Minutes

A meeting of *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. Neelima Gupta	Member
2	Dr. Ravendra Singh	Internal Member & Chairman
3	Mr. Brajesh Kumar	Internal Member
4	Mr. Ashutosh Gupta	Internal Member
5	Mr. S. S. Bedi	Internal Member
6	Mr. Vinay Rishiwal	Internal Member
7	Mr. Akhtar Husain	Internal Member
8	Dr. Karamjeet Bhatia G.K.U. Hardwar	External Member
9	Mr. Brajesh Kumar	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 genuine, 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 AICTE, and The AICTE has given approval of the course by the name B.Tech.(Computer Sc. & Engineering) this

06.10.10

time. Therefore the existing course B.Tech.(Computer Sc. & IT) must be changed to B.Tech.(Computer Sc. & Engineering). As admissions are being made through UPTU counseling, 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 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 in 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 statue.

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.

(Mr. Akhar Husain)
Internal Member

(Mr. Vinay Rishiwal)
Internal Member

06/10/10
(Dr. S. S. Bedi)
Internal Member

(Dr. Ashutosh Gupta)
Internal Member

(Dr. Ravendra Singh)
Internal Member

(Prof. Neelima Gupta)
Member

06.10.10
(Dr. Karanjeet Bhatia)
External Member

(Mr. Brajesh Kumar)
Convener

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

SI. No.	Course No.	Subject	Credits	Teaching Schedule Hrs. L T P	Total
1.	PH-101T	Engineering Physics-I	4	3 1 0	4
2.	CY-101T	Engineering Chemistry	4	3 1 0	4
3.	MA-101T	Engineering Mathematics-I	4	3 1 0	4
4.	HU-101T	Communicative English	3	3 1 0	4
5.	CS-101T	Computer Programming and Fundamentals	3	2 1 0	3
6.	ME-101T	Manufacturing Techniques	2	2 0 0	2
7.	ME-103T	Engineering Graphics	3	1 2 0	3
		Total	**23**		**24**
Laboratory Courses					
8.	PH-101P	Engineering Chemistry Lab	2	0 0 3	3
9.	CS-101P	Computer Programming Lab	2	0 0 3	3
10.	ME-101P	Workshop Practice Lab	2	0 0 3	3
		Total	**6**		**9**
		G. Total	**29**		**32**

B.Tech I year II Semester

SI. No.	Course No.	Subject	Credits	Teaching Schedule Hrs. L T P	Total
1.	EI-102T	Basic Electronics Engineering	4	3 1 0	4
2.	MA-102T	Engineering Mathematics-II	4	3 1 0	4
3.	EE-102T	Basic Electrical Engineering	4	3 1 0	3
4.	PH-102T	Engineering Physics-II	4	3 1 0	4
5.	CY-102T	Environmental Studies: Scientific &Engineering Aspects.	3	3 0 0	3
6.	HU-102T	Fundamental of Economics	3	300	3
7	ME-104T	Basic Mechanical Engineering	4	310	4
		Total	**26**		**27**
Laboratory Courses					
8.	CY-102P	Basic Electronics Lab	2	003	3
9.	EC-102P	Engineering Physics lab	2	003	3
10.	CS-102P	Basis Electrical Engineering Lab	2	003	3
		Total	**6**		**9**
		G. Total	**32**		**36**

SECOND YEAR

SEMESTER-III

S. No.	Courses No.	Subject	Credits	Teaching schedule			Contact Hrs
1	CS-201T	Data Base Management System	4	3	1	0	4
2	CS-203T	Discrete Mathematical Structure	4	3	1	0	4
3	CS-205T	Data Structure	4	3	1	0	4
4	CS-207T	Object Oriented Programming	4	3	1	0	4
5	MA-201T	Engineering Mathematics-III	4	3	1	0	4
6	EI- 201T	Analog Electronic	4	3	1	0	4
Total			**24**				**24**
Laboratory Course							
7	CS-205P	Data Structure Lab in C/C++	2	0	0	3	3
8	CS-207P	Object Oriented Programming Lab	2	0	0	3	3
9	EC-203P	Electronics Devices Lab	2	0	0	0	3
Total			**6**	**0**	**0**	**9**	**9**
Semester Total			**30**				**33**

SECOND YEAR

SEMESTER-IV

S. No.	Courses No.	Subject	Credits	Teaching schedule			Contact Hrs
1	CS-202T	Analysis & Design of Algorithm	4	3	1	0	4
2	CS-204*T	Computer Organisation	4	3	1	0	4
3	CS-206T	Data Communication	4	3	1	0	4
4	ME-212T	Industrial Management	4	3	1	0	4
5	EC-202T	Signal & Systems	4	3	1	0	4
6	EC- 204T	Digital Electronic	4	3	1	0	4
Total			**24**	**18**	**6**	**0**	**24**
Laboratory Course							
7	CS-208P	Data Project Lab	2	0	0	3	3
8	EC-204P	Digital Electronics Lab	2	0	0	3	3
9	CS-202P	Analysis of Design of Algorithm Lab	2	0	0	3	3
Total			**6**	**0**	**0**	**9**	**9**
Semester Total			**30**	**18**	**6**	**9**	**33**

THIRD YEAR

SEMESTER-V

S. No.	Courses No.	Subject	Credits	Teaching schedule			Contact Hrs
1	CS-301T	Computer Networks	4	3	1	0	4
2	CS-303T	Software Engineering	4	3	1	0	4
3	CS-305T	Principles of Programming Languages	4	3	1	0	4
4	CS-307T	Theory of Computation	4	3	1	0	4
5	CS-309T	Operating Systems	4	3	1	0	4
6	EI-309T	Microprocessor & Their applications	4	3	1	0	4
Total			**24**				**24**
Laboratory Course							
7	CS-301 P	Computer Networks Lab	2	0	0	3	3
8	CS-309 P	Operating Systems Lab	2	0	0	3	3
9	EI- 309 P	Microprocessor	2	0	0	3	3

