DELHI TECHNOLOGICAL UNIVERSITY

SCHEME OF EXAMINATION
AND
COURSE OF READING
FOR

B.TECH (INFORMATION TECHNOLOGY)

Syllabus applicable to the students seeking admission to
B.TECH. (Information Technology) Course

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SUGGESTED SCHEME FOR B.Tech. (INFORMATION TECHNOLOGY)

I SEMESTER

S.No.	*Course No.*	*Subject*	*LTP*	*Evaluation*		*Total Marks*	*Credit Type*
				Sess	End		
TH1	MA 101	Mathematics-1	3 1 0	30	70	100	4H
TH2	EN 102	Environmental Sciences	2 0 0	30	70	100	2H
TH3	AS 103	Applied Sciences	4 0 0	30	70	100	4H
TH4	AS 104	Engineering Materials	4 0 0	30	70	100	4H
TH5	ME 105	Mechanical Sciences	3 1 0	30	70	100	4A
TH6	COE 116	Principle of Programming Language	2 0 0	30	70	100	2A
PR1	ME 107	Engineering Graphics	0 0 3	30	70	100	3A
PR2	ME 108	Mechanical Science Lab	0 0 2	30	70	100	2A
PR3	COE 118	Programming Language Lab	0 0 2	30	70	100	2A
PR4	PE 120	Mechanical Workshop	0 0 3	30	70	100	3A
	TOTAL	**Practice**	**30 hrs**	**Grand**	**Total**	**1000**	**30**

II SEMESTER

S.No.	*Course No.*	*Subject*	*LTP*	*Evaluation*		*Total Marks*	*Credit Type*
				Sess	End		
TH1	MA 111	Mathematics-II	3 1 0	30	70	100	4H
TH2	HU 112	Communication skills	2 1 0	30	70	100	3H
TH3	PH 113	Applied Physics	3 1 0	30	70	100	4H
TH4	CH 114	Applied Chemistry	3 1 0	30	70	100	4H
TH5	EE 115	Electrical sciences	3 1 0	30	70	100	4A
TH6	IT 106	Fundamentals of Information Technology	2 1 0	30	70	100	3A
PR1	PH 117	Applied Physics Lab	0 0 2	30	70	100	2H
PR2	CH 118	Applied Chemistry Lab	0 0 2	30	70	100	2H
PR3	EE 119	Electrical Sciences Lab	0 0 2	30	70	100	2A
PR4	IT 110	Information Technology Lab	0 0 2	30	70	100	2A
	TOTAL	**Practice**	**30 hrs**	**Grand**	**Total**	**1000**	**30**

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III SEMESTER

S.No	Course No.	Subject	L T P	Evaluation		Total	Credit Type
				Sess.	End		
TH-1	IT-201	Data Structures	3 1 0	30	70	100	4 C
TH-2	IT-202	Digital Electronics	3 1 0	30	70	100	4 C
TH-3	IT-203	Analog Electronics	3 1 0	30	70	100	4 A
TH-4	IT-204	Discrete Mathematics	3 0 0	30	70	100	3 A
TH-5	IT-205	Operating Systems	3 1 0	30	70	100	4 C
TH-6	IT-206	Object Oriented Technology	3 1 0	30	70	100	4 C
PR-1	IT-207	Data Structure Lab	0 0 2	30	70	100	2 C
PR-2	IT-208	Digital Electronics Lab	0 0 2	30	70	100	2 C
PR-3	IT-209	Analog Electronics Lab	0 0 2	30	70	100	2 A
VS-1	IT-210	Self Study	0 0 1	30	70	100	1 C
			GRAND TOTAL				**30**

IV SEMESTER

S.No	Course No.	Subject	L T P	Evaluation		Total	Credit Type
				Sess.	End		
TH-1	IT-211	Algorithms, Design and Analysis	3 1 0	30	70	100	4 C
TH-2	IT-212	Communication Engineering	3 1 0	30	70	100	4 C
TH-3	IT-213	Computer System Organization and Architecture	3 1 0	30	70	100	4 C
TH-4	IT-214	Software Engineering	3 1 0	30	70	100	4 C
TH-5	IT-215	Data Base Management Systems	3 1 0	30	70	100	4 C
TH-6	IT-216	Theory of Computation	3 0 0	30	70	100	3 C
PR-1	IT-217	Communication Engineering. lab	0 0 2	30	70	100	2 C
PR-2	IT-218	Software Engineering lab	0 0 2	30	70	100	2 C
PR-3	IT-219	Data Base Management Systems Lab	0 0 2	30	70	100	2 C
VS-2	IT-220	Self Study	0 0 1	30	70	100	1 C
			GRAND TOTAL				**30**

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V SEMESTER

S.No	Course No.	Subject	L T P	Evaluation		Total	Credit Type
				Sess.	End		
TH-1	IT-301	Telecommunication Networks	3 1 0	30	70	100	4 C
TH-2	IT-302	Computer Graphics and Multimedia	3 1 0	30	70	100	4 C
TH-3	IT-303	Microprocessor and its Applications	3 1 0	30	70	100	4 C
TH-4	IT-304	Computer Networks	3 1 0	30	70	100	4C
TH-5	IT-305	Information Theory and Coding	3 1 0	30	70	100	4C
PR-1	IT-306	Computer Graphics and Multimedia Lab	0 0 2	30	70	100	2 C
PR-2	IT-307	Microprocessor and its applications Lab	0 0 2	30	70	100	2 C
PR-3	IT-308	Networking Lab	0 0 2	30	70	100	2 C
PR-4	IT-309	Advanced Programming Lab	0 0 2	30	70	100	2 C
PR-5	IT-310	Minor Project	0 0 2	30	70	100	2 C
			GRAND TOTAL				**30**

VI SEMESTER

S.No	Course No.	Subject	L T P	Evaluation		Total	Credit Type
				Sess.	End		
TH-1	IT-311	Information Security	3 1 0	30	70	100	4 C
TH-2	IT-312	RF Engineering	3 1 0	30	70	100	4 C
TH-3	IT-313	Artificial Intelligence	3 1 0	30	70	100	4 C
TH-4	IT-314	Digital Signal Processing	3 1 0	30	70	100	4 C
TH-5	IT-315	Software Quality and Testing	3 1 0	30	70	100	4 C
PR-1	IT-316	Information security Lab	0 0 2	30	70	100	2 C
PR-2	IT-317	RF Engineering Lab	0 0 2	30	70	100	2 C
PR-3	IT-318	Digital Signal Processing lab	0 0 2	30	70	100	2 C
PR-4	IT-319	Minor Project II	0 0 2	30	70	100	2 C
PR-5	IT-320	Industrial Training	0 0 2	30	70	100	2 M
			GRAND TOTAL				**30**

