Minutes

A meeting of the Board of Studies (BOS) held on 04/09/2010 at 11:30 am in the Department of Computer Science & IT, MJP Rohilkhand University, Bareilly. The following members were present in the meeting:

1. Prof. Neelam Gupta - Member
2. Dr. Rosamand Singh - Internal Member
3. Mr. Brajesh Kumar - Internal Member
4. Mr. Anand Gupta - Internal Member
5. Mr. S.N. Bhard - Internal Member
6. Mr. Vinay Kashyap - Internal Member
7. Mr. Vikash Bhatnagar - Internal Member
8. Dr. Kamaljeet Bhattri - External Member
9. Mr. Haribhai - Convener

Following points were discussed and resolved:

1. The list of examiners for B.Tech. theory and lab exams for academic session 2010-2011.
2. The list of examiners for MCA theory and lab exams for academic session 2010-2011.
3. The list of examiners for BCA theory and lab exams for academic session 2010-2011.
4. It has been noticed that some colleges do not contact the examiners whose names are sent by the University, instead they invite other examiners of their choice to conduct the exam. University also does not object this illegal practice and usually such exams are considered prima facie, which is wrong. It is resolved by the BOS that colleges can not overlook the internal examiner appointed by the University unless they have written refusal from that internal examiner.

5. It has been observed that sometimes people from different universities departments who never taught computer science subjects and even non-teaching people, who are not in the approved list of examiners, are appointed as external examiners by the University, which is not legal. These people cannot make fair assessment of the students because they do not have the knowledge of the subject. To maintain the quality of the exam in the interest of the students such people cannot be appointed as examiners.

6. There is no branch named Computer Sc. & IT in the list of AIJCL, and The AIJCL has given approval of the course by the name B.Tech.(Computer Sc. & Engineering) this
Therefore the existing course B.Tech (Computer Science & IT) must be changed to B.Tech (Computer Science & Engineering). As admissions are being made through UPTU counselling, and there is no option by the name “Computer Science & IT” in the list of choices. It would be beneficial to change the branch name from this point also. It is resolved by the BOS that existing branch “Computer Science & IT” must be changed to “Computer Science & Engineering”.

7. The proposal for starting M.Tech (Computer Science & Engineering) has been approved by the faculty board in the earlier meeting. As directed by Faculty Board the course structure of M.Tech is prepared and it is approved by the BOS.

8. The MCA course is being run by the Department of CSIT and AICTE has given its approval for this course in the Faculty of Engineering. The course structure and syllabi of MCA is designed and regularly revised by the Department of CSIT. But the University statute this course is being considered under the Faculty of Applied Sciences. BOS recommends that this necessary action must taken to remove this anomaly and MCA should be mentioned as a course being run under Faculty of Engineering & Technology in the University statute.

The faculty members of Department of CS&IT were also present in the meeting. The convener is very thankful to all the BOS members and all the faculty members for their valuable suggestions.
Course Structure and Syllabi for

B.Tech (4 Years Course)

in

Computer Science and Information Technology

Effective from

Academic Session 2011-12
## Scheme of courses for B.Tech
### Computer Science and Information technology
#### B.Tech I year, I Semester

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<tr>
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#### Laboratory Courses

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#### Laboratory Course

| 7      | CS-306 P    | Computer Graphics Lab         | 2       | 0 0 3             | 3           |
| 8      | CS-310 P    | JAVA Programming Lab          | 2       | 0 0 3             | 3           |
| 9      | EC-302 P    | Digital Signal Processing Lab | 2       | 0 0 3             | 3           |

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**Semester Total** 30 33

### FOURTH YEAR

#### SEMESTER-VII

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<td>CS-431T</td>
<td>Network Management Systems</td>
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<td>CS-432T</td>
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<td>CS-433T</td>
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<td>CS-435T</td>
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<td>CS-438T</td>
<td>Fault Tolerance Computing</td>
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<td>CS-439T</td>
<td>Artificial Intelligence &amp; Expert System</td>
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<td>CS-441T</td>
<td>Advanced Data Base Management System</td>
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<td>CS-443T</td>
<td>Network Security and Cryptography</td>
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<td>EC-403T</td>
<td>VLSI Design &amp; Circuit</td>
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<td>CS-445T</td>
<td>Stochastic Models for Computer Applications</td>
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<td>EE-458T</td>
<td>Digital Image Processing</td>
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<td>CS-448T</td>
<td>Distributed database System</td>
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<td>CS-450T</td>
<td>Internet Programming with .net framework</td>
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<td>CS-451T</td>
<td>Wireless network and Mobile Computing</td>
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<td>CS-452T</td>
<td>Real Time System</td>
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SECOND YEAR (THIRD SEMESTER)

CS-201T  Data Base Management Systems  Credits 4(3-1-0)

UNIT 1: Introduction: Data Base System Concepts and architecture, Data models, scheme and Instances, Data Independence Data Base Languages and Interfaces, Network Model, Hierarchical Model.

UNIT 2: Data Modeling Using the Entity-Relationship Model: ER model concepts, Notations for ER diagram, Extended E-R diagram Extended E-R model, Relationships of higher degree

UNIT 3: Relational Data Model and Languages: Relational model concepts, constraints, Relational Algebra, Relational Calculus, Tuple and Domain calculus, SQL: Data definitions queries, Basic Structure, set operators, Aggregate function, Derived Relations. Modification of the Database, Joined relations and up-dates in SQL.


UNIT 6: Transaction Processing concepts: Transaction and system concepts, schedules and Recoverability, serializability of schedules.

UNIT 7: Concurrency Control Techniques: Locking Techniques for Concurrency control. Time stamping and Concurrency control.


References:

4) Whittigton, R.P. Database system engineering, Claventor Press.
UNIT 1: Logic: Propositions, Conditional and Biconditional Disjunctive normal Form and Simplification, Predicates, Valid Arguments and proofs.

UNIT 2: Set Theory: Sets, Set Relations, Set operations, Infinite Collection of sets, Power sets, Cartesian Products, Inductively defined sets, Formal Languages, Proofs by Induction.

UNIT 3: Functions: Functions, Injective and Surjective, Composition of functions, Inverse Function, Functions and Set operations.


UNIT 5: Relations: Relations, Compositions of Relations, Equivalence Relations, Equivalence Classes, Order Relations, Recurrence Relations, Lattice.

UNIT 6: Graph Theory: Basic Concepts, Paths and Connectivity, Planar Graphs, Trees, Rooted Trees, Shortest path algorithm.

UNIT 7: Introduction To Algebra: Binary operations, Semigroups, Groups, Subgroups, Cosets and Lagrange’s Theorem.

References:
UNIT 1: Basic Concepts & Notation:
Introduction to data structure, Binary and decimal integers, Real numbers, Abstract data types (ADT), Abstract Data Type for varying length character Strings.

UNIT 2: Arrays:
The array as an ADT, Using one dimensional array, implementing one Dimensional array, two dimensional array, multidimensional array.

UNIT 3: Stacks:
Definition and examples, primitive operations, Array representation of stacks, Example: Infix, Postfix, and Prefix: Basic definitions and Examples, Evaluating a postfix expression, Converting an expression from infix to postfix, Recursion - tower of Hanoi;

UNIT 4: Queues and link lists:
The Queue and its sequential Representation, Priority Queue; Linked Lists: Inserting and removing nodes from the list, Linked list as a data Structure, Other List structures: Circular Lists, Doubly Linked Lists

UNIT 5: Trees: Binary Trees:
Operation on Binary Trees, Traversal: In order, Preorder, Post order; Application Binary Tree. Binary search tree, Expression Tree; Binary Tree Representation: Array representation, Link List representation; Example: Huffman Algorithm

UNIT 6: Sorting:
Introduction, Selection sort, bubble sort, insertion sort, quick sort and Merge sort, Heap sort.

UNIT 7: Search: Basic search Techniques:
Sequential Searching, Indexed Sequential Search, Binary Search, Interpolation Search ; Tree searching : inserting into Binary Search Tree (BST), Deleting from a BST, Balanced (AVL) Tree, Search Tree and B-Tree

UNIT 8: Hashing:
Introduction, Hash function: Division Method, Midsquare Method, Folding Method, hash table;

UNIT 9: Graphs and Their Applications:
Introduction, Wars hall’s algorithm, Dijkstra’s algorithm, Graph traversal: Depth first search, Breadth First search.

References:
1) Data Structures using C/C++: Tennenbaum, PHI
2) Introduction to Data Structures : Schaum Series. by Lipetu, Mac Graw Hill
3) Data Structures by Augenstein & Tenenbaum.
UNIT 1: Basics Of Object Oriented Programming: What is Object oriented programming, Procedure oriented programming, problems with structured approach, OO terminology, Characteristics of Object oriented languages, Objects, Classes, Data Abstraction, Data Encapsulation, Inheritance, Polymorphism, Dynamic binding, Message passing, Structure of C++ Program

UNIT 2: Tokens, Expressions And Control Structure In C++ : Tokens. Basic data types, User defined data types, reference variables. Operators in C++, Operator Overloading, Loops (For, while and do), Decisions( if, if-else and switch), Control statements(break, continue and goto ).

UNIT 3: Building Objects With Classes: Specifying classes, defining member function, Inline function, main function, call by reference, function overloading, friend and virtual function, Constructor and Destructors, Copy constructor, Dynamic constructors.

UNIT 4: Defining Operations On Objects: Copy constructor, Defining operator overloading, overloading unary operator, overloading binary operator, overloading binary operator using friend function, manipulation of strings using operators, rules of operator overloading.