		Lab					
Total			**6**	**0**	**0**	**9**	**9**
Semester Total			**30**				**33**

THIRD YEAR

SEMESTER-VI

S. No.	Courses No.	Subject	Credits	Teaching schedule			Contact Hrs
1	CS-304T	Compiler Design	4	2	1	0	4
2	CS-306T	Interactive Computer Graphics	4	3	1	0	4
3	CS-308T	Distributed Systems	4	3	1	0	4
4	CS-310T	Programming with JAVA	4	3	1	0	4
5	CS-312T	Data Mining Techniques	4	2	1	0	4
6	EC-302T	Digital Signal Processing	4	3	1	0	4
Total			**24**				**24**
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
Total			**6**	**0**	**0**	**9**	**9**
Semester Total			**30**				**33**

FOURTH YEAR

SEMESTER-VII

S. No.	Courses No.	Subject	Credits	Teaching schedule			Contact Hrs
1	CS-401T	Advanced Computer Architecture	4	3	1	0	4
2	CS-403T	Modeling& Simulation	4	3	1	0	4
3	CS-***	Departmental Elective-I	4	3	1	0	4
4	**-***	Pool Elective	4	3	1	0	4
5		Open Elective	4	3	1	0	4
6	CS-405	Seminar	2	0	1	0	2
7	TRN-401	Industrial Training	3	0	0	0	0
Total			**25**				**18**
Laboratory Course							
7	CS-401 P	Simulation Lab	2	0	0	3	3

8	CS-403 P	Major Project	4	0	0	9	9
Total			**6**	**0**	**0**	**9**	**12**
Semester Total			**31**				**30**

FOURTH YEAR

SEMESTER-VIII

S. No.	Courses No.	Subject	Credits	Teaching schedule			Contact Hrs
1	CS-402T	Advanced Computer Networks	4	3	1	0	4
2	CS-***	Departmental Electives-II	4	3	1	0	4
3	CS-***	Departmental Elective-III	4	3	1	0	4
4	**-***	Open Elective	4	3	1	0	4
Total			**16**	**12**	**4**	**0**	**16**
Laboratory Course							
5	CS-402 P	Advanced Computer Networks Lab	2	0	0	3	3
6	CS-406 P	Major Project Lab	10	0	0	15	15
Total			**12**	**0**	**0**	**18**	**18**
Semester Total			**28**	**12**	**4**	**18**	**34**

LIST OF ELECTIVES

CS-431T	Network Management Systems
CS-432T	Object Oriented Analysis and Design
CS-433T	Artificial Neural Networks
CS-435T	Parallel Computing and Algorithm
CS-438T	Fault Tolerance Computing
CS-439T	Artificial Intelligence & Expert System
CS-441T	Advanced Data Base Management System
CS-443T	Network Security and Cryptography
EC-403T	VLSI Design & Circuit
CS-445T	Stochastic Models for Computer Applications
EE-458T	Digital Image Processing
CS-447T	Web Technology
CS-448T	Distributed database System
CS-450T	Internet Programming with .net framework
CS-451T	Wireless network and Mobile Computing
CS-452T	Real Time System

SECOND YEAR (THIRD SEMESTER)

CS-201T Data Base Management Systems Credits4(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 4: Protecting the Database Against Misuse: Integrity constraints, Views, security, Encryption, security in statistical Databases.

UNIT 5: Database Design: Functional dependencies, Normal forms, First second, and third functional personal normal forms. BCNF. Multivalued dependencies Fourth Normal form. Join Dependencies and Fifth Normal form, Inclusion Dependencies.

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.

UNIT 8: Query Processing: Catalog Information for cost Estimation, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operation, Evaluation of Expressions, Transformation of Relational Expressions, Choice of Evaluation Plans.

References:

1) Abraham Silberschatz. Henry F. Korth S.Sudarshan; database system concepts, McGraw hill Book co. 1997.

2) Dater, C.J; An introduction to database system volume I & II, Addison-Wesley, 1981, 1983.

3) Ullman, Jeffrey D: Principles of database systems 2nd Edn Galgotial Publication Pvt. Ltd. 1982.

4) Whittigton, R.P. Database system engineering, Claventor Press.

CS-203T Discrete Mathematical Structures Credit 4(3-1-0)

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 opeartions, 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 4: Counting and Countability: Counting Principles, Functions and Counting, Permutations and Combinations, Combinatorial arguments, Infinite Sets and Countability.

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

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

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

References:

1) Olympia Nicodemi, "Discrete Mathematics", CBS Publications, Delhi.

2) J.P. Trembley & R. Manohar, "Discrete mathematical Structure", Mc Graw Hill Book Co., NY

CS-205 T **Data Structures** **Credits 4(3-1-0)**

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.

CS-207T Object Oriented Programming Credits 4(3-1-0)

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 operfation, detecting EOF, file modes, file pointers and their manipulations, error handling during file operation. Command line argument.

UNIT 8: Object Oriented System Developnwnt: 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 Stroustroup,
2) Object Oriented Programming with C++ by Balagurusamy, TMH.
3) Turbo C++ by Robert Lafore,
4) Complete Reference C++ by Herbert Shield,

Subject: Engineering Mathematics-III **Code: MA-201 T** **Credits: 4**

Branches: All Branches **SEM: III Semester** **L P T: 3 1 0**

Note: A setting of eight questions will be there covering all the units proportionally out of which any five are to be attempted.

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

1. J.N.Sharma: Differential Equations, Krishna Prakashan Media (P) Ltd., Meerut.
2. B.V.Raman: higher Engineering Mathematics, Tata McGraw Hill Co., Ltd., 2008.
3. R.K.Jain & S.R.K. Iyenger: Advance Engineering Mathematics, Narosa Publishing House, 2002.
4. A.R.Vashistha: Integral Transforms Krishan Prakashan Media (P) Ltd., Meerut.
5. G.G.Simmons: Differential Equations, Tata McGraw Hill Co. Ltd., 1981.