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VII SEMESTER

S.No	Course No.	Subject	L T P	Evaluation		Total	Credit Type
				Sess.	End		
TH-1	IT-401	Internet and Web Engineering	3 1 0	30	70	100	4 C
TH-2	IT-402	Distributed Systems and Computing	3 1 0	30	70	100	4 C
TH-3	IT-403	Financial and Organizational Management	2 0 0	30	70	100	2 A
TH-4	IT-404	Elective I	3 1 0	30	70	100	4 C
TH-5	IT-405	Open Elective I	3 1 0	30	70	100	4 C
PR-1	IT-406	Internet and Web Engineering Lab	0 0 2	30	70	100	2 C
PR-2	IT-407	Distributed Systems and Computing Lab	0 0 2	30	70	100	2 C
PR-3	IT-408	Elective I Lab	0 0 2	30	70	100	2 C
PR-4	IT-409	Industrial Training	0 0 2	30	70	100	2 M
PR-5	IT-410	Project (Part-I)	0 0 2	30	70	100	4 M
			GRAND TOTAL				**30**

VIII SEMESTER

S.No	Course No.	Subject	L T P	Evaluation		Total	Credit Type
				Sess.	End		
TH-1	IT-411	Mobile Communication	3 1 0	30	70	100	4 C
TH-2	IT-412	Elective II	3 1 0	30	70	100	4 C/A/H
TH-3	IT-413	Open Elective II	3 1 0	30	70	100	4 C
PR-1	IT-414	Elective II Lab	0 0 2	30	70	100	2 C
PR-2	IT-415	Mobile Communication Lab	0 0 2	30	70	100	2 C
PR-3	IT-416	Seminar	0 0 2	100	-	100	2 C
PR-4	IT-417	Major Project (Part-II)	0 0 8	30	70	100	8 C
PR-5	IT-417	Industrial Training	0 0 4	30	70	100	4 C
			GRAND TOTAL				**30**

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IT-404 Elective - I (Any one from the following)

- IT in Marketing Management
- Optimization Techniques
- Numerical Algebra and scientific computing
- Control Engineering
- Simulation and Modeling
- Intellectual Property Rights

IT-412 Elective – II (Any one from the following)

- Advances in software engineering
- Fault Tolerant Systems
- Total Quality Management
- Pattern Recognition
- Optical Communication
- Robotics

IT 405 Elective – I (Open Elective) (Any one from the following)

- Advanced Microprocessor Architectures
- Advancement in Database Management System
- Digital Image Processing
- Bio-Informatics
- Intrusion Detection and Information Warfare
- Semantic Web
- FOR OTHER BRANCHES:
    - Computer Networks
    - Artificial Intelligence
    - Information Security
    - Operating System
    - Software Engineering

IT 413 Elective – II (Open Elective) (Any one from the following)

- Virtual Reality
- Advancement in Web Technology
- Embedded and real time Systems
- VLSI Technology
- Data Mining and Data Warehousing
- Soft Computing
- FOR OTHER BRANCHES:
    - Internet and Web Engineering
    - Database Management System
    - Computer graphics and Multimedia
    - Microprocessor and its Applications

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- Theory of Computation

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IT-106 FUNDAMENTALS TO INFORMATION TECHNOLOGY

L T P Credits **Total Hours: 30**
3 0 0 3

UNIT I:

Fundamental Concept of Information: Definition of information, Data Vs Information, Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Need, Value and Quality of information.

Compression: Definition, Compression ratio, Compression Techniques. [HOURS-3]

UNIT II:

Concepts in Computer: Definition of Electronic Computer, Generations, Classification, Characteristics and Applications.

Computer Software: System Software and Application Software.

Computer Hardware: CPU, Memory, different types of memories, Various I/O devices. Firmware and Humanware. [HOURS-4]

UNIT III:

Programming Language Classification & Methodology: Introduction to Computer Languages, Generation of Languages, Flow Charts, Dataflow Diagram, Introduction to 4GL and 5GL.

Translators: Assemblers, Interpreters, Compilers. [HOURS-4]

UNIT-IV:

Digital Fundamentals: Number System, Decimal, Binary, Octal, Hexa-Decimal and their conversion, Introduction to various codes, Fixed and Floating number representations, Boolean Algebra, K-maps, Basic and Universal gates.

Combinational Circuits: adder, subtractor, encoder, decoder, MUX and DeMUX.

Sequential circuits: Definition, Flip Flops –SR, JK, Master-slave JK, T and D. [HOURS-7]

UNIT V:

Communication & Computer Networks: Introduction to Information Transmission Systems, Modulation, Need for Modulation, Analog Modulation- AM-Equation Of AM, modulation index, power calculations, AM generation(block diagram) and demodulation, Introduction to FM and PM , Comparison of AM techniques , PCM, LAN, MAN and WAN, Network Topologies, Client-server Architecture. [HOURS-6]

UNIT VI:

Internet and Web Technologies: Internet, Intranet and Extranet, Hypertext Markup Language, Static, active and dynamic web pages, WWW, HTTP, HTTPs, Gopher, FTP, Telnet, Web Browsers, Search Engines, Email, Digital Signatures, Firewall, Elementary Concepts of E-Commerce, Electronic Payment Systems. [HOURS-6]

TEXT BOOKS:

1. Peter Norton, “Introduction to Computers”, Tata McGraw-Hill VI Edition.
2. Rajaraman, “Introduction to Computers “, PHI.
3. Morris Mano, “Digital Design”, PHI, 2nd Ed, 2002.
4. Floyd, “Digital Fundamentals, Pearson, 10th Edition.
5. Kennedy, “Communication Systems”, 4th Edition.

REFERENCE BOOKS:

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1. Nelson, “Data Compression”, BPB
2. CIS Tems, “Internet, An introduction” Tata McGraw Hill.
3. Curtin, “Information Technology: Breaking News”, TMH.
4. Leon & Leon “Fundamentals of Information Technology”, Vikas.