UNIT 5: Using Inheritance In C++: Derived class, single inheritance, multilevel inheritance, multiple inheritance, Hierarchical inheritance, hybrid inheritance, hybrid inheritance, virtual base class, abstract class, Constructor in Derived class

UNIT 6: Pointer’s, Virtual Functions And Polymorphism : Dynamic binding, static binding, virtual function, pure virtual function, dynamic binding through virtual function, pointer to objects, this pointer and pointer to derived class

UNIT 7: Working With Files: Classes for file stream operation, detecting EOF, file modes, file pointers and their manipulations, error handling during file operation. Command line argument.

UNIT 8: Object Oriented System Development: Procedure oriented paradigm, Procedure oriented development tools, object oriented paradigm, steps in object oriented analysis and steps in object oriented design.

UNIT 9: Templates And Exception Handling: Templates, class templates, function templates, member function templates, exception handling.

References:
1) Programming in C++ by Bjarne Stroustrup,
2) Object Oriented Programming with C++ by Balagurusamy, TMH.
3) Turbo C++ by Robert Lafore,
4) Complete Reference C++ by Herbert Shield,
UNIT:1  **Ordinary Differential Equations:** First order equations (linear and non-linear). Linear equations of second and higher orders with constant and variable coefficients. Solution of second order equations by removing first derivative, changing of dependent and independent variables and method of variation of parameters.

UNIT:2  **Special Functions & Partial Diff. Eqns:** Power Series solutions of second order equations by frobenious method. Legendre polynomials and Berel’s functions of first kind and their properties method of separation of variable for heat, wave and Laplace equations: Their solutions and related application.

UNIT:3  **Integral Transforms:** Laplace transform, existence theorem, Laplace transform of derivatives and integrals, Laplace transform of special functions. Inverse Laplace transform, convolution theorem. Applications of Laplace transform and its inverse to solve ordinary and partial differential equation.

Introduction to Fourier transforms. Fourier series, half range sine and cosine series, related applications.

References

Unit 1:- Transistor as an amplifier: Transistor Biasing and thermal stabilization: The operating point, Biasing Circuits, fixed bias, bias stability, self bias or emitter bias, fixing of Q-point using graphically & analytical methods, stabilization against variation in $I_{CO}$, $V_{BE}$, $\beta$: Bias compensation Diode for $I_{CO}$, $V_{BE}$.

Unit 2:- The Transistor at low frequencies: Two port devices and the hybrid model. The h-parameter, determination of h-parameter from input and output characteristics. Analysis of a transistor amplifier circuit using h-parameters; the emitter follower (its modelling), miller’s theorem and its dual, cascading transistor amplifier (up to 2 stages), simplified hybrid model, high input resistance transistor circuit e.g. Darlington, Emitter follower.

Unit 3:- Field effect transistors: General description on FET, JFET operations, and its characteristic, MOSFET, the FET small signal model, CS and CD amplifiers at high and low frequencies.

Unit 4:- Feedback amplifiers: Classification of amplifiers, feed back concepts, transfer gain with feedback, general characteristics of negative feedback amplifier, input and output resistances for voltage series, current series, current shunt, voltage shunt feedback, analysis of feedback amplifier (voltage series, current series, current shunt, voltage shunt feedback).

Unit 1:- Power amplifier: Class A large signal amplifier, second harmonic distortion, higher order harmonic generation, the transfer audio power amplifier, efficiency, class B, class C, class AB and push-pull amplifier.

REFERENCES

1. Integrated Electronics Analog and Digital circuits and systems, J. Millman, Halkias and Prikh, TMD.
2. Electronics Devices and Circuit Theory; Robert Boylestad & Nashlasky (PHI).
SECOND YEAR (FOURTH SEMESTER)

CS-202T Analysis & Design of Algorithms Credits 4(3-1-0)

UNIT 1: Introduction: What is an algorithm, writing algorithms in SPARKS, Writing structured programs, Analyzing algorithms, sorting recurrences?

UNIT 2: Divide - And - Conquer: The general methods Binary search, Finding the maximum and minimum, Mergesort, Quicksort, Selection sort, Strassens’s matrix multiplication.


UNIT 5: Basic Search And Traversal Techniques: The techniques, code optimization, and depth first search, Breadth first search.

UNIT 6: Backtracking: The general method, The 8-queens problem sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem

UNIT 7: Branch-And-Bound: The method, travelling salesperson problem.

References:

2) Algorithms: Theory and Practices by Brassard and Bratley, PHI.
3) Fundamentals of Computer Algorithms by Horowitz & Sahni, Computer Science Press
1. **Introduction:** - Review of digital logic gates, Design of adder and subtractor using gates & K-MAP, functioning of multiplexer, de-multiplexer, flip-flop.

2. **Arithmetic for Computer:** - Introduction to number system, negative numbers, addition & subtraction, logical operation, constructing and A.L.U., multiplications & division, floating point arithmetic.

3. **Processor Design:** - Processor organisation, Processor Level, information representation, instruction format, Addressing modes (Implied Mode, Immediate mode, register indirect mode, auto increment or Auto decrement mode, direct addressing mode, indirect addressing mode, relative addressing mode, index addressing mode), instruction types.

4. **Control Design:** - Control memory address sequencing, micro instruction interpretation, CPU control unit, basic concepts of micro programmed control, micro program sequencer for a control memory, micro instruction formats.

5. **Memory Organization:** - Classification memories, Memory Hierarchy, Optimization of memory hierarchy, Virtual Memory, Dynamic Address Translation Scheme addressing scheme for main memory, segmented memory system, paged segment memory, memory management policies, High speed memories, characteristics of cache memory, Cache memory organisation, Block replacement policies, interleaved memories, associated memories.

6. **System Organization:** - Bus arbitration, Programmed I/O (IO addressing, IO instruction), DMA (Types & procedures), interrupts (procedure, interrupt selection, vectored interrupts), Concurrency Control, System management.

**REFERENCES**

3. Computer System Architecture, by M. Morris Mano, PHI
UNIT 1: Introduction to Data Communication:

UNIT 2: Signals: Analog and Digital, periodic and aperiodic signals, analog signals, time and frequency domains, composite signals, digital signals.

UNIT 3: Data Transmission: Data transmission basics, asynchronous and synchronous transmission, error detection methods, data compression, transmission control circuits, communication control devices.

UNIT 4: Encoding and Decoding: Digital to digital conversion, analog to digital, digital to analog, analog to analog conversions.

UNIT 5: Modulation & Demodulation of Digital Signal: Interfaces and modems, digital data transmission, DTE - DCE interface, other interface standards, Modems: 56k modem, cable modem

UNIT 6: Multiplexing: Many to one/one to many, FDM, WDM, TDM, multiplexing application telephone system, DSL, FTTC.

UNIT 7: Introduction to Mobile Communication:

References:
1) Data communication, computer networks and open systems, Fred Halsall. PEA
2) Data communication, Stalling, PHI
3) Data communication and networking, Behrouz A Forouzan, TMH Computer network, A. Tannenbaum, PHI
1. Work study, method study & work measurement including time study, work sampling, production study, PMTS, MTM, importance of time standards, rating & allowance. Work study, incentive schemes, job description, analysis & evaluation.


3. Market research, principle of marketing, customers viewpoint & selective selling, functions & scope of marketing, sales forecasting techniques.

4. Performance measures of a Production system, Production, Productivity, Efficiency, Effectiveness, Quality, Flexibility, Agility etc.

5. Organization, organization structure, department on functional charts for business & industrial organization centralized & decentralized organizations, manpower planning, requirement & forecasting, recruitment training & placement.


Text Book:
1. Engineering Management by: Fraidoon Mazda

Reference:
2. Marketing Management by: Philip Kotler
Unit 1:- Fourier analysis of signals, Amplitude, Phase and Power spectrum, Orthogonality of functions, Types of signals, Fourier transform of some useful functions, Singularity functions & its properties, Dirac Delta function & its properties, Sampling function, Laplace transform of some useful functions.

Unit 2:- Convolution of signals, Graphical & analytical methods of convolution, sampling theorem, Nyquist rate & Nyquist interval, Aliasing, Aperture effect, Recovery from sampled signal, natural sampling, flat top sampling. Time convolution theorem, Frequency convolution theorem.


Unit 4:- Systems & Filters: Linear system, Time invariant & LTI system, Impulse response, Causal systems, Filter characteristics of linear systems, Low pass filter High pass filters, Band pass filters, Band pass, Band stop filters.

Unit 5:- Random variables and probability theory, PDF, CDF and their properties, Normal and Gaussian distribution.

REFERENCES BOOKS

1. Modern Digital & Analog System by B.P. lathi
2. Communication systems by Singh & Spare
3. Communication systems by Simon Haykins
4. Digital communication systems by Taub & Schilling
5. Probability theory and Queuing methods
Unit 1:- Basic concept of Boolean algebra: Different rules for arithmetic operation, minimisation of switching functions with theorem and K-Map up to five variables, reduction techniques, prime and essential implicants, concepts of don’t care condition, min. and max. Terms SOP, POS variables, entered mapping VEM, plotting & reading theory, QM methods.

Unit 2:- digital logic families: TTL, RTL, DTL, ECL, Totem pole and open collector concept, comparison of logic families.

Unit 3:- Combinational Logic: Design of combinational logic circuit using different chips/gates. Code converter: BCD-gray, excess three, encoders, decoders, multiplexers, de-multiplexers, 7-segment decoder/driver, ROM, PLA, full and half adder/subtractor, parallel adder/subtractor, look ahead carry generator, parity bit checker/generator, implementation of Boolean function with mux and decoder.

Unit 4:- Sequential logic circuit: Concept of memory storage, Latches, Flip Flops, JK, SR, T, D, Master slave, characteristic table truth table, concept of flip flop, conversion techniques, race around condition, Triggering of flip flop, classification of sequential machines, oscillators, analysis of synchronous sequential circuits, design steps for sequential circuits, state diagram, state reduction minimization of the next state decoder, o/p decoder designing.

Unit 5:- Design of single mode and multimode counter: Ripple & ring, Registers, Shift register, Shift register sequences, Ring counter using shift register and memories type of register universal and directional.