Subject: Analog Electronics **Code: EI-201 T** **Credits:4**
Branches: EC, EI,CSIT and EE **Sem: III semester** **L P T: 3 1 0**

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}, β: Bias compensation Diode for I_{CO}, V_{BE}.

Unit 2:- The Transistor at low frequencies: Two port devices and the hybrid model. The h-paratmeter, 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).

3. Electronics Devices and Circuit: Allen mottershed (TMH).

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 3: The Greedy Method : The general method, optimal storage on tapes, Knapsack problem, Job sequencing with deadlines, Optimal merges patterns, Minimum panning trees, Single source shortest path algorithm.

UNIT 4: Dynamic programming: The general method, Multistage graphs, all pairs shortest paths, optimal binary search trees, O/I Knapsack, The travelling salesperson problem.

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:

1) Design and Analysis of Algorithms by Aho, Hopcroft and Ullman, Addision Weseley.
2)Algorithms : Theory and Practices by Brassard and Bratley, PHI.
3)Fundamentals of Computer Algorithms by Horowitz & Sahni, Computer Science Press

Subject: Computer Organization **Code: CS-204 T** **Credits: 4**

Branches: EC, EI , CSIT **SEM: IV Semester** **L P T: 3 1 0**

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

1. Computer Architecture and Organization, By John P. Hayes, Me Graw Hill.
2. Computer organization and design, by John L. Hennessy 7 David A. Petterson, Morgan Kaufman.
3. Computer System Architecture, by M. Morris Mano, PHI

CS-206T **Data Communication** **Credits 4(3-1-0)**

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.
2. Plant maintenance, preventive maintenance, maintenance strategy, value engineering. Ergonomics, safety health & environmental protection, work physiology job stress & fatigue, ergonomics of manual material handling.
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.
6. Role of IT in Systems - MIS, FMS, Japanese intherenes; JIT, Kanban, Decision, Support Systems.

Text Book:

1. Engineering Management by: Fraidoon Mazda

Reference:

2. Marketing Management by: Philip Kotler

Subject: Signals and Systems *Code: EC-202T* *Credits: 4*

Branches: EC, EI *SEM: IV Semester* *L P T: 3 1 0*

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 3:- Power & Energy signals, Energy & Power spectral densities of signals, Cross correlation, Auto correlation.

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

Subject: Digital Electronics *Code: EC-204 T* *Credits: 4*

Branches: EC, EI EE and CSIT *SEM: IV Semester* *L P T: 3 1 0*

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)
2. Digital principles and applications by MALVING & LEACH, McGraw-Hill Book Co.
   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:

Data Link Control: Line Discipline, Flow Control, Error Control. Data Link Protocol : A Synchronous Protocol & Synchronous Protocols.

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:

Network layer design issue, Routing Algorithms (types and Characteristics): Shortest path routing, Flooding, Distance vector routing, Link State routing. Congestion control algorithms: General principles of congestion control, congestion prevention policies, traffic shaping.

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

CS-303 T **Software Engineering** **Credits 4(3-1-0)**

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, acquistion. 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 abstracton, 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: Desigh 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, programcomponents 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 Qulaity 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:

1) Software Engineering: A Practitioner's approach by Roger S. Pressman (McGraw Hill International Edition)

2) Fundamentals of Software Engineering by Orio GHEZZI, Mehdi Jazayeri Dino Mandrioti. PHI.

3) An Integrated Approach to Software Engineering: Pankaj Jalote, Narosa Publication

CS-305T Principles of Programming Languages Credits 3(2-1-0)

UNIT 1: Introduction:

Why study programming language?

UNIT 2: Virtural 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, syncronization 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 programe with its implementation Referencin environment

References:

1) Programming Languages (2nd ed.) by Ravi Sethi

2) Programming Languages (2nd ed.) by Ravi Sethi & Terrence W. Pratt.

CS-307T **Theory of Computation** **Credits 4(3-1-0)**

UNIT 1: Introduction: A general introduction to Strings, languages, graphs, trees and relations. Motels 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 relatinship 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, eqivalence 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: Unior, 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 grammers, simplification of context free grammar : Remobal 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, constuction of CFL's given the transition function of PDA, Pumping Lemma (definition and examples), effective Closure, Properties of CFLs : Unior, 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 arithmatic function.

References:

1) Instruction to Automata Theory. Language and Computation by J.E. Hoproft and J.D. Ullaman, Narosa Publishers.

2) Theory of Computation by D.Wood, John Welley and Sons.

CS-309 T **Operating systems** **Credits 4(3-1-0)**

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: Fine Management

File concepts, types, access methods, operation on files, free space management, allocations, implementation, directory eystem.

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 apgorithms allocation of algorithms, tarshing, 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, serucity 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: 1) Operating System concepts by J.Peterson & A. Silberschetx, Addition-Wesley Publishing Company.

2) Operating System by Deitel, Addison Wesley.

3) Operating System by M.Milenkovic, TMH.

4) Operating System: Design &Implementation by A.S.Tannenabaum,PHI.

Subject: Microprocessor & their Applications *Code: EI-301T* *Credits: 4*

Branches: EC, EI, EE, ME and CSIT *SEM: V Semester* *L P T: 3 1 0*

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.

Unit 8:- 8087 Coprocessor, Features and internal organization, RS-232, RS-442, IEEE-488, Features and architecture of 80186, 80286, 80386 & 80486.

REFERENCES BOOKS

1. Microprocessor Architecture programming and application with 8085/8080 by Ramesh S. Gaonkar.
2. Fundamentals of Microprocessor & Microcontroller by B. Ram.
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.

Subject: Microprocessor Lab ***Code: EI-301P*** ***Credits: 2***

Branches: EC, EI, EE, ME and CSIT ***SEM: V Semester*** ***L P T: 0 0 3***

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 representationof 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 :

1) Aho, Sethi & Ullman, "Compilers Principles & Techniques & Tools", Addision Wesley.

2) Aho & Ulman, "Compiler Design, "Narosa Publishers, New Delhi.