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IT-201 DATA STRUCTURES

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Fundamentals of Algorithm Analysis: Time and space complexity of algorithms, asymptotic notations, elementary data structures and their applications,
Arrays: Array Definition and Analysis, Representation of Linear Arrays, Traversing of Linear Arrays, Insertion and Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Linear Search, Binary Search, Multidimensional Arrays, Character String Operations, passing arrays as parameters. [HOURS-6]

UNIT II:
Stacks and Queues: Introduction to operations associated with Stacks, Array representation of stacks, Application of stacks - polish expression, conversion of infix expression to prefix and postfix expression, Evaluation of postfix expression, Tower of Hanoi problem, Representation of Queues, Operations associated with Queues, Concept of Heap and Priority Queues, Dequeues. [HOURS-6]

UNIT III:
Linked Lists: Singly linked lists- Representation of linked lists in memory, Traversing, Searching, Insertion, Deletion, Polynomial Addition, Header nodes, doubly linked list, generalized list, linked list implementation of stacks and queues. [HOURS-8]

UNIT IV:
Trees: General Trees and Basic Terminologies, Binary Trees and their representation, expression evaluation, Binary trees- Traversing, Searching, Insertion and Deletion, Complexity of searching algorithm, Binary Search Tree, AVL trees, Threaded binary trees, B trees. [HOURS-7]

UNIT V:
Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Weighted Graphs, Representation of graphs- Adjacency matrices and list, Traversal of graphs, Connected Component, Minimum Spanning trees and Shortest path algorithms. [HOURS-5]

UNIT VI:
Sorting: Bubble, Selection, Insertion, Quick, two-way Merge, Heap, Radix, comparison of algorithms.
File Structure: Physical storage media, File Organization, Organization records into blocks, Sequential blocks, Indexing & Hashing, Primary Indices, Secondary Indices, B tree Index files, B+ tree index files. [HOURS-8]

TEXT BOOKS:

1. E. Horowitz and S. Sahani, “Fundamentals of Data Structures”, Galgotia Booksource Pvt. Ltd, 1999.
2. Schaum’s outline series, “Data Structure”, TMH, 2002.
3. Yashwant Kanetkar, “Data Structure through C”, BPB, 2005.

REFERENCE BOOKS:

1. Y. Langsam et. al., “Data Structures using C and C++”, PHI, 1999.

www.semesterhub.com

2. R. L. Kruse, B. P. Leung, C. L. Tondo, “Data Structures and program design in C”, PHI, 2000.

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IT-202 DIGITAL ELECTRONICS

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Introduction: Revision of basic concepts of digital Electronics and Logic Gates, Tristate Logic, Error detection and correction codes: Hamming code.

Logic Families: DTL, RTL, TTL, ECL, CMOS and I^2 L Logic. Logic parameters, Bistable, Monostable, Astable and Schmitt trigger circuit using gates. [HOURS-4]

UNIT II:

Combinational and Sequential Circuits: Revision, Designing of combinational circuits using MSI devices, Conversion of Flip-flops, Designing of sequential circuits- Counters, Shift Registers, Design of synchronous & asynchronous sequential circuit [HOURS-10]

UNIT III:

Analysis and Synthesis of Sequential Circuits: Basic model, Equivalence and minimization, concept of state assignments, Hazards, ASM charts. [HOURS-6]

UNIT IV:

Semiconductor Memories: Memory parameters, Types of memory devices: ROM, PROM, EPROM, EEPROM, STATIC & DYNAMIC RAM, programmable logic devices – PLA, PAL. [HOURS – 6]

UNIT V:

Convertors: Concept of digital to Analog Conversion, Types of DAC- Ladder and R- 2R Networks, performance criteria, Concept of Analog to digital conversion: Dual Slope method, V-F conversion, stair case Ramp-method/counter method successive approximation type of A/D converters etc. [HOURS-8]

UNIT VI:

HDL: Introduction to HDL, Need for HDLs, Design flow, overview of VHDL, data types, Logic Operators, Data flow Modeling, Structural Modeling, Behavioral Modeling, Mixed Modeling, Modeling of combinational and sequential circuits. [HOURS-6]

TEXT BOOKS:

1. Morris Mano, "Digital Design", PHI, 2nd Ed, 2002.
2. Samuel C. Lee, "Digital Circuits and Logic Design", PHI,
3. R.P. Jain, "Modern Digital Electronics", TMH, 3rd Ed, 2004

REFERENCE BOOKS:

1. R. J. Tocci, "Digital Systems", PHI, 2000
2. Malvino and Leach, "Digital principles and applications", TMH, 2000.
3. I. J. Nagrath, "Electronics, Analog & Digital", PHI, 1999.
4. J. M. Yarbrough, "Digital Logic-Application and Design", PWS Publishing, 1999.
5. B. S. Nai, " Digital Electronics and Logic Design", PHI, 2000.
6. Balabanian and Carlson, "Digital Logic Design Principles", Wiley Pub., 2000.

www.semesterhub.com

IT-203 ANALOG ELECTRONICS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Semiconductors Diodes and Rectifiers: Review of diodes**,** transition & diffusion capacitance, different types of diodes (zener, varator, schottky, power tunnel, photodiode & LED), Application of diodes. [HOURS-3]

UNIT II:

Bipolar junction transistor: Introduction, Transistor, Construction, transistor operations, BJT characteristics, load line, operation point, leakage currents, saturation and cut off mode of operations, Bipolar Junction Transistor configurations - CB, CC, CE.

Field Effect Transistor: Introduction, construction, operation and characteristics of FET and MOSFET**.**

DC analysis of Transistor: Bias stabilization- Need for stabilization, Different types of biasing circuits using Bipolar Junction Transistor and FET, stabilization factors, thermal stability.

[HOURS-8]

UNIT III

AC analysis of transistors: Different parameters of BJT: H- parameters, π-parameters, T-parameters, analysis of different configurations of BJT amplifiers, FET and MOSFET amplifiers, Frequency response. [HOURS -8]

UNIT IV:

Feedback: Classification and Representation of Amplifiers, Concept of feedback, Types of feedback, Properties of feedback, Analysis of feedback amplifiers & stability and response of feed back amplifiers, Concept of oscillators, Types of oscillators. [HOURS-4]

UNIT V:

Large Signal Amplifiers: Harmonic distortion, Power Amplifiers: classification, operation and frequency response. [HOURS-3]

UNIT VI:

Ideal op-amp and its applications: Differential Amplifiers, Analysis of Differential Amplifiers, Basic binding blocks of analog ICs, Linear and non-linear application of Op -Amps, Active filters and oscillators, Astable multivibrator, monostable multivibrator, square & triangular wave generators.

Applications of other analog ICs: timer 555, voltage regulators, PLL and function generators.