REFERENCES

1. Digital logic and computer design by MORRIS MANO (PHI)
   Fundamental of digital electronics by BARITTEE, TMH
THIRD YEAR (FIFTH SEMESTER)

CS-301T    Computer Networks    Credits 4(3-1-0)

UNIT 1: Introduction:
Basic Concepts, Transmission Mode, Categories of Network, The OSI Model, Functions of the layers, interface Services, Connections and Connectionless Oriented Services, Service Primitives.

UNIT 2: The Physical Layer:
Transmission Media, Switching, Circuit Switching & Packer Switching, Message Switching.

UNIT 3: Data Link Layer:

UNIT 4: Medium Sub Access Sub Layers:
The Channel allocation problem, Topologies: asymmetric and symmetric, Multiple Access Protocol, IEEE Standard 802 for LAN & MANS, (IEEE 802.3 (Ethernet), IEEE 802.4 (Token ring), IEEE 802.5 (Token Bus), IEEE 802.6 (DQDB).

UNIT 5: Network Layer:

UNIT 6: Introduction to Routers:
Bridges, ATM, ISDN, SNMP, PPP, HTTP, FTP, TELNET, POP3, SLIP, Network Simulator (NS-2)

Reference:
1) Data Communication and Network by Stalling. PHI.
2) Computer Networks by A.S. Tannebaum. PHI.
3) Data Network by Bertisekar D, Gallegar R. (PHI)
4) Data Communication And Networking by Behrouz A Forouzan. TMH
UNIT 1: Software: The process and its management: Software and Software engineering the importance of software, software characteristics, components and applications, a crisis on horizon, software, myths, software engineering paradigms- a definition, classical life cycle, prototyping, spiral mode fourth generation techniques.

UNIT 2: Project Management:
(a) Software Metrics: The project management process, metric for software productivity and quality, measuring software metrics for software quality, integrating metrics within software engineering process. (b) Estimation: Observations on estimating, planning objectives, scope, resources, decomposition techniques LOC and FP estimation, models- COCOMO model. (c) Planning: Risk analysis, software project scheduling, acquisition, re-engineering, organizational planning, project plan.

UNIT 3: Software Requirement Analysis
(a) Requirement analysis fundamentals: Requirement analysis, communication techniques analysis principles software prototyping specifications. (b) Structured analysis and its extensions: Basic notations and its extensions-Data flow diagrams, extensions for real time systems, ward and Mellor extensions, Hatley and Pirbhai extensions. (c) Object oriented analysis and data modeling: Object oriented concepts, object oriented analysis modeling classification and assembly structures, defining object. (d) Alternative Analysis Techniques: Data structure oriented methods, the DSSD approach, Jackson system development.

UNIT 4: The Software Design Fundamentals:
The design process, design fundamentals: abstraction, refinement, modularity software architecture, control hierarchy, data structure, software procedure, modular design, data design procedure design.

UNIT 5: Various Design Techniques And Its Implementations:
(a) Data flow oriented design: Design and information flow, design process considerations, transform analysis, transaction analysis, design post processing design optimization. (b) Object oriented design: concepts, design methods, class and object definitions, refining operations, program components and interfaces, a notation for OOD, detail design, and alternative design strategy. (c) User interface design: Human factors, human computer interaction, human-computer interface design, interface design guidelines, interface standards.

UNIT 6: Software Quality Assurance and Testing:
(a) Software quality assurance: Quality assurance, software reviews formal technical review, software quality metrics, formal approaches to SQA, software reliability. (b) Software testing techniques: Fundamentals, While-Box testing, Black-Box testing. (c) Software testing strategies: A strategic approach to
software testing, unit testing, integration testing (top-down and bottom-up, integration comments on integration testing, test documentation), validation testing, system testing, the art of debugging.

UNIT 7: Software Maintenance and Configuration Management:
Software maintenance: A definition, maintenance characteristics, maintainability, maintenance tasks, maintenance side effects, reverse engineering and re-engineering.

Reference:

2) Fundamentals of Software Engineering by Orio GHEZZI, Mehdi Jazayeri Dino Mandrioti. PHI.
UNIT 1: Introduction:
Why study programming language?

UNIT 2: Virtual computer and actual computer:
Definition, syntax and semantics

UNIT 3: Data objects, variables and constant:
Data types, specification of elementary data types, types checking (Static and dynamics).

UNIT 4: Vectors and arrays:
Implementation of one and multi dimension arrays, records and structures, their implementation, Record and arrays with structured component, pointer.

UNIT 5: Parallel programming:
Principle of Parallel programming language coroutines, synchronization of tasks using interrupts, semaphores and messages, mutual exclusion, critical section.

UNIT 6: Abstract data types:
Data Abstraction, information, hiding, encapsulation by subprograms-subprograms as Abstract operation, subprogram definition & invocation, generic subprogram.

UNIT 7: Subprogram control:
Simple subprogram call-return with its implementation Recursive program with its implementation Referencing environment

References:
1) Programming Languages (2nd ed.) by Ravi Sethi
2) Programming Languages (2nd ed.) by Ravi Sethi & Terrence W. Pratt.
UNIT 1: **Introduction:** A general introduction to Strings, languages, graphs, trees and relations. Models of Computation: RAM and RASP Models of Computation. Complexities of Algorithm run on these models with linear and logarithmic costs and their inter relationships. Turing machines and their relationship to RAM & RASP models., Finite State Machines, Regular expressions; Deterministic - Finite systems, Non deterministic Automata with and without e-moves Proof of equivalence of DFA and NDFA without e-moves, Construction of DFA from NDFA with e-moves Regular expressions: Definition, equivalence of finite automata and regular expression with the proof and examples.

UNIT 2: **Properties of regular sets:** Definition of Pumping Lemma along with examples, effective Closure properties of regular sets: Union, Intersection, Complementation, Concatenation, Kleen-Closure, Minimisation of a given DFA (only numerical example and no proofs.)

UNIT 3: **Context Free Grammars** : Definition of CFG, left most and right most derivations, definition of Ambiguous grammars, simplification of context free grammar: Removal of useless symbols, e-production, Unit production. Conversion of a given grammar into Chomsky normal form, Griebach normal form (examples only).

UNIT 4. **Push Down Automata & Properties of context free languages** : Definition of instantaneous descriptions, definition of Deterministic PDA, Construction of PDA for a given language, construction of CFL’s given the transition function of PDA, Pumping Lemma (definition and examples), effective Closure, Properties of CFLs: Union, Concatenation and Kleen closure.

UNIT 5: **Turing machine**
Definition, Construction of Turing machines for simple languages, Definition of Computable languages and functions, Definition of total recursive, partial recursive functions, construction of turing machine for simple arithmetic function.

References:
2) Theory of Computation by D.Wood, John Welley and Sons.
UNIT 1: Introduction and History:
What is an operating system, generations of OS, bare system, batch system, time sharing and real time system, multiprocessor systems, types of services, user’s view operating system’s view.

UNIT 2: Processor Management
Concept of process, process state, state diagrams, CPU scheduling concepts, job scheduling, process scheduling algorithms, multiple processor scheduling.

UNIT 3: File Management
File concepts, types, access methods, operation on files, free space management, allocations, implementation, directory system.

UNIT 4: Concurrent Processes and Programming:
Precedence graphs, critical section problem, semaphores, classical process coordination problems, interprocess communication, motivation modularization, synchronization, concurrent languages.

UNIT 5: Memory Management
Preliminaries, bare machines, resident monitor, swapping, fixed and multiple partitions, pagging, segmentation, page replacement algorithms, allocation of algorithms, tasking, locality concepts.

UNIT 6: Device Management:
Techniques of device management, device characteristics, channels and control units, device scheduling algorithms, virtual devices, SCM, sector queuing.

UNIT 7: Protection And Deadlock:
Goals of protection, mechanism and policies, domain of protection, access matrix, existing systems, language based protection, protection problems, security, what is deadlock characterization, deadlock prevention, deadlock avoidance, detection and recovery from deadlock combined approach.

UNIT 8: Design Principles:
Goals, mechanisms and policies, layered approach, virtual machines, multiprocessors, implementation, system generation.

UNIT 9: Case Study:
General concepts of UNIX, MSDOS, CTSS, MULTICS, OS/360, Windows NT.

References:
2) Operating System by Deitel, Addison Wesley.
3) Operating System by M.Milenkovic, TMH.
4) Operating System: Design &Implementation by A.S.Tannenbaum,PHI.
Unit 1:- General features of Microprocessor: Microprocessor architecture and its operation, Memory, Memory Organisation, Memory Mapped I/O mapped I/O Scheme.

Unit 2:- Architecture of 8085 Microprocessor: 8085 Microprocessor pin configuration, Internal architecture and its operation, Control signals, Flag register, Timing control unit, Decoding, Execution of an instructions and memory interfacing. Timing instruction cycle, Opcode Fetch, memory and input output read/write cycle of an instruction set.

Unit 3:- Programming Techniques of 8085 Microprocessor: How to write and execute a simple program timing and execution of the instructions, Addressing modes, programming techniques, programming technique for looping, counting and indexing, counter programs and timing delay program and timing calculations, stack operation and subroutine programs.

Unit 4:- Interrupts of 8085 Microprocessor: Hardware and software interrupts, interrupts call locations, RIM, SIM, RST 7.5, 6.5 and 5.5.

Unit 5:- Programmable interfaces of 8085 microprocessor: Programmable peripheral interface 8255, programmable interval timer 8253/8254, DMA controller 8257, and interrupt controller 8259.

Unit 6:- Microprocessor Applications: Delay subroutine, seven segment display, water level indicator, microprocessor based traffic control.

Unit 7:- Introduction of 8086 microprocessor: Internal Architecture organisation, Maximum mode and minimum mode, instruction set, initialization instructions, constructing the machine codes for 8086 instruction. Assembler directives, addressing modes, procedure and macros, re-entrant and recursive procedures.