CS-306T Interactive Computer Graphics Credits 4(3-1 -0)

UNIT 1: Introduction:

Origin of computer graphics, display devices, general purpose graphics software display of solid objects.

UNIT 2: Display Techniques And Pevices: Point plotting techniques, coordinate, systems and incremental metnods, 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 cdncurrent 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, midpoitit division, dipping other graphic entities, polygon dipping, viewing transformation, tine windowing transformer.

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

UNIT 6: Event Handling & Input Furtctions: Introduction, polling, interrupts, the event queue, functions for handling eveifits, polling task design, light pen interrupts, dragging and fix, htt detection, on-Jine character recognizers.

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

UNIT 8: 3-0 Graphics : Realism of 3D Graphics, 3D Transformation, Projections and its types. Curves & surfaces, hidden line and surface elimination (Z-Buffer Algorithm).

UNIT 9: Introduction To Virtual Reality

References:

1) Principles of interactive coinsurer graphics by W. M. Newman & R. F. Sproull, Me Graw Hill.

2) Computer Graphics by R~y A. Plastick & Gorden Kalley, Schaum's Outline Series.

3)Computer Graphics by Donald Heam & Baker, PHI.

4) Computetr Graphics, harinqton, TMH

5) Mathematical Approach To Computer Graphics, Rodger,

6) Computer graphics, Folay Addison Wessley

CS-308T Distributed System Credits 4(3-1-0)

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 2: Architecture of Distributed System: Motivation of distributed operating system, System Architecture types, Various issues in distributed operating system: Global Knowlege, Naming,Scalability, Compatibility, Process Synchronization, Resource Management, Security, Client-Server computing model. Communication Network (WAN and LAN), Communication Primitives, The Massage Passing Model, Re mote procedural calls.

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 4: Distributed deadlock, Distributed Mutual Exclusion and Agreement Protocol:

Mutual Exclusion: Centralized Algorithm, Distributed algorithm, Token ring algorithm.Deadlock in distributed system. Distributed deadlock detection, Distributed deadlock prevention., Introduction to Agreement protocols, System models: Asynchronous Vs Synchronous Computation, Model od processor failure, Authenticated Vs Non-Authenticated Massages, Perfor-mance Aspects.

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.

CS-310T **Programming with Java** **Credits 4(3-1-0)**

UNIT 1: An overview of JAVA:

Object Oriented programming (Two paradigms Abstraction, The Three OOP principles0, 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(), toCharArray()), 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 refrence by Patrck Naughton, Schieldt

2) Programming in Java by E. Balaguruswamy

CS-312T Data Mining Techniques Credits 4(3-1-0)

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 4: Data Mining Techniques: Preliminary Analysis of data set using traditional Query rules, Visualization techniques, Likelihood & distance, OLAP Tools, K-nearest neighbor, Decision Trees. Association rules, Neural Networks, Genetic algorithm.

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: G.Proakis & Dimitris G. Manolakis, PHI

1) Data Mining techniques by Arun Pujari, Universities Press.

2. Digital signal processing by Alan V. Oppenheim and Ronald Schafer

2) Data Mining by Pieter Adriaans, Dolf Zantinge, Addison-**3.**Introduction to digital system Processing by Roman Kuc. Mcgraw hill Wesley. international editions.

3) Datawarehousing, Data mining, OLAP, by Alex Berson & Stephen J. Smith, TMH Edition

4) Berson, "Data Warehousing, Data-Mining & OLAP", TMH

5) Mallach, "Decision Support and Data Warehousing System", TMH

6) Bhavani Thura-is-ingham, "Data-Mining Technologies, Techniques Tools & Trends", CRC Press **7)**Navathe, "Fundamental of Database System", Pearson Education

8) Margaret H. Dunham, "Data-Mining. Introductory & Advanced Topics", Pearson Education

Subject: Digital signal processing *Code: EC-302T* *Credits: 4*

Branches: EI, EC *SEM: VI Semester* *L P T: 3 1 0*

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.
3. Introduction to Digital System Processing by Roman Kook., McGraw hill international editions.

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 inputoutput 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 4: Structures and Algorithms for Array Processors : SIMD array processor, SIMD interconnection networks: Illiac, Cube, Shuffle Exchange, Omega, Modified Omega, Barrel Shifter, Parallel algorithms for array processor: SIMD Matrix Multiplication, Parallel sorting on Array Processor.

UNIT 5: Multiprocessor Architecture and Programming : Functional structures : Loosely Coupled Multiprocessors, Tightly Coupled Multiprocessors; Interconnection Networds : UMA, MUMA, COMA, Time shared, Crossbar switch and Multiport Memories; Multiprocessor Operating Systems: Classification of Multiprocessor Operating Systems, Exploiting Concurrency for multiprocessing : Language features, Matrix multiplication on concurrent processor; Multiprocessor Scheduling Strategies: Dimensions of Multiple processor Management.

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

References:

1) K. Hwang and F.A. Briggs, "Computer Architecture and Parallal processing" McGraw Hill Book Co. NY.

2) M.J. Flynn, "Computer Architecture: Pipelined And Parallel Processor Design". Naros Publishing Co.

3) K. Hwang "Computer Architecture" Mc Graw Hill Co. NY.

CS-403 T **Modeling & Simulation** **Credits 4(3-1-0)**

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-eventmodel, 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, uncertaintities in activityduration, resource allocation and consideration, Simulation languages, object oriented simulation.

Reference Books:

1) Geoftrey Gordon, "System Simulation", PHI
2) Narsingh Deo, "System Simulation with digital computer", PHI.
3) Averill M. Law, W. David Kelton, "Simulation Modelling and Analysis",TMH.

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 reliablity, 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 1: Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

UNIT 2: SNMPV1 Network Management: Organization and Information and Information Models. Managed network: Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model. SNMPv1 Network Management: Communication and Functional Models. The SNMP Communication Model, Functional model. SNMP Management: SNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, the SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1.

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

UNIT 4: Telecommunications Management Network: Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, Implementation Issues.