[HOURS-14]

TEXT BOOKS:

1. Millman & Halkias "Electronic Devices & Circuits", TMH(ISE), 1998.
2. Jacob Millman and Arvin Grabel "Microelectronics", TMH
3. Sedra and Smith "Microelectronics", Oxford
4. Shail.B.Jain and Roy Choudhary, "Linear Integrated Circuits" New Age

REFERENCE BOOKS:

1. S.G. Burns, P.R. Bond, "Principles of Electronic Circuits, 2nd Ed., Galgotia, 1999.
2. M.S. Roden, G.L. Carpenter & W.R.Wieseraman, "Electronic Design", Shroff Publisher & Distributors, 2003
3. Malvino, Electronic Principles, TMH, 1998.

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IT-204 DISCRETE MATHEMATICS

L T P Credits **Total Hours: 30**
3 0 0 3

UNIT I:

Introduction and Preliminaries: Mathematical Logic, Propositions, Truth Tables, and Logical inferences, Predicates and quantifiers, Methods of Proof.

Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness. [HOURS-7]

UNIT II:

Elements of Set Theory, Primitives of set theory, Introduction to infinity and Natural numbers Mathematical induction and proof by induction, Groups & rings. a set, set operations/set identities, fundamental country principles, principle of inclusion, exclusion, pascal's triangles, binominal theorem, representation of discrete structures. [HOURS-7]

UNIT III:

Binary Relations, binary Relation and its Representation, type of Binary Relations Equivalence relations and partitions. Functions, types of functions, Pigeon hole principle, Counting and analysis of algorithms, Permutations, Combinations, Asymptotic behavior of algorithms, Recurrence relation. [HOURS-7]

UNIT IV:

Lattices & Boolean Algebra: Lattices: definition, sublattices, direct product, homomorphism Boolean algebra: definition, properties, isomorphic structures (in particulars, structures with binary operations) subalgebra, direct product and homomorphism, Boolean function, Boolean expression, representation & minimization of Boolean function. Graph theory, elementary Graph Theory, Eulcian paths and circuits, Hamilton paths and circuits, shortest paths, Spanning trees. Introduction to finite state Machines, Formal grammars, Non deterministic machines.

[HOURS-9]

TEXT BOOKS:

1. Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH, 1999.
2. C.L. Liu, "Elements of Discrete Mathematics", TMH, 2000.

REFERENCE BOOKS:

1. Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 1996.
2. Narsingh Deo, "Graph Theory With Application to Engineering and Computer Science", PHI, 2004.
3. J. P. Trembly & P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1997.
4. Vinay Kumar, "Discrete Mathematics", BPB Publications, 1998.

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IT-205 OPERATING SYSTEMS

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Introduction: Operating system services, multiprogramming, time-sharing system, storage structures, system calls, and multiprocessor system.

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Concepts of Real-Time Scheduling, Algorithm Evaluation. [HOURS-6]

UNIT II:

Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation, Segmentation with Paging.

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations, Demand Segmentation. [HOURS-10]

UNIT III:

Processes: Process Concept, Process Scheduling, Operation on Processes, Cooperating Processes, Inter-process Communication.

Process Synchronization: Background, the Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Atomic Transactions. [HOURS-8]

UNIT IV:

Deadlock: Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability, Stable-Storage Implementation.

[HOURS-8]

UNIT V:

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights.

[HOURS-4]

UNIT VI:

File System implementation: File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance.

Introduction to Distributed Systems and Parallel Processing. [HOURS-4]

TEXT BOOKS:

1. Silbersachatz and Galvin, "Operating System Concepts", Pearson, 5th Ed., 2001
2. Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000

REFERENCE BOOKS:

1. E. Madnick, J. Donovan, "Operating Systems", Tata McGraw Hill, 2001
2. Milenekovic, "Operating System Concepts", McGraw Hill.

www.semesterhub.com

3. Dietel, “An introduction to operating system”, Addision Wesley.

www.semesterhub.com

IT-206 OBJECT ORIENTED TECHNOLOGY

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Introduction: Approach related to functional and data decomposition paradigms, Characteristics of Object-Oriented Languages. Encapsulation, information hiding, objects identify, messages, classes, inheritance, polymorphism. [HOURS-6]

UNIT II:

Object Model: Evolution and Elements of an object model, Classes & Objects – Nature of an object, relationships among objects, Nature of a class relationship among classes, Classification, Key Abstractions and mechanisms, Notation-Class diagrams. State Transition diagrams, Object diagrams, Interaction diagrams, module diagrams, Process diagrams. [HOURS-10]

UNIT III:

Object Oriented Design: Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams, Case Studies. [HOURS-6]

UNIT IV:

Object Oriented analysis and Modeling: Introduction, Class modeling, Functional modeling, Dynamic modeling. [HOURS-8]

UNIT V:

Object Oriented Construction: OO Language Object–Orientation programming, OO databases management systems, Components and their management. [HOURS-4]

UNIT VI:

Object oriented Testing: Unit, Integration and System testing, the testing process, Object oriented software metrics, Design issues. [HOURS-6]

TEXT BOOKS:

1. Ivar Jacobson, "Object Oriented Software Engineering", Pearson, 2004.
2. Grady Booch, James Rambaugh, Ivar Jacobson, "Object oriented analysis and design", Pearson, 2004.
3. Wendy Boggs, Michael Boggs "Mastering UML with Rational Rose", BPB Publication, 2003.

REFERENCES BOOKS:

1. Stephen R. Scach, "Classical & Object Oriented Software Engineering with UML and Java: McGraw Hill, 1999.
2. Richard C. Lee, William M. Tepfenhard, "UML and C++, A Practical guide to object-oriented Development", Pearson Education, 2002.

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Practical Paper I

IT-207 Data Structure Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-201

Practical Paper II

IT-208 Digital Electronics Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-202

Practical Paper III

IT-209 Analog Electronics Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-203

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IT-211 ALGORITHMS DESIGN AND ANALYSIS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Introduction: Review of Algorithm Complexity and Order Notations. Recurrences: The substitution method, iteration method, master method, Data Structures for Disjoint Sets. [HOURS-4]

UNIT II:
Divide and Conquer Method: Binary Search, Merge Sort, Quick sort and Strassen's matrix multiplication algorithm.
Greedy Method: fractional Knapsack Problem, Huffman codes, an activity selection problem.
Dynamic Programming: Matrix Chain Multiplication. Longest Common Subsequence, 0/1 Knapsack Problem and Memoization. [HOURS-12]

UNIT III:
Graph Algorithm: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Kruskal's and Prim's algorithm Minimum Cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. [HOURS-10]

UNIT IV:
Number Theory and Cryptography: Euclid's GCD algorithm, modular arithmetic including exponentiation and multiplicative inverses, primality testing, Cryptographic computations. [HOURS-5]

UNIT V:
String Matching: Naïve and Rabin Karp string matching algorithms, Finite automata, KMP Matcher and Boyer Moore Algorithms. [HOURS-4]

UNIT VI
Problem Classes-NP, NP-hard and NP-complete: Definitions of P, NP-Hard and NP-Complete Problems. Proving NP-Complete and Reductions Problems: Satisfiability problem, formula Satisfiability, 3-CNF, clique and vertex cover problems. [HOURS-5]

TEXT BOOKS:

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Ed., PHI, 2004.
2. Ellis Horowitz and Sartaz Sahani, "Computer Algorithms", Galgotia Publications, 1999.