REFERENCES BOOKS

1. Microprocessor Architecture programming and application with 8085/8080 by Ramesh S. Gaonkar.
3. Microprocessor and interfacing Programming and Hardware by Douglas V. Hall.
   The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 80486, Pentium and Pentium pro-processor, Architecture, Programming and interfacing by Berry b. Bery.
1. Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers.

2. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.

3. To perform multiplication and division of two 8 bit numbers using 8085.

4. To find the largest and smallest number in an array of data using 8085 instruction set.

5. To write a program to arrange an array of data in ascending and descending order.

6. To convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set.

7. To write a program to initiate 8251 and to check the transmission and reception of character.

8. To interface 8253 programmable interval timer to 8085 and verify the operation of 8253 in six different modes.

9. To interface DAC with 8085 to demonstrate the generation of square, saw tooth and triangular wave.

10. Serial communication between two 8085 through RS-232 C port.

Note :-In addition, Institutes may include two more experiments based on the expertise
THIRD YEAR (SIXTH SEMESTER)

CS-304T  Compiler Design  Credits 3(2-1-0)

UNIT 1: Introduction to Compiling: The phases of a compiler, Cousins of the Compiler, grouping of Phases, Bootstrapping.

UNIT 2: Lexical Analysis: Role of lexical analyzer, Input buffering, specification & Recognition of tokens, Finite automata, Regular expression, Conversion of regular expression to FNA, optimization of DFA states.

UNIT 3: Syntax Directed Translation: Syntax directed definition, 3-address code, Postfix notation, Quadruples, Triples, implementation of syntax directed translator, parse tree and syntax tree.

UNIT 4: Symbol Tables: The contents of symbol table, Data structure for symbol tables, representing scope information.

UNIT 5: Error detection and recovery: Errors, Lexical phase errors, Syntactic-phase errors, Semantic errors.

UNIT 6: Code optimization: Principles sources of optimization, loop optimization, DAG representation of basic blocks, values numbers and algebraic laws, Global data-flow analysis.

UNIT 7: Code Generation: issues in the design of code generator, a simple code generator, register allocation and assignment.

References:

UNIT 1: Introduction:
Origin of computer graphics, display devices, general purpose graphics software display of solid objects.

UNIT 2: Display Techniques And Devices: Point plotting techniques, coordinate systems and incremental methods, line-drawing algorithm, circle generators, display devices, CRT, inherited memory devices, the storage tube display, refresh line-drawing display.

UNIT 3: Graphic Packages And Display Files: A simple graphics, segments, functions for segmenting the display files, posting and unposting, segment naming schemes. appending to segment refresh concurrent with reconstruction free storage allocation, display file structure, geometric models, defining symbols procedures, display procedure, structured display files

UNIT 4: Two Dimensional Transformation: Principle concatenation matrix representation, a line dipping algorithm, midpoint division, dipping other graphic entities, polygon dipping, viewing transformation, tine windowing transformer.

UNIT 5: Input Devices: Pointing and positioning devices, three dimensional input devices, graph input techniques.

UNIT 6: Event Handling & Input Functions: Introduction, polling, interrupts, the event queue, functions for handling events, polling task design, light pen interrupts, dragging and fix, hot detection, on-line character recognizers.

UNIT 7: Raster Graphics: Introduction, generating a raster image, interactive faster graphics raster display hardware.


UNIT 9: Introduction To Virtual Reality

References:
3) Computer Graphics by Donald Heam & Baker, PHI.
4) Computer Graphics, haringtion, TMH
5) Mathematical Approach To Computer Graphics, Rodger
6) Computer graphics, Folay Addison Wessley
UNIT 1: Introduction to distributed system: What is distributed system, Advantages of distributed systems over centralized systems and PCs, Disadvantages of distributed system. Hardware concepts: Bus based multiprocessors, switched Multiprocessors, Bus based multi computer, Switched multi computers. Software Concepts: Network OS, true distributed systems, Multiprocessor time sharing system.


UNIT 3: Theoretical Foundations of Distributed Operating System: Inherent limitation of distributed system, absence of global clock, Absence of shared memory, Lamport’s Logical clock, Global State Chandy-Lamport’s global state recording algorithm, termination detection.


UNIT 5: Distributed data storage and distributed Query Processing: Data Replication, Data Fragmentation (horizontal, vertical and mixed), Data replication and fragmentation, Query Transformation, Simple join Processing. Semijoin strategy. Join strategy that exploits parallelism, Distributed transaction model.

UNIT 6: Commit protocol, Concurrency control and deadlock handling: Commit protocols-two phase commit and three phase commit, Concurrency control-locking protocol and time stamping, Deadlock handling - centralized and distributed approaches.

References:
1) Advanced Concepts in operating system by Mukesh Singhal and Niranjan G. Shivaratri.
2) Distributed operating system by Andrew S. Tanenbaum.
UNIT 1: An overview of JAVA:
Object Oriented programming (Two paradigms Abstraction, The Three OOP principles, Entering the program, Compiling the program, Lexical Issues (white space identifiers, literals, comments, separators, keywords

UNIT 2: Data Type and Operators: Variables and Arrays, the simple type, integers (byte, short, int, long), floating point types( float, double, characters, booleans), a closer look at literals, integer literals, floating point literals, string literals), variable (declaring a variable, dynamic initialization, the scope and life time of variable), Type conversion and Casting, arrays(one dimensional array, multi-dimensional arrays), Arithmetic operators( the basic operators, the modulous operators, arithmetic assignment operators, increment and decrement operators)

UNIT 3: Control Statement: JAVA’s selection statement (if, switch), iteration statements, while, do while, for, sum for loop (nested loops), jump statements (using break, using continue, return)

UNIT 4: Classes and Methods: class fundamentals( the general form of the class, a simple class), declaring objects (a close look at new), assigning a object reference variable, introducing method (adding a method to the box class, return a value, adding a method that takes parameters), constructors, this keyword, overloading methods( overloading constructors), using objects a s parameters, a close look at argument passing, returning objects, recursion, introducing access control, understanding static, introducing final, introducing nested and inner class, exploring the string class.

UNIT 5: Inheritance: Inheritance basics (member access and Inheritance), using super, to call super class constructors, creating a multilevel hierarchy, when constructors are called, method overriding.

UNIT 6: Packages and Interfaces: Packages (defining a package, understanding a class path), access protection, importing packages, interface (defining an interface, implementing an interface, applying interface, variable interface, interface can be extended).

UNIT 7: Exception and String handling: Exception handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, string length, character extraction( char At(), getChars(), get Bytes(), toString(), String comparison( equals(),compareTo()), modifying a string( substring(), concat(), replace()), data conversion using value, string Buffer( length(), and capacity()), ensure capacity(), setLength(), charAt(), setCharAt(), getChars(), append(), insert(), reverse(), delete(), and delete Char At(), replace())
UNIT 8: Mutithreaded programming: Java thread model (thread priorities, synchronization, messaging the thread class and the runnable interface), the main thread, creating a thread (implementing runnable, extending thread), creating multiple threads, thread priorities (using synchronized methods, the synchronized statements), suspending, resuming, and stopping threads.

UNIT 9: Input output: Exploring java i/o, the java i/o classes and interfaces, file (directories, using file name filter, the list files(), alternative, creating directories), the stream classes, the byte Streams (input streams, output stream, file input stream, file output stream, byte array, input stream, byte array output stream), the character streams (reader, writer, file reader, file writer, char array reader, char array writer, buffer reader, buffer writer).

References:
1) The complete reference by Patrck Naughton, Schieldt
2) Programming in Java by E. Balaguruswamy
UNIT 1: **What is learning:** Introduction, What is learning, Self learning computer systems, Machine learning & Methodology of science, Ex:- A kangaroo in mist. Data Mining: Definitions, Challenges, The knowledge discovery process in detail (Data selection, Cleaning, Enrichment, Coding process) KDD (Knowledge Discovery in Database) v/s Data Mining, DBMS v/s Data Mining, Golden rules to setup KDD environment

UNIT 2: **DSS:** Characteristics, Definitions for DSS, Why Decision DSS, Benefits, DSS Architecture. Dss-Uses, definition, Operational Database. Introduction to DATA Warehousing, why do we need it & Integration with Data Mining, Data-Mart, Concept of Data-Warehousing, Multi Dimensional Database Structures. Client/Server Computing Model & Data Warehousing.

UNIT 3: **DATA Warehousing:** DATA Warehousing, Data Warehousing Components. Building a Data Warehouse. Warehouse Database. Technical considerations & Implementation considerations of data warehouses, 3-level architecture of data warehousing.


UNIT 5: **Association Rules:** What is an Association rule, Methods to discover Association Rules, A Priori algorithm, Partition algorithms, Pincer search algorithms, Discussion on different algorithms, Incremental algorithms, Border algorithm, Generalized association rule. Decision Trees: What is a decision tree, Tree construction principle, Web-split, Splitting Indices, Splitting Criteria, Decision tree construction algorithm(brief description only)

UNIT 6: **Web Mining:** Web mining, Web content mining, Web structure mining, Web users mining, Text mining, Unstructured text, Episode Rule Discovery for Text, Hierarchy of Categories, Text-Clustering.

**References:**
1. G.Proakis & Dimitris G. Manolakis, PHI
2. Digital signal processing by Alan V. Oppenheim and Ronald Schafer
4. Datawarehouseing, Data mining, OLAP, by Alex Berson & Stephen J. Smith, TMH Edition
5. Berson, “Data Warehousing, Data-Mining & OLAP”, TMH
Unit 1:- **Discrete time Signals & Systems:-** Discrete-time signals, discrete time systems, analysis of discrete time linear system-invariant systems.