UNIT 5: Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions

UNIT 6: Web-Based Management: NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network, Future Directions.

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.

CS-432 T Object Oriented Analysis and Design Credits 4(3-1-0)

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

2) Booch Grady, "Object Oriented Analysis & Design with application 3/e", Pearson Education, New Delhi.

3) James G. Booch, J. Rambaugh "The Unified Modeling Language"

CS-433T Artificial Neural Networks Credits 4(3-1-0)

UNIT1: Introduction to neural nets, Perceptrons and the LMS Algorithm. Back propagation Learning, Visually-Guided Robot Control.

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:

1) Bishop, C. M. (1995) Neural Networks for Pattern Recognition,. Oxford University Press.

2) Optional enrichment: Anderson, J. A., and Rosenfeld, E.

3) Handout: Derivation of the backprop learning rule

4) Haykin, S. Neural Networks: A Comprehensive Foundation, 2nd edition.

5) Kearns, M. J., and Vazirani, U. V. An introduction to Computational Learning Theory,. Cambridge, MA: MIT Press.

6) Churchland, P.S. (1986) Neurophilosophy: Toward a Unified Science of the Mind-Brain.. Cambridge, MA: MIT Press

CS-435T Parallel Computing and Algorithms Credits 4(3-1-0)

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 3: Parallel Sorting Networks, Parallel Merging Algorithms on CREW/ EREW/MCC, parallel Sorting Networks on CREW/EREW/MCC, linear array.

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:

1) M.J. Quinn, "Designing Efficient Algorithms for Parallel Computer" by Mc Graw Hill.

2) S.G. Akl, "Design and Analysis of Parallel Algorithms"

3) S.G. Akl, "Parallel Sorting Algorithm" by Academic Press.

CS-438T Fault -Tolerance Computing Credit: 4(3-1-0)

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 2: Architecture of Fault Tolerant Computer: Taxonomy, Fault Avoid ance Techniques, Fault Detection at IBM, Dynamic redundancy in multiple computer system & Recovery on Time and Space, Fault, Detection Techniques, Detection of errors in Data Management, Component Fault Detection, Detection Tests at System level.

UNIT 3: Reliable Design and Fault Diagnosis: Hazard, Fault Detection in Combinational circuits, fault location Experiments, Boolean Differences, Fault Detection by Path Sensitizing.

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, Asymnetric Error-correcting codes, single-Asymmetric error correcting code.

UNIT 5: Software Design Faults: Approaches for uniprocess software: Exception Handling Framework, Recovery Block Approach, N-version Programming. Backward Recovery in Concurrent systems: Domino Effect, Conversations, and FT-Actions, Conversation using monitors, Using Distributed-Action. Forward recovery in concurrent Systems: Exception Resolution Exception Handling with FT-Action.

CS-439T Artificial Intelligence & Expert system Credits 4 (3-1-0)

UNIT 1: Introduction : Overview, The Al proglems, Al techniques, applications of Al, Introduction to LISP.

UNIT 2: Problem spaces and search techniques: Defining the problem, production system, problem charactersits, Henriste search techniques : Hill chimbing, BFS, DFS, A*, AO* altorithm admissibility, monotonicity.

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

UNIT 4: Advanced Topics : Planning understanding, Natural language processing parallel 7 distributed Al, Learning neural network Genedic learning, patern, recognition.

UNIT 5: Expert system archicture : Representing and using down aim knowledge, Expert system shells, knowledge acquision, applications, case study of mycin.

Reference:

1) E. Rich & K. Knight, "Artificial Intelligence," TMH.

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 5: Advanced Transaction processing: Remote Backup systems, Transaction-Processing Monitors, TP-Monitor Architectures, High-Performance Transaction systems. Long Duration Transactions, Transactional Workflows, Query Optimization security and production, Encryption, Statistical Database.

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

References:

1) Stegano Ceri and qiuseppe Pelagati : Distributed Data base system, Mc-Graw Hill Book Company. 1984. OR (Advance version)

2) Prabhat K. Andleigh, Michacl R. Gretzinger : Distributed Object Oriented Data-Systems Design, PTR Prentic- Hall Inc., 1992.

3) Pieter Adriaans Dolf Zantinge : Data Mining, Addison, Wesley, Longman Ltd., 1997.

CS-443T Network Security and Cryptology Credits 4(3-1-0)

UNIT 1: Introduction: Terminology, Substitution ciphers and Transposition ciphers, Simple XOR, One-Time Pads, Computer Algorithms. Cryptographic Protocols

UNIT 2: Protocol Building Blocks: Introduction, Communication using Symmetric Cryptography, One-Way Hash Functions, One-Way Hash Functions, Communication using Public-Key Cryptography, Digital Signatures, Digital Signatures with Encryption.

UNIT 3: Protocols: Authentication and Key exchange, Key Exchange, Authentication, Multiple key public key cryptography, Secret splitting, Secret Sharing, Cryptographic protection. Zero-Knowledge Proofs, Zero-Knowledge Proofs of Indentity, Blind Signatures, Obilivious Transfer, oblivious signature, Simultaneous contract singing Cryptographic Techniques

UNIT 4: Key Management : Generating Keys, Nonlinear Keyspaces, Transferring Keys, Verifying Keys, Using Keys.

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 Viley & Sons.

2) Network Security and Cryptography by Willam Stalling

3)Concept of Network Security and Cryptography by Frozen

Subject: VLSI Design & Circuits	*Code: EC-403T*	*Credits 4*
Branches: EI	*SEM: VII*	*LPT:310*

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 C MOS 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.
4. Design technique for analog and digital circuits by L.Geizer, Philip E.allen, Noel R.starder.

CS-445 Stochastic Models for Computer Applications Credits 4(3-1-0)

UNIT 1: Bavariate 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.

UNIT 3: Conditional Expectation: Introduction, Mixture distribution, Conditional Expectation, Imperfect.

