.