Unit 2:- **The Z-transform:-** The Z-transform, properties of Z-transform, Inversion of Z-transform, one sided Z-transform.

Unit 3:- **Discrete Fourier Transform:-** Its properties & applications; Discrete Fourier Transform, properties of Discrete Fourier Transform, linear filtering methods based on DFT.

Unit 4:- **Efficient computation of the DFT:-** Fast Fourier Transform, FFT algorithms, application of FFT algorithms.

Unit 5:- **Implementation of Discrete-time system:-** Structure of the realization of discrete-time systems, structures, of FIR systems, structures of HR systems.

Unit 6:- **Design of digital Filters:-** General considerations, design of FIR filter, design of HR filters from analog filters.

**REFERENCE BOOKS**

1. Digital signal processing (principles, algorithms and applications) by John G. Proakis & Dimitris G. Manolakis, PHI
2. Digital signal processing by Alan V. Oppenheim and Ronal W. Schafer.
FOURTH YEAR (SEVENTH SEMESTER)

CS-401T  Advanced Computer Architecture  Credits 4(3-1-0)

UNIT 1: Introduction to Parallel Processing: Parallelism in uniprocessor systems; Parallel computer structures; Architectural classification schemes. Data driven computing and languages; Control Flow versus Data Flow Computers.

UNIT 2: Memory Input-Output subsystems: Memory Hierarchy, Addressing Schemes for Main Memory, Characteristics of cache memory; Cache Memory Organization; Characteristics of input/output subsystems.

UNIT 3: Pipelining and Vector Processing: Pipelining: Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Table Design of instruction pipelined units; Arithmetic Pipeline Design Examples, Job sequencing and collision prevention; Characteristic of Vector Processing, Vector supercomputers; Scientific attached processor; Architecture of star-100 and TI-ASC.


UNIT 6: RISC and Superscalar Architecture: Instruction set architectures, RISC Scalar processors; SPARC architecture, window register concept, Superscalar processors

References:
UNIT 1: System definition and components, stochastic activities, continuous and discrete systems, System modeling, Types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.

UNIT 2: System simulation, Need of simulation, Basic nature of simulation, techniques of simulation, comparison of simulation and analytical methods, types of system single-server queuing system and an inventory problem, Monte-Carlo simulation, Distributed Lag model, Cobweb model.

UNIT 3: Simulation of continuous Systems, analog vs digital simulation, simulation of water reservoir system, simulation of a servo system, simulation of an auto-pilot. Discrete system simulation, fixed time-step vs event-to-event model, generation of random numbers, test of randomness, Monte-Carlo computation vs stochastic simulation.

UNIT 4: System dynamics, exponential growth models, exponential decay models, logistic curves, system dynamics diagrams, world model.

UNIT 5: Simulation of PERT networks, critical path computation, uncertainties in activity duration, resource allocation and consideration, Simulation languages, object oriented simulation.

Reference Books:
1) Geoffrey Gordon, “System Simulation”, PHI
2) Narsingh Deo, “System Simulation with digital computer”, PHI.
FOURTH YEAR (EIGHT SEMESTER)

CS-402T  Advanced Computer Networks  Credits 4 (3-1-0)

UNIT 1: Introduction and Overview: TCP/IP, Internet, Internet services, Internet protocol and standardization, Approaches to network communication, WAN & LAN Ethernet Technology, FDDI, ATN.

UNIT 2: Internetworking concept and Architectural Model, Internet Addresses: Application label interconnection, Network label Interconnection, Properties of Internet Internet Architecture, Interconnection Through IP Routers, Universal Identifiers, Classes of IP Addresses, Network and Broadcast services, weaknesses in internet addressing, dotted decimal notation, loop back address, summary of special address conventions.

UNIT 3: Mapping Internet Address to physical Addresses (ARP): The address resolution problem, Two type of physical addresses, Resolution through Direct mapping and dynamic binding, ARP refinement, relationship of ARP to other protocols, ARP Implementation, ARP protocol format, Determining an internet Address At startup (RARP)

UNIT 4: Internet Protocol: Connectionless Datagram delivery: Virtual network, internet architecture & Philosophy, Concept of Unreliable delivery, connectionless delivery system, Internet datagram and its options, Routing IP Datagrams: Routing in Internet, Direct and Indirect delivery, Table-Driven IP & Next-Hop Routing, Default and Host-specific routers, IP routing algorithm, routing with IP addresses, handling incoming datagrams, establishing routing tables.

UNIT 5: Reliable Stream Transport service (TCP): Need for stream delivery, properties of reliable delivery service, providing reliability, TCP, ports, connections and endpoints, passive and active opens, segments and sequence numbers, TCP segment format, TCP checksum computation, acknowledgement, timeout and retransmission, Karn’s algorithms and timer back off, response congestion, establishing and closing a TCP connection, TCP state machine, TCP performance, silly window syndrome and avoiding silly window syndrome.

UNIT 6: TCP/IP over ATM Networks: ATM hardware, logical view of ATM network, two ATM connection paradigms, ATM cell transport, Packet type and multiplexing, IP address binding in ATM network, Connection management, address binding with in an logical IP subnet, ATM ARP packet format, use of ATP ARP packet to determine an address.
UNIT 7: Bootstrap and autoconfiguration (BOOTP, DHCP), DNS and Application:
    BOOTP message format and retransmission policy, two step Bootstrap procedure, Dynamic Host configuration and IP address assignment, obtaining multiple addresses, address acquisition and lease renewal state, DHCP message format, option and message type, DSCP and Domain name, TCP/IP internal Domain names, mapping domain name to addresses, Domain name resolution, domain server message format, compressed name format, abbreviation of domain names, inverse mapping, obtaining authority for subdomain, Applications: File access and transfer sharing by file transfer, TCP/IP file transfer protocol (FTP), FTP features, FTP process model, TCP port number assignment, TFTP, NFS, Remote procedural call (RPC), Electronic mail (822, SMTP, MIME.)

References:
    1) Internetworking with TCP/IP Vol I by corner & Stevews Estern Economy.
DEPARTMENTAL ELECTIVES

CS-431T  Network Management Systems  Credits 4(3-1-0)


UNIT 3: SNMP Management: RMON: What is Remote Monitoring? , RMON SMI and MIB,RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON


Text Book:
  1) Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

References:
  1) Network management, Morris, Pearson Education.
  2) Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
  3) Distributed Network Management, Paul, John Wiley.
UNIT 1: **Introduction**: Object oriented themes, object oriented development, object oriented paradigms encapsulation, abstraction, binding, polymorphism, inheritance, message passing), the object modeling techniques, impact of an object oriented approach.

UNIT 2: **Modeling**: The object modeling techniques, object and classes, link and association, advance link and association concepts, elements of object model, aggregation, abstract classes, multiple inheritance, candidate key.

UNIT 3: **Dynamic and functional modeling**: Events and states, operations, concurrency, object oriented developments, functional model, data flow diagram, specifying operations, constraints.

UNIT 4: **Analysis and system design**: Overview of analysis, principles of system design, object design, breaking of a system into subsystem.

UNIT 5: **UML (Unified Modeling language)**: Introduction to UML, importance and principles of modeling, A brief introduction to conceptual model of UML, architecture of UML, case study: Elevator problem.

**Reference Books:**

1) James Rumbaugh etal, “Object Oriented Modeling and Design”, PHI
3) James G. Booch, J. Rambaugh “The Unified Modeling Language”

UNIT 2: Optimization Techniques, Over fitting, Cross-Validation, and Early Stopping, Simple Recurrent Networks, Pattern Classification, Language Processing Models.

UNIT 3: Radial Basis Functions, the EM (Expectation-Maximization) Algorithm, Neural Networks for Control, Support Vector Machines, Time Series Prediction.

UNIT 4: Shared Weight Networks, Competitive Learning and Kohonen Nets, Hebbian Learning and Principal Components Analysis, Hopfield Nets and Boltzmann Machines.

UNIT 5: Mean Field Approximation, Helmholtz Machines; Minimum Description Length, Bayesian Networks, Computational Learning Theory, Connectionist Symbol Processing, Reinforcement Learning, Neurophysiology for Computer Scientists.

References:
2) Optional enrichment: Anderson, J. A., and Rosenfeld, E.
3) Handout: Derivation of the backprop learning rule
UNIT 1: Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.

UNIT 2: Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Costoptimality, An example of illustrate Cost-optimal algorithms- such as summation, Min/Max on various models


UNIT 4: Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

UNIT 5: Graph Algorithms - Connected Graphs, search and traversal, Combinatorial Algorithms-Permutation, Combinations, Derrangements

References:
2) S.G. Akl, “Design and Analysis of Parallel Algorithms”
UNIT 1: INTRODUCTION: Fundamental terminology, Objective of Fault Tolerance, Applications of Fault-Tolerant computing, Reliability, Safety, Availability and Maintainability Modeling using Markov chain, Dependability Evaluation technologies, Failure rate, reliability function. Mean time to Failure (MTTF), Mean Time between, failures (MTBF) Mean time to Repair (MTTR)


UNIT 4: Coding Theory For Fault-Tolerant System: Error models, Basic structural properties of parity check codes, Matrix description of parity check codes, vector-space properties of parity check codes Error checking the syndrome, Group properties of Parity check codes, Distance properties of parity check codes Polynomial algebra and cyclic codes, Hamming single error correcting codes, Unidirectional error correcting and Detecting codes, Asymmetric Error-correcting codes, single-Asymmetric error correcting code.

UNIT 1: Introduction: Overview, The AI programs, AI techniques, applications of AI, Introduction to LISP.

UNIT 2: Problem spaces and search techniques: Defining the problem, production system, problem characteristics, Heuristic search techniques: Hill climbing, BFS, DFS, A*, AO* algorithms admissibility, monotonicity.

UNIT 3: Knowledge representation: Issues, predicate logic and calculus, role based system, symbolic reasoning, Frames, conceptual graphs.