UNIT 4: STOCHASTIC Process: Introduction, Classification of Stochastic Process, the Bernoulli Process, the Poisson Process, Renewal Processes, Availability Analysis, Random Incidence, Renewal model of Program Behavior

UNIT 5: Discrete Parameter Markov Chains: Introduction, Computation of n-step transition Probabilities, State Classification & Limiting Distributions, Distribution Between State Changes, Irreducible Finite Chains & A periodic States, The Queuing System, Finite Markov Chains With Absorbing States.

UNIT 6: Continuous Parameter Markov Chains: Introduction, The Birth & Death Process, Non Birth & Death Processes, Markov Chains with Absorbing States.

Reference:-

1) Probability & Statistics with Reliability, Queuing & Computer Science Application: R. S. Trivedi, John Wiley & Sons.

2) Probability, Random Variables & Stochastic Processes: A. Papoulis, TMH

CS-448 Distributed Data Base System Credits4 (3-1-0)

UNIT 1: Introduction to Distributed Data system, Distributed Database Architecture, Distributed Data base 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: Dis- tributed Date baseAdministration, Catalouge Management Authorisation, Security and protection.

References:

1) Ceri & Palgathi, "Distributed Database System", McGraw Hill.
2) Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", Mc Graw Hill.
3) Date C. J, "An Introduction to Database System, Vol1 & II", Addition Wesley.
4) Korth, Silbertz, Sudarshan , "Database Concepts", McGraw Hill.
5) Elmasari , Navathe, "Fundamentals of Data Base Systems", Addition Wesley.
6) Data C. J "An Introduction to Database System" , Addition Wesley

CS-449 Embedded Systems Credits 4(3-1-0)

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.

CS-446 Digital Image Processing Credits 4(3-1-0)

UNIT 1: Introduction: what is digital image processing ? origin of digital image processing. Use of digital image processing. Fundamental steps in digital image processing, components of an digital image processing.

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 arithemetic/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 f requency domain filters, homomorphic filtering, implementation

UNIT 5: Image restoration: A model of the image degradation/restoration process. Noise model, restoration in the presence of noise only, spatial filtering, mean filters, order statistics, filters, adaptive filters, periodic noise reduction by frequency domain filtering: band reject filters, band pass filters, notch filters, optimum notch filters, linear, position invariant degradations, estimating degradation function inverse filtering, wiener filtering, geometric mean filters, geometric transformation.

UNIT 6: Image compression: Fundamentals of image compression models, error free compression: variable length coding, LZW coding, bit plane coding, lossless predictive coding, lossy predictive coding, transform coding, wavelet coding, image compression standard.

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:

1) R. C. Gonzalez, R.E. Woods, "digital image processing", Pearson education.
2) R. C. Gonzalez "digital image processing using MATLAB", Pearson education.
3) W. K. prett, "digital image processing", Addison Wesley.

CS-447 Web Technology Credits 4(3-1-0)

UNIT 1: History of the Internet and World Wide Web, Growth of the Web, Protocols - HTTP, FTP, SMTP, POP3, MIME, IMAP. Choosing an ISP, Introduction to Internet Services, E-Mail concepts, Sending and Receiving secure E-Mail .

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 3: HTML: Concept of Hypertext, Versions of HTML, Elements of HTML, Formatting Tags, Links, Hyperlinks, Image & Image map, List, Tables, Frames, Forms, Style Sheets, Background and Color Controls. DHTML: Introduction to DHTML. Advanced Netscape DHTML, Advanced Microsoft DHTML & Cross browser DHTML JavaScript: Introduction, Statements, Functions, objects in JavaScript, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

UNIT 4: XML: Introduction, Problems with HTML & SGML, Types of XML Markup, Displaying an XML Document, Document Type Definitions (DTD), Linking, Using Style Sheets with XML. Data Interchange with an XML document, Document type definitions, Client-side usage, Server Side usage

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 contraols, web server controls. Web database tools: overview of ADO.NET, difference between ADO and ADO.net ADO.NET architecuture , 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

CS-450 Internet programming with .net framework Credits 4(3-1-0)

UNIT 1: The NET Framework: Introduction, Common Language Runtime, Common Type System,Common Language Specification, The base class library, The .Net Class Library Intermediate Language, Just In Time Compiler, Garbage Collection, Assemblies

UNIT 2: C# Basics: Introduction., .Data Type, Identifiers, Variabes & 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) 'Undestanding .NET Framework ' by Tonybaer

CS-451 Wireless Network and Mobile Computing Credits 4(3-1-0)

UNIT-1 Overview of wireless communication: History, Different Generations, General characteristics of mobile devices, Electromagnetic spectrum, Radio propagation mechanisms, characteristics of wireless medium, wireless topology, cellular system (cell concepts, cell hierarchy, cell fundamentals) Issues in mobile computing: Introduction, functions, 3-Tier architecture, applications and services. GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling Handover, Security.

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 4: Mobile Network layer: Mobile IP: Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations, and dynamic host configuration protocols (DHCP). Mobile Transport layer: Traditional TCP, Indirect TCP, Snooping TCP,, Mobile TCP, Fast retransmission/ fast recovery, transmission/ time-out freezing, selective retransmission, transaction oriented TCP. Wireless Application Protocol WAP: Introduction, protocol architecture and treatment of protocols of all layers.

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.

CS- 452 Real Time Systems Credits 4(3-1-0)

UNIT 1: Introduction: Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT 2: Real Time Scheduling

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT 3: Resources Access Control Effect of Resource Contention and Resource Access Control (RAC), Non preemptive Critical Sections, Basic Priority-Inheritance and Priority Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-UNIT Resources, Controlling Concurrent Accesses to Data Objects.

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 Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

Books:

1) Real Time Systems by Jane W. S. Liu, Pearson Education Publication.

2) Real-Time Systems: Scheduling, Analysis, and Verification by Prof. Albert M. K.Cheng, John Wiley and Sons Publications.

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 2 : Concept in Economics- Law of Demand, Law of Diminishing Marginal Utility, Law of Equi-marginal Utility, Elasticity of Demand, Indifference Curve Analysis- Price effect. Income effect and Substitution effect.