REFERENCES BOOKS:

1. A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addition Wesley, 1998.
2. D. E. Knuth, "The Art of Computer Programming", 2nd Ed., Addison Wesley, 1998

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IT-212 COMMUNICATION ENGINEERING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Amplitude Modulation, Generation & Demodulation of AM DSBSC waves, Coherent Detection of DSBSC Signal, Quadrature-Carrier Multiplexing, Generation of SSB waves, Demodulation of SSB waves, VSB modulation and demodulation. [HOURS-8]

UNIT II:

Angle Modulation: Frequency & phase Modulation, narrow & wide-band, FM, BW of FM waves, Generation & demodulation of FM waves, S/N ratio, Comparison of AM, FM & PM. [HOURS-4]

UNIT III:

Transmitter and Receivers: Classification of radio transmitters, Block diagram of AM transmitter, Frequency Scintillation, Frequency Drifts, Radio broadcast transmitter. Armstrong FM transmitter, Simple FM transmitter- using reactance modulator, classification of radio receivers, TRF receivers, super heterodyne receivers, image signal rejection, frequency mixers, tracking and alignment of receivers, intermediate frequency, AGC, AFC, SSB receivers. [HOURS-10]

UNIT IV:

Pulse Analog Modulation: Sampling theorem, Sampling of Low Pass and band pass signals, Aliasing, Aperture effect, PAM, PWM and PPM generation and modulation, TDM, Cross talk, Spectral analysis of PAM, PWM and PPM Waves, S/N ratio for different pulse modulation. [HOURS-6]

UNIT V:

Pulse Digital Modulation: Pulse Code Modulation signal to quantization noise ratio, Companding, Probability of error for PCM in AWGN Channel, DPCM, DM and ADM modulators and demodulators, Prediction Filter, line coding, Inter symbol Interference. [HOURS-6]

UNIT VI:

Digital transmission through career modulation: Amplitude, Frequency and phase shift keying, differential phase shift keying, CPFSK, MSK OPSK and QAM modulation & detection, probability of error calculation, Matched Filter. [HOURS-6]

TEXT BOOKS:

1. Taub & Schilling, "Principles of Communication Systems", TMH, 1998.
2. Simon Haykins, "Communication Systems", John Wiley, 2nd Edition, 1998.

REFERENCE BOOKS:

1. Kennedy, "Communication Systems", 4th edition.
2. Wayne Tomasi, "Electronic Communication Systems", 4th Edition, Pearson Education, 2002.
3. Gary Miller, "Modern Electronic Communication", 7th Edition.

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IT- 213 COMPUTER SYSTEM ORGANIZATION AND ARCHITECTURE

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Register Transfer and Micro-operations: Register Transfer Language, Data movement around registers, to/from memory. Arithmetic, logic and shift micro operations. Concept of bus and timing in register transfer, ALU design. [HOURS-5]

UNIT II:
Hardwired Control Unit: Common Bus system, Instruction cycle, types of instruction, I/O and interrupts, Design of basic computer.
Microprogrammed Control Unit: Basic organization of micro programmed controller, Address sequencer, Design of Control Unit. [HOURS-10]

UNIT III:
CPU Organization: General Register Organization, Addressing Modes, Instruction Format. Introduction to CISC and RISC Architectures. [HOURS-5]

UNIT IV:
Pipeline Processing: Arithmetic and Instruction pipeline, RISC pipeline.
Arithmetic Algorithms: Addition, subtraction for signed, unsigned numbers and 2's complement numbers. Array multiplier, Booth's algorithm, Division algorithms. [HOURS-10]

UNIT V:
Memory Organization: Concept of RAM/ROM, basic cell of RAM, Associative memory, Cache memory organization, Virtual memory organization. [HOURS-5]

UNIT VI:
I/O Organization: Introduction to Peripherals & their interfacing. Strobe based and handshake-based communication, DMA based data transfer, I/O processor, serial communication.
[HOURS-5]

TEXT BOOKS:

1. Mano, Morris "Computer System and Architecture", PHI.
2. John D. Carpinelli, "Computer System Organization and Architecture", Pearson Education.

REFERENCES BOOKS:

1. Pal Chaudhuri, P. "Computer Organization & Design", PHI.
2. Hayes. J.P., "Computer Architecture and Organization", McGraw Hill
3. Stallings, W "Computer Organization & Architecture", PHI.

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IT-214 SOFTWARE ENGINEERING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Introduction: Software Crisis Software processes & Characteristics, Software Development Life Cycle (SDLC) models, Overview of Quality. [HOURS-5]

UNIT II:
Software Requirement Analysis and Specifications: Requirement engineering & Specification, Behavioral and non-behavioral requirements, Software Prototyping, requirement elicitation techniques like FAST, QFD & Use case approach, Problem analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS. [HOURS-5]

UNIT III:
Software Project Planning: Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, Single and multivariate models, COCOMO, COCOMO-II, Putnam resource allocation model, project scheduling, staffing, project monitoring, Risk Management.
Software Metrics: Software measurement : What & Why , LOC, Token Count, Function Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics. [HOURS-10]

UNIT IV
Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design, SDD. [HOURS-5]

UNIT V
Software Testing: Software Testing process, Design of test cases, Black Box Testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, White Box Testing: Path Testing, Data flow and Mutation Testing; Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing, Testing Tools & Standards.
Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models, Basic Model, Logarithmic Poisson Model, Calendar time Component Software Quality Models, CMM & ISO 9001. [HOURS-10]

UNIT-VI
Software Maintenance: Management of Maintenance, Maintenance Process, structured vs. unstructured maintenance, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering.
CASE: Introduction and classification of CASE tools. [HOURS-5]

TEXT BOOKS:
1. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.