UNIT 4: Advanced Topics: Planning understanding, Natural language processing parallel and distributed AI, Learning neural network Genetic learning, pattern recognition.

UNIT 5: Expert system architecture: Representing and using domain knowledge, Expert system shells, knowledge acquisition, applications, case study of MYCIN.

Reference:
2) D.W. Patterson, "Introduction to Artificial Intelligence"

CS-441 T Advanced Data Base Management System Credit 4(3-1-0)

UNIT 1: Introduction to distributed data base systems, transaction processing Concurrency control techniques, security, Distributed Data Base architecture.

UNIT 2: Introduction to object oriented database system, Definition of Objects, Review of Key Object-oriented programming concepts, Object Orientation for Database Systems, Relational Extensions to Object-oriented Database Systems, Object Orientation in Relational Databases, Uses for Object-oriented Database.

UNIT 3: Introduction to data mining, Self-learning, What is data warehouse and why do we need, Designing decision support systems, Integration with data mining.

UNIT 4: Introduction to knowledge discovery process, Data selection, cleaning. Enrichment coding data mining, Preliminary analysis of the data set using traditional query tools, Decompose trees, Association rules, Neural networks, Genetic algorithms Introduction to setting up a KDD environment.


UNIT 6: Data base triggers, functions, procedures, packages and forms with respect to existing database.

References:


UNIT 5: Using Algorithms: Choosing an Algorithm, Public-Key cryptography versus Symmetric cryptography, Encrypting Communication Channels, Encrypting data for Storage.

UNIT 6: Cryptographic Algorithms: RSA, DES

References:
1) Applied Cryptography by Bruce Schneier, John Wiley & Sons.
2) Network Security and Cryptography by Willam Stalling
3) Concept of Network Security and Cryptography by Frozen
UNIT: 1  MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, basic Inverter device, Sizing Enhancement load verses load inverters, basic NMOS NOR logic circuit, basic NMOS NAND logic circuit, multi input NAND & NOR logic circuit.

UNIT: 2  A basic CMOS inverter, CMOS inverter logic levels, inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate, NMOS pass transistor, CMOS, Transmission gate.

UNIT: 3  Ratio logic model, Process characteristics time const, inverter pair delay, super Buffer NMOS NAND & NOR DELAY, Enhancement v/s depletion load, CMOS logic delay, interconnection Characteristics capacitive loading logic fan out delay, distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, capacitive noise coupling, NMOS noise margin, CMOS noise margin.

UNIT: 4  Structured gate layout, logic gate arrays, Dynamic MOS storage circuit, simple shift register, other shift register, clock CMOS logic Evaluate, logic Domino CMS.

UNIT: 5  Semiconductor memory, memory organization, ROM design, EPORM, EEPROM, Static RAM, Storage cell, decode and selector circuit, select time delay calculation, optimum precharge voltage concept, dynamic RAM cell, sense amplifier, Stick rules & Diagrams.

References:

1. VLSI design & circuits by Geige: Publisher Mc-Graw Hill
2. VLSI design & circuit by Shoji.
3. VLSI design by Puknell.
UNIT 1: Bivariate Distribution, One function of two Random variables, two functions of two Random variables, Problems.

UNIT 2: Expectation:
Introduction, Moments, Expectation of function of more than one random variable, Transform Methods, Moments & Transforms of some important distributions, Computation of mean time to failure, Inequalities & Limit Theorems.


Reference:
2) Probability, Random Variables & Stochastic Processes: A. Papoulis, TMH
UNIT 1: Introduction to Distributed Data system, Distributed Database Architecture, Distributed Database Design, Transaction processing, Concurrency Control techniques, Security.

UNIT 2: Types of Data Fragmentations, Fragmentation and allocation of fragments, Distribution transparency, access primitives, integrity constraints.

UNIT 3: Grouping and aggregate function, Query processing, Equivalence transformation of queries.

UNIT 4: Evaluation, parametric queries, Query optimization, Join and general queries.

UNIT 5: Management of Distributed transaction and concurrency control: Distributed Database Administration, Catalogue Management, Authorisation, Security and protection.

References:
6) Data C. J “An Introduction to Database System”, Addition Wesley
UNIT 1: Introduction to embedded systems: Classification, Characteristics and requirements

UNIT 2: Timing and clocks in Embedded systems, Task Modeling and management, Real time operating system issues.

UNIT 3: Signals, frequency spectrum and sampling, digitization (ADC, DAC), Signal Conditioning and Processing. Modeling and Characterization of Embedded Computation System.

UNIT 4: Embedded Control and Control Hierarchy, Communication strategies for embedded systems: Encoding and Flow control.

UNIT 5: Fault-Tolerance Formal Verification.

UNIT 2: Digital image fundamentals: Elements of visual perception, brightness adaption and discrimination, image sensing and acquisition, image sampling and quantization, some basics on pixel, relationships between pixel

UNIT 3: Image enhancement: In spatial domain: basic gray level transformations, Histogram processing enhancement using arithmetic/logic operations, basics of spatial filtering, sharpening spatial filters, combining spatial enhancement methods.

UNIT 4: Image enhancement in the frequency domain: Introduction to the fourier transform and frequency domain, smoothing frequency domain filters, sharpening frequency domain filters, homomorphic filtering, implementation


UNIT 7: Image segmentation: Detection of discontinuities, edge linking and Boundary detection, threshold, region based segmentation

UNIT 8: Representation and description: Chain codes, polygonal approximations, signatures, boundary segments, skeletons, and boundary descriptors, shape numbers, Fourier descriptors, statistical moments, regional descriptors, texture 2d moments.

Reference books:
2) R. C. Gonzalez “digital image processing using MATLAB”, Pearson education.

UNIT 2: Web project, Web Team, Communication Issues, the Client, Multi-departmental & Large scale Websites, Quality Assurance and Testing, Technological advances and Impact on Web Teams, Overview of Static or Dynamic Web page, Portal, Search Engine.


UNIT 5: ASP.NET, Features of ASP.NET, Differences between ASP and ASP.NET. Create an ASP.NET web application, ASP.NET web forms, ASP.NET controls-validation controls, web server controls. Web database tools: overview of ADO.NET, difference between ADO and ADO.net ADO.NET architecture, Accessing data adapters and datasets, SQL server and AMS-ACCESS.

Text books:
1) Burdman, “collaborative web development” addision Wesley
2) ASP.NET 21 days, TMH
3) “magic with HTML, DHTML, Javascript”, laxmi publication.
4) “web technology”, laxmi publication

UNIT 2: **C# Basics:** Introduction, .Data Type, Identifiers, Variables & Constants, C# Statements, Object Oriented Concepts, Object & Classes, Arrays and Strings, System Collections, Delegates.

UNIT 3: **Developing ASP.NET Applications:** Namespace System, Window Forms, C# in Web Application, Web Form Fundamentals, Validation and Rich Controls, Master Pages and Themes

UNIT 4: **Working With Data:**
ADO.NET Fundamentals, Reflection, State Management, Website Navigation

UNIT 5: **Advanced ASP.NET.**
Error Handling, Security Fundamentals, Web Services, Unsafe Mode.

**Reference Books:**
1) 'Beginning ASP.NET 2.0 in C# 2005' by Apress
2) 'C# with .NET Framework' by Shibi Pannikar & Kumar Sanjeev
3) 'Understanding .NET Framework' by Tonybaer

UNIT-2 WLAN: Technical issue (uses, design goal, types, components and services offered by a typical IEEE 802.11 network), IEEE 802.11 standard (physical layer, MAC layer mechanism & functionalities, CSMA/CA mechanism). HIPERLAN: HIPERLAN standard, HyperLAN/1 (physical layer, DLC & RLC layer, MAC sub-layer), HyperLAN/2 (Physical layer, MAC sub-layer, power conservation issues) BLUETOOTH: Specifications, transport protocol group, middleware protocol group, profile.

UNIT 3: Medium access control (wireless): Motivation for a specialized MAC (hidden and exposed terminals, near and far terminals), SDMA, FDMA, TDMA and CDMA.


UNIT-5 Introduction & issues in Ad Hoc wireless networks: introduction (cellular vs ad hoc wireless networks and applications), Medium Access Scheme, Routing, Multicasting, transport layer protocols, Pricing Scheme, QoS provisioning, Self-organization, security, addressing and service discovery, energy management, Scalability, deployment considerations, Issues in designing a routing protocol for ad hoc wireless Networks (Mobility, Bandwidth constraint, Error prone shared broadcast radio channel, Hidden & exposed Terminal Problems, Resource Constraints, characteristics of idle routing protocol), Classification of routing protocols: Table-driven routing protocols (DSDV,WRP), On-demand routing protocols (DSR, AODV, LAR).

Text Books:
1. Murthy and Manoj, Ad Hoc Wireless Networks, Pearson Education publication.

UNIT 2: **Real Time Scheduling**

UNIT 3: **Resources Access Control**

UNIT 4: **Multiprocessor System Environment**
Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.

UNIT 5: **Real Time Communication**

**Books:**
1) Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
ELLECTIVE SUBJECTS (from other Department)

HU -402    Engineering Economics

UNIT 1: Economics Micro and Macro Definition, Importance and Uses, Interdependence between Micro and Macro Economics


UNIT 3 : Theory of Production - Production Function, Laws of Variable Proportions, Laws of Returns to Scale, Cost Function Meaning of Fixed Cost and Variable Cost, Location of Firms, Wabers Theory of Location of the firms


UNIT 5: International Trade:- Meaning, Nature and Scope of International Trade, Types and Effects of Tariffs and Quotas, Objective and Functions of international Monetary Fund(I.M.F.)
UNIT 1: (10) Productivity: Factors affecting productivity, causes of low productivity, remedies to increase productivity in brief. Work study and productivity. Work study techniques and their comparison

UNIT 2: (10) Work study- definition, purpose & scope, value of work study, human aspects in work study, basic approach.