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 4: Theory of The Firm- Perfect Competition, Monopoly and monopolistic Competition:- Meaning, Assumptions, Equilibrium of the Firm in Short run and Long run period of time.

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.)

ME-473 **WORK STUDY** **Credits:4(3-1-0)**

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 aspectsin 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, standardtime calculation using rating.

Text Book: Work study by ILO.

EC-403 VLSI Design & Circuits Credits4(3-1-0)

UNIT 1: MOS transistor, Depletion MOS Transistor, Enhancement MOS Transis- tor, 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 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, Evalute 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

EC-433 Digital System Design Credits 4(3-1-0)

UNIT 1: DIGITAL DESIGN FUNDAMENTALS: Hardware Aspects Related to ASSERTED and NOT-ASSERTED Conditions, Concepts of gates.

UNIT 2: MINIMIZATION AND DESIGN OF COMBINATIONAL CIRCUITS: Introduction, Minimization with Theorems, The Karnaugh Map, Plotting a Karnaugh Map, Labeling a K-Map. Five and Sis Variable Maps, Prime and Essential Implicants, Don't Care Map Entries, Map Reduction Resulting in Product-of-sum Expressions, Using the Map for Simplifying Partially Simplified Expressions, Variable-Entered Mapping, VEM Plotting Theory, VEM Reading theory.

UNIT 3: SEQUENTIAL MACHINE

Introduction, The Need for Sequential Circuits, Basic Architectural Distinctions between Combinational and Sequential Circuits, Concept of Memory, The Binary Cell, Fundamental Differences between sequential Machines, Fundamentals of Sequential Machine Operation, Using Variations of the General Model to Classify Sequential Maachines, The SET/Flop,CLOCK and OSCILLATORS, Types of Traditional Clocked Flip-Flops,The SET/RESET Flip-Flop, The "D" Latch Flip-Flop, The CLOCKED "I" Flip- Flop, The CLOCKED JK" Flip-Flop, The Design of a Clocked Flip-Flop Conversion from one type to another.

UNIT 4: TRADITIONAL APPROACHES TO 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 State Decoder,

UNIT 5: ASYNCHRONOUS FINITE STATE MACHINES: Introduction, Why Asynchronous Circuits, Scope, Asynchronous Analysis. Design steps Leading to Next State Decoders, Trying a JK or T Flip-Flop, OutputDecoder Design, Counters, Design of Single-Mode Counters, Multi-Mode Counters, Design of Specialized Multi-Mode Counters, RippleCounters, MUlti-ModeCounters, Design of Specialized Multi-Mode Counters,Ripple Counters, Ring Counters, Applications of Ring Counters, ShiftRegister, Shift Register Sequences, Ring Counters Using Shift Register, Shift Registers and Memory.

References:

1) An Engg Approach to Digital Design: William I. Fletcher (PHI)
2) Digital Design: Morris Mano (PHI)

EC-435 Optical Fiber Communications Credits 4(3-1-0)

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 3: Transmission Characteristics of optical fibers: Attenuation, Intrinsic absorption, Intrinsic & Extrinsic absorption, Linear & non-linear scattering, Rayleigh scattering, Mie scattering, Stimulated Brillouin scattering, stimulated Raman scattering, Fiber bend loss, Mid infrared and far infrared transmission, disporsion.

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.

EC-454 Digital and Non-Linear Control System Credits 4(3-1-0)

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, propertis, Final value and initial value theorem, pulse transfer function, State-space modeing of continuous and discrete systems, conversion of state space model to TF, Conversion of TF to state space model : I,II cannonical form- Jordan Cannonical 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, Binear transformation and freq. prewarping., matched 2- Transformation.

UNIT 3: Stability Stability of digital system: Schur cohen and Jury stability criteria, controlability of discrete systems, transformation of a controllable system to controllable canonical form, Observability of discrete systems, solution to homogeneous and non-homogeneous state eqn. Digital controller design using root locus method.

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: ntroduction, General description of microprocessor based control system Control System. Case study of microprocessor based position control system : Hardware mechanization, Digital measurement of shaft position/ speed, control algorithm. **Case study** of microprocesser based temperature control system. Hardware description, Control Algorithms, A realization scheme for the PID Controller.

References:

1) Digital control systems by Kuo, B.C., (2nd edition Orlando Florida : Saunders college publishing-1992.

2) Digital control engineering by M.Gopal.

3) Applied Non-linear control by slotine J.J.E. & W,LI Englewood clififis; New Jersey : Printice Hall-1991

EE-411 NON CONVENTIONAL ENERGY SOURCES Credits 4 (31-0)

UNIT 1: Introduction: Energy Sources, Renewable Energy Sources, and Prospect of Renewable Energy Sources.

UNIT 2: Solar Energy: Solar Radiation, Solar Radiation Measurement and Conversion of Solar Radiation into Heat, Collection and Solar Energy Storage, Application of Solar Energy.

UNIT 3: Wind Energy: Principle of Wind Energy Conversion System (WEC), Wind Machines, Generating Systems, Energy Storage.

UNIT 4: BioMass Energy: BioMass conversion Technology, Photosynthesis, Biogas plants.

UNIT 5: Geothermal Energy: Estimate of Thermal Energy, Sources, Geothermal Plants.

UNIT 6: Ocean Energy: Ocean Thermal Conversion Electric Conversion (OTEC), Methods of Conversion, Heat Exchanger, Energy From Tides, Tidal Plants, Prospects

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 ubstation, and it's major equipment's, Block diagram of AC Electric Locomotive, Breaking in Traction System.

Books:

1) Art and Science of Utilization of Electrical Energy by H.Pattab Pb. Dhanpat Rai & Co.

2) Utilization of Electrical Energy by O.E.Taylor A.H.Wheeler Pub.

3) Electric Traction by A.T.Dover A.H.Wheeler Pub.