REFERENCE BOOKS:
1. Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, TMH, 1996.
2. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons, 2004.
3. I.Sommerville, "Software Engineering", Addison Wesley, 2004.
4. K. Chandrasehakhar, "Software Engineering & Quality Assurance", BPB, 2005.

www.semesterhub.com

5. K. K. Aggarwal & Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International, 2005.

www.semesterhub.com

IT-215 DATABASE MANAGEMENT SYSTEMS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Introduction: Database systems, advantages of DBMS, ANSI/SPARC architecture, Data Independence, Data Models and their comparison (Hierarchical, Network, Relational Model), Schemes and Instances, Components of DBMS. [HOURS-6]

UNIT II:
Data Modeling Using the Entity-Relationship Model: Entities, Attributes and Relationships, Cardinality of Relationships, Strong and Weak Entity Sets, Generalization, Specialization, and Aggregation, Translating your ER Model into Relational Model. [HOURS-6]

UNIT III:
Relational Data Model: Structure of relational database, integrity constraints over relations, enforcing integrity constraints, Relational algebra and calculus. [HOURS-5]

UNIT IV:
Relational Data Base Design: Introduction to SQL, database Design, Transformation of ER Schema to relational tables.
Normalization: Functional Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal Forms Based on Primary Keys, (1NF, 2NF, 3NF & BCNF), Lossless Join and Dependency Preserving Decomposition. [HOURS-10]

UNIT V:
Transaction Management: Transaction Concept and State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Concurrency Control Techniques, Lock-Based Protocols, Timestamp-based Protocols, Deadlock Handling, Recovery System, Failure Classification, Storage Structure, Recovery and Atomicity, Log-based Recovery, Shadow Paging, Recovery with Concurrent Transactions. [HOURS-7]

UNIT VI:
Query Processing and Optimization: Indexing and Hashing, Ordered Indices, B tree Index Files, B+ tree Index Files, Static Hashing, Dynamic Hashing, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Database Tuning. [HOURS-6]

TEXT BOOKS

1. Korth, Silberschatz, "Database System Concepts", 4th Ed., TMH, 2003.
2. Elmsari and Navathe, "Fundamentals of Database Systmes", 4th Ed., A. Wesley, 2004.

REFERENCE BOOKS:

1. C. J. Date, "An Introduction to Database Systems", 7th Ed., Narosa Publishing, 2004.
2. Steve Bobrowski, "Oracle 8 Architecture", TMH, 2000.
3. J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

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IT-216 THEORY OF COMPUTATION

L	T	P	Credits	Total Hours: 30
3	0	0	3	

UNIT I:

Introduction: Strings, Alphabet, Language, Operations, Finite state machine, finite automaton model, non deterministic finite automaton, deterministic finite automaton, equivalence between NFA and DFA, Conversion of NFA into DFA, minimization of FSM, equivalence between two FSM's. [HOURS-5]

UNIT II:

Regular expression: Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden's Theorem, Non Regular Languages, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output-Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA. [HOURS-6]

UNIT III:

Context free grammar (CFG) and Context Free Languages (CFL): Derivation trees, Ambiguity in Grammer, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs- CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs-Emptiness, Finiteness and Membership.

Pumping Lemma: Introduction, Applications, Pumping Lemma for regular languages and CFLs. [HOURS-7]

UNIT IV:

Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA. [HOURS-4]

UNIT V:

Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Theorem, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs, Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory. [HOURS-6]

UNIT VI:

Chomsky hierarchy of languages, linear bounded automata and context sensitive language, Introduction to DCFL and DPDA, LR(O) grammar. [HOURS-2]

TEXT BOOKS:

1. John Martin, "Introduction to Languages and theory of Computation", TMH.
2. Michael Sipser, "Introduction to the Theory of Computation", International Thomson.
3. P K Srimani, S F B Nasir, "Automata Theory", Cambridge University Press.

REFERENCES BOOKS:

1. Hopcroft and Ullman, "Introduction to Automata Theory, languages and computation",

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Addision Wesley.
2. Mishra & Chandrashekharan, “Theory of Computer Sciences”, PHI.

www.semesterhub.com

Practical Paper I

IT-217 Communication Engineering Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-212

Practical Paper II

IT-218 Software Engineering Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-214

Practical Paper III

IT-219 Database Management System Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-215

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IT-301 TELECOMMUNICATION NETWORKS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Introduction: Basic Switching Systems, Simple Tele-phone Communication, Brief Introduction to Electromagnetic Exchanges, Strowger switching systems, Cross bar switching. [HOURS-6]

UNIT II:
Electronic Switching Space Division: Stored Programme Control – Centralized SPC, Distributed SPC, Software Architecture, Application Software – Enhanced Services, Multi Stage Switching Networks. [HOURS-5]

UNIT III:
Speech Digitization and Transmission: Quantization Noise, Companding, Differential Coding, Delta Modulation, Vocoders, Pulse Transmission on Transmission line concepts, Line Coding, NRZ and RZ Codes, Manchester Coding, AMI Coding, Walsh Codes, TDM.
[HOURS-7]

UNIT IV:
Time Division Switching: Time Division space switching, Time Division time Switching, Time multiplexed space switching, Time multiplexed Time Switching, Combination Switching.
Traffic Engineering: Grade of Service and Blocking Probability. [HOURS-6]

UNIT V:
Telephone Networks: Subscriber Loops, Switching Hierarchy and Routing, Transmission Plans and Systems, Signaling Techniques, Inchannel, Common Channel signalling. [HOURS-6]

UNIT VI:
Integrated Services Digital Network: Motivation for ISDN, new services, network and protocol architecture, Transmission channels, user network interfaces, signalling, numbering and addressing, service characterization, interworking, ISDN standards, Expert systems in ISDN, Broadband ISDN, Voice data integration. [HOURS-10]

TEXT BOOKS:
1. Viswanathan T., *Telecommunication Switching Systems and Networks*, Prentice Hall of India Pvt. Ltd.
2. Schwartz M., *Telecommunication Networks - Protocols, Modeling and Analysis*, Addison Wesley Publishing Company.

REFERENCE BOOKS:
1. Flood J.E., *Telecommunications Switching Traffic and Networks*, Pearson Education Pvt. Ltd.
2. Freeman R.L., *Telecommunication System Engineering*, Wiley Inter Science Publications
3. Das J., *Review of Digital Communication*, New Age Internal (P) Ltd., Publishers.