UNIT 3: (20) Method study- definition, purpose and scope, basic approach or procedure, recording techniques, outline process charts, flow process charts, their construction and analysis flow diagrams, string diagram photographic aid, models.

UNIT:4 (10)
Critical examination techniques, primary and secondary questions, development, installation and maintenance of improved methods.

UNIT:5 (10)
Motion Economy Principle- Micro motion study, therbligs, and motion analysis simo charts, motion study.

UNIT:6 (10)
Work Measurement definition, purpose & scope, basic procedure, work measurement techniques, introduction to stop watch time study, work sampling & predetermined motion time standards.

UNIT:7 (10)
Rating its techniques & scope, application of rating normal time, standard time calculation using rating.

Text Book: Work study by ILO.
UNIT 1: MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, basic Inverter device, Sizing, Enhancement load verses load inverters, basic NMOS NOR Logic circuit, basic NMOS NAND logic circuit, multi input NAND & NOR logic circuit.

UNIT 2: A Basic CMOS Inverter, CMOS Inverter logic levels, Inverter device sizing, CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate. NMOS pass transistor, CMOS Transmission gate.

UNIT 3: Ratio logic model, Process characteristics time const, inverter pair delay, super Buffer NMOS NAND & NOR DELAY, Enhancement v/s depletion load, CMOS logic delay, connection Characteristics, capacitive load- ing, logic fan out delay, distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, capacitive noise coupling, NMOS noise margin, CMOS noise margin.

UNIT 4: Structured gate layout, logic gate arrays, Dynamic MOS storage circuit, Simple shift register, other shift register, clock CMOS logic, Evaluate logic, Domino CMOS

UNIT 5: Semiconductor memory, memory organization, ROM Design, EPROM, EEPROM, Static RAM, Storage cell, decode and selector circuit, select time delay calculation, optimum precharge voltage concept, dynamic RAM cell, sense amplifier, Stick rules & diagrams.

References:
1) VLSI Design & circuits by Geige: Publisher Mc. Graw Hill
2) VLSI Design & circuits by Shoji
3) VLSI Design by Puknill.
4) Design technique for Analog and digital circuits by L.Geizer, Philip E.Allen, Noel R.starder
UNIT 1: DIGITAL DESIGN FUNDAMENTALS: Hardware Aspects Related to ASSERTED and NOT-ASSERTED Conditions, Concepts of gates.


UNIT 3: SEQUENTIAL MACHINE


References:
1) An Engg Approach to Digital Design: William I. Fletcher (PHI)
2) Digital Design: Morris Mano (PHI)
UNIT 1: Introduction: Historical development, The general system, Advantage of optical fibre communication.

UNIT 2: Optical fiber waveguides
Total internal reflection, Acceptance angle, Numerical aperture, Skew rays, modes in planer guides, phase and group velocity. Cylindrical fiber Modes, Mode coupling, Step index fibers, Graded index fibers.


UNIT 4: Optical fibers and cables: Preparation of optical fibers, Liquid phase (melting) techniques, Vapour phase deposition techniques, Fluoride glass fibers, optical fiber, optical fiber cable, Stability of the fiber transmission characteristics.

UNIT 5: Optical sources: Laser, Basic concepts of laser, Optical emission from semiconductors, Injection laser characteristics, LED characteristics, Modulation.

UNIT 6: Optical detectors: Device types, Optical detection principles, Quantum efficiency, semi conductor photodiode, Midinfrared photo diodes, photo transmitter, photo conductive detectors.

UNIT 7: Optical fiber systems: Basic system, Modulation formats, Demodulation schemes, optical transmitter, optical receiver, optical power budgeting.

UNIT 8: Optical Fiber Measurements:
Fiber numerical aperture measurements, Reflection and optical return loss, Field measurement, fiber attenuation measurements.

UNIT 9: Applications and future developments:
Military applications, Computer applications, Local area networks, Public Network application, medical applications.

Text Book/Main Book
Optical fiber communication by John M. Senior Publisher-Prentice Hall

Reference Books:
1) Optical fibres and fibre optic communication systems by Subir Kumar Sarkar Publisher-S.Chand &Company Ltd.
2) Optical fiber communication by Keiser Publisher Mc. Graw hill.
3) Optical communication systems by J. Franz V.K. Jain Publisher-Narosa Publishing house.
UNIT 1: Digital Control Systems
Introduction, comparison with analog control systems, advantages of digital control system, Mathematical treatment of sampling, sampler, Ideal sampler, Laplace transform of sampled function, z transform: Definition, properties, Final value and initial value theorem, pulse transfer function, State-space modeling of continuous and discrete systems, conversion of state space model to TF, Conversion of TF to state space model: I,II canonical form- Jordan Canonical form.

UNIT 2: Methods of discretization
Discretization of a continuous system (ZOH equiv, model of a system): Various approach to design a digital control system, Design directly in Digital form. Design in analog form then convert it into digital form: Impulse Invariant transformation, impulse invariant transformation and artificial hold, Mapping of difference, Bilinear transformation, Bilinear transformation and freq. prewarping., matched 2- Transformation.

UNIT 3: Stability

UNIT 4: Non-linear Control
Non-linear systems, stability criterion of nonlinear control systems Lyapunov's and popov's criterion.

UNIT 5: Microprocessor based control system:

References:
2) Digital control engineering by M.Gopal.


UNIT 7: **Chemical energy Sources**: Fuel cells, Classifications, hydrogen Production, hydrogen energy, utilization of hydrogen gas, hydrogen as a fuel for motorcars.

UNIT 8: **Magneto hydrodynamic (MHD)**: Principle MHD system, advantages.

UNIT 9: **Thermoionic generator**: Principle Basic Thermoionic generator

Books:
1) Non-conventional energy sources by G.D. Rai, Khanna Publisher

EE-413  NEURAL NETWORKS AND FUZZY LOGIC  Credits 4(3-1-0)

UNIT 1: **Neural Networks**: Introduction to neurons, classification of neurons, Introduction to neural networks, modeling of neural networks based on soft and hard neurons Different network configuration, Feed forward and recurrent.

UNIT 2: **Fuzzy Logic**: Fuzzy logic concepts, Fuzzy sets, Fuzzy relations and membership functions, fuzzy network, defuzzification, Fuzzy controllers.

UNIT 3: **Genetic Algorithm**: Introduction, Gene, Mutation, Genetic algorithm concepts, Application of genetic algorithm in solving the nonlinear equations, Schemata, coding, reproduction, cross-over, mutation, scaling and fitness, Mechanics, Types of Traction Service, Speed time Curve, Simplified Speed time Curve, Tractive effort with and without friction & resistance of Track, Power of Traction motor, Mechanics of train movement, Coefficient of adhesion, Factor affecting slip, Power supply arrangement, High voltage supply, Constituents of Supply System, Function of DC Traction substation, and it's major equipment's, Block diagram of AC Electric Locomotive, Breaking in Traction System.

Books:
UNIT 1: Electrical Illumination: Introduction, Nature of light, Definitions, Principle of production of light, Discharge through gases, incandescence: sources of light-Filament, Hydrogen lamp, Cold lamp, Discharge lamp, sodium lamp, Mercury lamp, Dual lamp, Fluorescent lamp, Arc lamp; Inverse square law, Cosine law, lamp fittings, light fittings, lighting systems, Outdoor lighting systems, Flood lighting, Design of lighting system..

UNIT 2: Electric Heating: Advantages, Resistance Heating-Direct and Indirect, Types of furnaces and their relative comparison, Electric Arc furnace-Direct and Indirect and comparison, High frequency heating, Induction Heating-Ajax Wyatt, Tama Furnaces, Core-less furnace, Skin effect and it's application, Dielectric heating.


UNIT 4: Traction: Types and relative comparison, Choice of Traction System, Battery Drive, Hybrid Drive, Flywheel Drive, Tram Way Trolley Bus, Electric Traction-Development in India, Types of Track electrification and their relative study, Comparison of AC system to DC system, Traction Mechanics, Types of Traction Service, Speed time Curve, Simplified Speed time Curve, Tractive effort with and without friction & resistance of Track, Power of Traction motor, Mechanics of train movement, Coefficient of adhesion, Factor affecting slip, Power supply arrangement, High voltage supply, Constituents of Supply System, Function of DC Traction Substation, and it's major equipment's, Block diagram of AC Electric Locomotive, Breaking in Traction System.

Books:
UNIT 1: **Elements of Antenna Theory**: Antenna action, antenna parameters, gain, power gain, directive gain, antenna resistance and its efficiency, radiation from a short dipole, half wave dipole, short monopole, Hertizen dipole, pointing vector & power flow, power & field pattern, antenna aperture.

UNIT 2: **Types of antennas**: Folded dipole, loop & bicanonical antenna, rhombic antenna, turnstile antenna, helical antenna, log periodic antenna & parabolic reflectors.

UNIT 3: **Antenna arrays**: Two element array (broad side & end fire array), linear arrays multiplication of patterns, binomial array, chebyshev array & (Yagi-Uda array).

UNIT 4: **Antenna measurements**
Effective area, total resistance of ariel, effective height & radiation resistance.

**Books:**
1) Antenna & Wave propagation K D Prasad
2) Antennas J D Kraus
3) Electromagnetic Waves & radiating system Edward C. Jordan, Keith G. Balmain
PART 1: Design of Printed Circuit Boards

UNIT 1: Introduction:
Types of PCB: Single side and double side, General considerations Layout scale, Grid system, Board types, Standards.

UNIT 2: Layout approaches:
Materials & Aids: simple approach with sketching of components, Layout sketching with Puppets, Procedures, etc.

UNIT 3: Layout General rules and parameters:
Resistances in general, Resistance & temp, Capacitance: capacitance between conductors on opposite sides of the PCB, Inductance of PCB conductors.