EE-415 UTILIZATION OF ELECTRICAL ENERGY AND TRACTION Credits 4(3-1-0)

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 3: Electric Welding: Classification, Arc Welding, Electrodes, Electric Supply; Projection, Seam, butt, Percussion Welding, Electron beam, Ultrasonic and Laser Weldings.

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:

1) Art and Science of Utilization of Electrical Energy by H.Pattab Pb. Dhanpat Rai & Co.

2) Utilization of Electrical Energy by O.E.Taylor A.H.Wheeler Pub.

3) Electric Traction by A.T.Dover A.H.Wheeler Pub.

EI-435 Antenna Engineering Credits 4(3-1-0)

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 an- tenna, helical antenna, log periodic antenna & parabolic reflectors.

UNIT 3: Antenna arrays: Two element array (broad side & end fire array), linear arrays multiplication of patterns, bionomial 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

EI-452 PCB Design & Technology Credits4(3-1-0)

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 compo- nents, Layout sketching with Puppets, Procedures, etc.

UNIT 3 : Layout General rules and parameters:

Resistancae 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 Reconstruc- tion, Nyquist rate, Aliasing, foldrer 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.

UNIT 5: Image Reconstruction: Tomographies, Radon transform, Back projection operator, Projection theorem, Image data compression: Pinel coding, predictive techniques, Transform calling theory, Hybrid coding and vector DPCM, Interframe coding.

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 4: Directing: Leadership Concept, Ingredients, Traits, Styles, Roles Communication Concept. Types, Process Barriers, Making Communication effective, Importance.

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

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

UNIT 1: Nature of foreign Trade-Meaning, Nature, Scope and Distinct Features of International Tansactions.

UNIT 2: Theories of International Trade-The Classical Theory:-Absolute Advantage Model of Adam Smith, Comparative Advantage Model of David Ricardo, The Neo-Classical Analysis:- International Trade Equilibrium under Constant Cost, Increasing Cost and Decreasing cost Conditions.

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

UNIT 4: International Monetary Fund [I.M.F]-Nature, Objectives and Functions of I.MF., International Monetary System Since the demise of Bretton Woods System.

UNIT 5: International financial Institutions-world Bank (IBRD), International Financial Corporation (I.F.C.) International Development Association (I.D.A.)

UNIT 6: India's Trade Policy Trends of Exports and Imports of India since independence, Composition of India's Foreign Trade.

HU-409T Quantitative Methods in Economics Credits 4(3-1-0)

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 6: Index Number- Definition. Uses and Types of Index Numbers, Methods of Construction index Numbers-(1) Simple Aggregate Method(2) Weighted Aggregate Method (3) Fisher's Ideal Index Numbers (4) Const of living Index Numbers (5) Chain Base and Fixed Base Index Numbers. Base Shifting. Limitations of Index Numbers.

PH 419T **Futuristic Materials** **Credits 4(3-1-0)**

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 it alloys used of LED and other devices, Utility of semiconducting alloys like GaAIAs, GaAIN, GaAIP etc.

UNIT 2: Superconductors:

Fundamenal Phenomena associated with sumerconductors. Type I & II superconductors, Meissner Ochenfeld effects, Josephon effects, fundamental of BCS theory. Novel High Temperature Superconductors. Hole superconductors, TIBa CaCuO single and bilayer. Electron superconductors NdCuO etc. Doping effects in superconductors, Organic superconductors, fullerenesl. Application of the superconductors in science, medical and commercial sectors.

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 Chactrization of Materials

Books: 1) Superconductivity Today: T.V. Ramakrishnan & C.N.R. Rao Wiley astern Pvt. Ltd, New Delhi, 1992 **2)** Solid State Physics: Ashcrost/Mervin

PH-429T Material Imperfection and Applications Credits 4(3-1-0)

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-intestitials colour centres, inpurities is solids, Linear defects dislocations, Interfocial efects, Bulk or volume defects

UNIT 3: Diffusion in Solids : Diffusion, diffusion mechanisms: vacancy diffusion, intertitial diffusion, steady state diffusion : Fick's first law, non-steady state diffusion: Fick's second law, Factors that influence diffusion, Applications.

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 stregthening, strain hardening.

UNIT 6: Lasers: Principle, population inversion, Einstein's A and B coefficients, types: Ruby laser, He-Ne laser, semi conductor lasers.

Books: Non Crystalline materials: by Davis & Mott Amorphous Solids by S.R. Elliot Solid State Physics by M.A.Wahab

CY-401T Polymeric materials and their applications Credits 4(3-1-0)

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 3: Rubbers/Elastomers : Natural rubber, compounding of rubber, Properties, uses, reclaimed rubber, Synthetic rubber, Buna- S, Nitrile rubbers, Butylrubbers, Neoprene rubber, Thiokols, silicone rubbers, fibre reinforced plastics (FRP) .

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 1: Introduction: Definition of O.R. and it's scope, modelling in O.R. General methods for solving O.R. models. The Montocarlo technique, main characterstic of O.R. main phases of O.R. Linear programming problems. Graphical method for solve L.P.P., Two phase Method, Big-M Method, problems of tie.

UNIT 2: Assignment Model : Mathematical formulation of assignment model, Reduction theorem, problems of maximisation & minimisation. Hungarian process, travelling salesman problems.

UNIT 3: Transportation Model : Mathematical formulation of transportation problem. Definition of BFS, IBFS, Optimum solution. Algorthim of N-W rule, Least-cost & VAM and their problem

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

UNIT 5: Game Theory : Characteristic of Games. Basic definitions, minimax criterion and optimal strategy. Equavalence of rectangular Games, Dominance process, Arithmatic method for solving zero-sum-two person Games. Graphical and simplex methods for solving the games.

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

UNIT 7: Inventory : Elementry Inventory Models, Inventory models with price breaks.

EI-452T **P.C. Interfacing** **Credits: 4(3-1-0)**

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.

EI-456 T **Air-craft Instrumentation** **Credits 4(3-1-0)**

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 barom-eter. 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:

1) Measurement Systems Application and Design. By:Ernest O Doebelin Publisher-McGraw Hill
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.