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IT-302 COMPUTER GRAPHICS AND MULTIMEDIA

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Mechanism and working principle of raster scan and random scan, refreshing, flickering, interlacing, Scan Conversion, View port, Aspect ratio, Applications. [HOURS-4]

UNIT II:

Scan Conversion Algorithms: Line, Circle and Ellipse.
Filled Area Primitives: Scan line polygon fill algorithm, Boundary-fill and Flood-fill algorithms.
2-D Transformations and Viewing: Geometric, Coordinate System and Composite Transformations, Homogeneous coordinates. Window to View-port Coordinate Transformation.
Clipping: Point, Line and Polygon Clipping Algorithms. [HOURS-10]

UNIT III:

3-D Transformations: Geometric, coordinate system and composite transformations
Representation of 3-D object on 2-D screen: Parallel and Perspective Projection. [HOURS-5]

UNIT IV:

Curves: Parametric curves, Beizer & B-Spline curves.
Hidden surfaces: Z-buffer algorithm, Painter's algorithm, Scan-line algorithm, Sub-division algorithm.
Color and Shading models: Color models, Phong model, Interpolative shading methods.
Introduction to Animation: Principles, Keyframe animation, Articulated figures, Kinematics, dynamics. [HOURS-8]

UNIT V:

Introduction to Multimedia: Definition, Uses of Multimedia, Multimedia applications, Multimedia System Architecture, Multimedia Information representation of Text, Images, Audio and Video, Authoring Tools. [HOURS-5]

UNIT VI:

Multimedia File Handling: Compression principles, Compression & Decompression Techniques for text, image, audio and video, Data & File Format standards, Multimedia I/O technologies, Storage and retrieval Technologies, quality of services, Multimedia Databases. [HOURS-8]

TEXT BOOKS:

1. Donald Hearn and M. Pauline Baker, "Computer Graphics", Pearson Education
2. Foley, Vandam, Feiner and Hughes, "Computer Graphics, Principles and Practice", Pearson Education.
3. Fred Halsall, "Multimedia Communications: Applications, Networks, protocol and Standards", Pearson Education.

REFERENCE BOOKS:

1. Tay Vaughan, "Multimedia: Making it work", TMH, 1999.
2. Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw hill edition.
3. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications & Applications", Pearson, 2001.
4. David F. Rogers, " Computer Graphics Techniques: Theory And Practice", Springer,

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2001.
5. Ranjan Parekh, “Principle of Multimedia”, TMH.

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IT-303 MICROPROCESSOR AND ITS APPLICATIONS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction to 8085: Microprocessor Evolution and Types, 8085 internal architecture, PIN diagram introduction to programming the 8085, addressing modes of 8085, Timing Diagrams. [HOURS-8]

UNIT II:

8086 Family Assembly Language Programming: 8086 internal architecture, programming concepts of 8086, addressing modes, Program Development Steps, Constructing the machine codes for 8086 instructions, writing programs for use with an assembler, assembly language program development tools. [HOURS-6]

UNIT III:

Standard Program Structures: Simple Sequence Programs, Jumps, Flags, and Conditional Jumps, If- Then, if-then-else, and multiple if-then-else programs, while-do programs, while-do programs, repeat- until programs, instruction timing and delay loops. Strings, Procedures, and macros: the 8086 string instructions, writing and using procedures, writing and using assembler macros.8086 Instruction Descriptions and Assembler Directives. [HOURS-4]

UNIT IV:

Troubleshooting and Interrupts: Minimum-mode System, SDK-86, Troubleshooting 8086-based microcomputer, Timing Diagrams, 8086 Interrupts, Interrupt Responses, Hardware Interrupt Applications. [HOURS-10]

UNIT V:

Interfacing chips: PIN diagrams of 8255, 8253, 8251, 8257, 8279, 8259 and interfacing with processor. Interfacing of Microprocessors with Pushbutton, Keyboards, LEDs, Seven Segments and Printers. [HOURS- 5]

UNIT VI:

Convertors: A/D Converters, D/A Converters and stepper motors. Memory Interfacing.
Brief Introduction to Architecture of 80186, 80286, 80386, 80486, 8087 and Pentium architecture.
Microcontroller: Architecture of 8051, Signals, Operational features, Memory and I/O addressing, Interrupts, Instruction set, Application. [HOURS-7]

TEXT BOOKS:

1. D. V. Hall, "Microprocessors and Interfacing", TMH, 2nd Edition, 1999
2. Ramesh Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085", 3rd Edition.

REFERENCES BOOKS:

1. Peter Able, "IBM PC Assembly language programming", PHI, 1994.
2. James. L. Antonaks, "An Introduction to the Intel Family of Microprocessors", Addison Wesley, 1999.
3. Liu Gibson, "Microprocessor Systems: The 8086/8088 family Architecture,

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Programming & Design", PHI, 1999.

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IT-305 COMPUTER NETWORKS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Network Architecture, applications of Computer Networks, Layered tasks, Addressing.

Reference Models: OSI model, TCP/IP Protocol Suite. [HOURS-4]

UNIT II:

Physical Layer: Multiplexing- FDM, TDM, Switching- circuit, packet, virtual circuit, datagram, message, Media- guided media, unguided media. [HOURS-6]

UNIT III:

Data Link Layer: Design issues, Error Detection and Correction Codes, Framing, Protocols for noisy channels, Protocols for noiseless channels, HDLC. [HOURS-6]

UNIT IV:

Medium Access Sublayer: The channel allocation problem, multiple access protocols, IEEE standard 802 for LANs, Connecting devices-repeaters, hubs, switches, bridges, routers, gateways, Frame Relay, X.25, ATM- architecture and types of AAL. [HOURS-8]

UNIT V:

Network Layer and Routing: Logical Addressing, Internet protocol (IPv4 and IPv6), address mapping, ICMP, IGMP, Routing algorithm- optimality principle, distance vector routing, link state routing, multicast routing, broadcast routing, hierarchical routing; Congestion control algorithm- Congestion control in virtual circuit subnets, Congestion control in datagram subnets, load shedding, jitter control, Point to Point Protocol. [HOURS-8]

UNIT VI:

Transport Layer: Multiplexing and De-multiplexing applications, connectionless and connection oriented services, UDP Segment structure, use of UDP and UDP Checksum. TCP- features, services, segment, flow control, congestion control, error control, TCP connection. SCTP- services, features, format.

Overview of Application Layer: HTTP, SMTP, MIME, DNS. [HOURS-8]

TEXT BOOKS

1. A. S. Tennanbaum, "Computer Network," 2nd Edition, PHI
2. B. A. Forouzan, "Data Communications and Networking (3rd Ed.) " – TMH

REFERENCE BOOKS

1. D. E Comer and D. L. Stevens, "Internetworking with TCP/IP: Design, Implementation and Internals," Vol. II PHI
2. L. L. Peterson and B. S. Davie, "Computer Network a System approach," 2nd Edition Morgan Kaufmann, 2002.