UNIT 4: Design Rules for analog circuits PCB:
Placing of heat producing and heat sensitive components: Signal conductors high freq. amplifiers/oscillators, multistage amplifiers especially with high power output stage, High gain DC amplifiers (Thermal effects).

UNIT 5: Design Rules for Digital Circuit PCB's:
Main problem: Reflection, cross talk, ground and supply line noise, Electromagnetic interference from pulse type E.M.Field.

UNIT 6: Design Rules for PCB's in High Frequency and Fast Pulse type Applications:
Matching of conductors, effect of mismatch in the different cases: Effect of Mismatch in the Fast-Pulse case, in High freq. case.

UNIT 7: Computer Aided Design of PCB's: Input data, component Placement, conductor Routing, checking, scope, etc.

PART 2: Technology of Printed Circuit Board

UNIT 8: Film Master Production: Introduction, Emulsion Parameter, Film Emulsion, Increasing and Decreasing Line Width,

UNIT 9: Photo printing:
Basic properties for double-sides PCB's(Print-and-each process, Pannel plating process, Pattern plating process, Tenting process) Photoresist, in General (desirable feature of Photoesist), Wet-film Resist, Dry film resist,

UNIT 10: Screen printing:
scope of screen-printing, Screen fibers, Patterns transfer onto the screen, (Direct method, Indirect method)
UNIT 11: Plating:
Introduction, Immersion plating, Tin immersion plating, Electro less plating, Electro plating.

UNIT 12: Etching:
Introduction, Under etching, Overhang, Etchant system, (Ferric chloride, Cupric chloride and chromic Acid)

UNIT 13: Fabrication process of P.C.B.'s:
Single side, double side PTH and multilayer PCB's Soldering

UNIT 14: Solders & soldering techniques:
Iron soldering, Mass soldering, Flux removal After soldering, PCB cleaning after soldering.

Reference:
1) PCB design and technology by Walter C Boschart Tata McGraw-Hill publishing company Ltd., New Delhi.
UNIT 1: Introduction to Digital Image Processing- Image enhancement, Image representation and modelling, Image Reconstruction, Z-transform and fourier transform, Optical and modulation transfer function, Matrix theory.

UNIT 2: Image sampling and quantization, Two dimensional theory Reconstruction, Nyquist rate, Aliasing, folder Ineq., Hexagonal sampling, Optimum Sampling, compounder designing, visual quantization.

UNIT 3: Image transforms: orthogonal and UNITary transforms, transform freq., optimum transform, properties of UNITary transforms, DFT, Dimensional and 2 Dimensional, Cosine transform, fine transform Hadamard. Harr, Slant, KL transforms and properties.

UNIT 4: Image enhancement: point operation, Histogram modelling, spatial operation, Multispectral image enhancement, false color and pseudocolor, color image enhancement, Image filtering: Inverse and wiever filtering, FIR filters, filtering using image transforms, casual models and recursive filtering.


Reference books: Fundamentals 0f DIP By Anil K. Jain. PHI India Ltd
Open Elective SYLLABUS

HU-449T    PRINCIPLE OF MANAGEMENT    Credits 4(3-1-0)

UNIT 1: Management as a discipline: Definition, nature, scope, functions, managerial Skills, Management Thought - Historical Prospective, Social Responsibility, of Business.

UNIT 2: Planning: Concept and purpose, planning process, Management, By Objectives (MBO), Decision making.

UNIT 3: Organization: Concept and purpose of organisation, types of organisation, bases of Departmentation, concept of Authority and Responsibility, Span of Management, Line and Staff Authority, Functional Authority, Delegation of Authority, Centralization and Decentralization of Authority, Coordination Staffing.


UNIT 5: Controlling: Concept, Provides, Requirements, for adequate control, controlling and earning, Budgeting control Importance, Management Audit, Management in future.

HU-407T     Foreign Trade                         Credits 4(3-1-0)


UNIT 3: Tariffs and Quota-Types and Effect of Tariffs and Quotas, Quota vs.


UNIT 6: India’s Trade Policy Trends of Exports and Imports of India since independence, Composition of India’s Foreign Trade.
UNIT 1: **Statistics:** Definition, Importance, Scope and Limitations of statistics, Primary and Secondary data. Classification of data Meaning Objectives and Types of Classification. Frequency Distribution- Discrete, Grouped and Continuous frequency distributions. Fundamentals of frequency distribution.

UNIT 2: **Measures of Central Tendencies:** Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean, De-merits and Uses of all Methods.

UNIT 3: **Measures of Dispersion:** Mean Deviation Method about Mean, Median and Mode, Merits and Demerits of Mean Deviation. Coefficient of M.D. Standard Deviation(S.D.) Method with Simple Short-cut and Step Deviation Methods. Merits and Demerits of S.D. Coefficient of S.D.

UNIT 4: **Correlation-Introduction:** Types of Correlation, Karl Pearson’s Coefficient of Correlation. Interpretation of ‘r’. Probable Error. Uses of Probable Error.

UNIT 5: **Linear Regression Analysis-**Introduction. Two method of Linear Regression Analysis:- (1) Line of Regression of Y on X and (2) Line of Regression and X on Y. Why two lines of Regression” Coefficient of Regression. Relation between the Coefficient of Correlation and Regression.

UNIT 1: Semiconductors:
Introduction of semiconductors, intrinsic and extrinsic, II-VI and IIIV semiconductors and its alloys, Advantages and necessity of the tailoring of semiconductor, Semiconductors and its alloys used of LED and other devices, Utility of semiconducting alloys like GaAlAs, GaAIN, GaAIP etc.

UNIT 2: Superconductors:

UNIT 3: Material for Magnetic media:
Material useful for magnetic recording head, magnetic disk, magnetic tape media, Magneto optic recording materials. Holography, data storage materials.

UNIT 4: Holography:
Fundamentals of holography, Difference between conventional photography and holography. Techniques to make a hologram. Advantages of holography over other techniques.

UNIT 5: Introduction of following with applications:
Fibre optics, Lasers, Ceramics, Dielectric Characterization of Materials

UNIT 1: Structure of Crystalline Solids:
Fundamental concepts, UNIT cell, crystallographic directions and planes, crystal systems, metallic crystal structures.

UNIT 2: Imperfections in Solids: Introduction, Point defects: Vacancies and self-interstitials colour centres, impurities in solids, Linear defects dislocations, Interfacial effects, Bulk or volume defects


UNIT 4: Amorphous Materials: Definition, types, structure, methods of preparation of Amorphous materials, Applications: optical fibres, amorphous semiconductor, optical memories, solar cells

UNIT 5: Plastic deformation and Strengthening Mechanisms: Plastic deformation, the tensile stress-strain curve, modes of plastic deformation- slip and twinning, the shear strength of perfect and real crystals, the stress to move a dislocation, mechanisms of strengthening in metals -by grain size reduction, solid solution strengthening, strain hardening.


UNIT 1: Basic Polymer Chemistry: Definition, classification, Types of polymerization

UNIT 2: Resins and plastics: Thermoplastic and thermosetting resins, constituents of plastics, fabrication of plastic materials, Important resins, Cellulose derivatives, Polyethylene, Teflon, Polystyrene, Polyvinylacetate, PVC, Nylons, Phenolic resins, Phenol-Formaldehyde, Urea and Malamine - Formaldehyde resins, Epoxy resins, Polyester, Silicones, Ion exchange resins.


UNIT 4: Biopolymers: Importance and applications of few important biopolymers eg. proteins, carbohydrates etc.

MA-491 Mathematics (Operation Research) Credits 4(3-1-0)


UNIT 4: Sequencing: Introduction, principle assumtions processing of jobs through two, three & m machine's.


UNIT 6: Replacement: Replacement of item that fail completely.

UNIT 7: Inventory: Elementry Inventory Models, Inventory models with price breaks.
UNIT 1: Introduction of personal computer (PC). Hardware Organization of a PC. Memory organization of a PC, Memory devices ROM, SRAM, DRAM, SIMM, with timing diagram.

UNIT 2: Personal computer I/O map; Basic I/o interfaces 8-bit to 32 bit wide I/o ports. DISK memory system: Floppy disk, Hard disk, Optical disk memory.

UNIT 3: VIDEO display : TTL RGB monitor, analog RGB monitor, Generation of VGA video signal.

UNIT 4: Bus Interface: ISA Bus, EISA bus & PCI Bus and Add OM cards like 32 bit parallel port interface, A to D and D to A & 32 bit events and general purpose counter. The serial I/o ports. The Parallel printer port LPT ports.

Reference:
1) The intel microprocessors, architecture, Programming and interfacing by Barry B.Brey.
2) Microprocessors and interfacing programming and Hardware by Douglas V.Hall.
3) Hardware and software of personal ocmputers by Sanjay K Bose.
UNIT 1: Requirement and standards:
Location, visibility and grouping of Instruments, Instruments to be installed. Flight and navigational instruments. Power plant instruments.

UNIT 2: Instrument Panels, Displays and Layouts:
Director displays, Head up displays.

UNIT 3: Pitot static systems:
Probes Pressure (Position) error, measurement to altitude. Aneroid barometer. Air speed indicator vertical speed indicator.

UNIT 4: Primary Flight Instruments (Attitude indication):
The gyroscope and its properties. References established by gyroscopes. Gyro horizon.

UNIT 5: Heading Indicating Instruments:
The directional gyroscope.

UNIT 6: Measurement of fuel quantity and fuel flow:

UNIT 7: Integrated instruments and flight director systems.

UNIT 8: Flight data recording.

TEXT BOOK:
Air Craft Instruments by E.H.J. Pallet

References Books:
2) Air Craft Instruments By C.A. Williams
3) Air Craft Instrument Control Systems by C.A. Williams.
4) Air Craft Electronics and Electricity by Kroes, Bent.