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IT-306 INFORMATION THEORY & CODING TECHNIQUE

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Probability: Basic terms and concept, Random variables, Probability density and distribution function, Marginal and conditional distributions. Expectation. Markov's inequality, Chebyshev inequality, Binomial, Poisson and Gaussian distributions, Introduction to Merkov process.

[HOURS-6]

UNIT II:

Uncertainty and Information, Shannon Entropy, Joint and conditional Entropies. Mutual Information, Uniquely decipherable and Instantaneous codes, Noiseless coding problem. Source coding Theorem, Block coding, construction of Optimal codes, Huffman's & Shannon – Fano methods. [HOURS-10]

UNIT III:

Discrete memory less channel, channel capacity. BSC and other channels. Information measure for continuous ensembles capacity of AWGN channel. [HOURS-6]

UNIT IV:

Error control coding: The channel coding Theorem, Application to BSC , Source Coding with fidelity criteria. Types of codes, error and error control strategies, Linear block codes, syndrome and error detection, Minimum distance, Error detecting and correcting capabilities of a block code, Syndrome decoding , Hamming codes. [HOURS-8]

UNIT V:

Cyclic codes, Generator and parity: check matrices, encoding, syndrome computation and error detection and decoding. BCH codes, decoding of the BCH codes. Introduction to RS codes. Convolution codes, Maximum likelihood decoding, viterbi algorithm, Turbo codes.

[HOURS-10]

TEXT BOOKS

1. "Information Theory", R Ash, Dover Science Publications.
2. "Element of Information Theory", Cover and Thomas, John Wiley & Sons.
3. "Statistical methods for Engineering and Sciences", H.C.Taneja, I.K. International.

REFERENCE BOOKS

1. Shulin and Daniel J. Costello Jr, "Error Control coding: Fundamental & Application", Prentice Hall, Inc.
2. Simon Haykin, "Communication Systems", Wiley Student Edition.

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Practical Paper I

IT-306 Computer Graphics and Multimedia Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-302

Practical Paper II

IT-307 Microprocessor and its applications Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-303

Practical Paper III

IT-308 Networking Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-304

Practical Paper IV

IT-309 Programming Lab

L	T	P	Credits
0	0	2	2

Based on course work on JAVA language

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IT-311 INFORMATION SECURITY

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Security attacks, Services and mechanism, Need for Security, Principles of Security, OSI security Architecture, Network Security Model. Introduction to Cryptography, Plain Text and Cipher text, Concept of key.

Cryptographic Protocols: Basic Protocols, Intermediate Protocols, Advanced Protocols, Esoteric Protocols. [HOURS-6]

UNIT II:

Cryptographic Techniques: Conventional Encryption Model, Classical Encryption techniques-Substitution ciphers and Transposition ciphers, Stream and Block ciphers, Rotor Machines, Steganography, Cryptanalysis. [HOURS-6]

UNIT III:

Modern Block Ciphers: Block Ciphers Principles, Shannon's theory of confusion and diffusion, feistel structure, Data Encryption Standard(DES),strength of DES, differential and linear cryptanalysis of DES, Block Cipher Modes of Operations, Triple DES, S-AES, IDEA encryption and decryption, Strength of IDEA, Pseudo-Random Sequence Generators. [HOURS-8]

UNIT IV:

Public Key Cryptosystem: Principals of public key cryptosystems, RSA algorithm, security of RSA, Key Management, Diffie-Hellman key exchange algorithm, Knapsack Algorithm, Rabin cryptosystem, Elgamal encryption, Introductory idea of Elliptic curve cryptography.

[HOURS-7]

UNIT V:

Message Authentication and Hash Function: Authentication requirements, authentication functions, Message Authentication Code, Hash functions, Birthday Attacks, Security of Hash Functions and MACs, MD5, Secure Hash Algorithm (SHA), HMAC,CMAC.

Digital Signatures: Digital Signatures, Authentication Protocols, Digital Signature Standards (DSS), Elgamal signatures, RSA signatures. [HOURS-8]

UNIT VI:

Authentication Applications: Kerberos and X.509 Authentication Services, Electronic- Mail security-pretty good privacy (PGP), S/MIME, CA. [HOURS-5]

TEXT BOOKS

1. Bruce Schneier, "Applied Cryptography: Protocols, algorithms and source code in C", John Wiley & Sons Inc.
2. William Stallings, "Cryptography and Network Security", Prentice Hall
3. Behrouz A. Forouzan , "Cryptography & Network Security", McGraw-Hill

REFERENCE BOOKS

1. Pieprzyk,Hardjono,Seberry, "Fundamentals of Computer Security", Springer International Edition.
2. Atul Kahate, "Cryptography & Network Security", McGraw-Hill

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IT-312: RF ENGINEERING

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I

Fundamentals of Electromagnetic Fields [HOURS-2]

UNIT II

Electromagnetic waves: Introduction, Maxwell's equation, solution of Maxwell's equations, Applications of Maxwell's equation to various fields, Poynting Theorem, Poynting Vector, Applications of Poynting theorem, Uniform plane wave and wave propagation, reflection and refraction of plane magnetic waves. [HOURS-10]

UNIT III

Transmission Lines and Matching Networks: Basic Principles of Transmission Lines, Transmission lines equations, characteristic impedance, attenuation and propagation constants, open and short circuited lines concept, reflection coefficient, Standing wave ratio, principles of matching networks, Quarter wave transformer, introduction to Microstrip Lines.

[HOURS-6]

UNIT IV

Microwave: Introduction, Microwave Spectrum and Bands.

Rectangular Waveguides: TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Dominant and Degenerate Modes, Sketches of TE and TM mode fields in the cross-section, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations; Power Transmission and Power Losses in Rectangular Guide. [HOURS-8]

UNIT V

Microwave Components: Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Directional Couplers, S matrix, two cavity Klystrons, reflex klystron, Gun Diode, PIN Diode, magnetrons. [HOURS-8]

UNIT VI

Antennas: Introduction, Basic definitions and parameters of antenna, Types of antennas–Dipole antenna, Yagi-Uda antenna, Horn antenna, Log periodic, Parabolic Reflector, introduction to microstrip antennas. [HOURS-6]

TEXT BOOKS:

1. Electromagnetic Waves and Radiating Systems - E.C. Jordan K.G. Balmain, PHI.
2. Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
3. Microwave and Radar Engineering – M. Kulkarni, Umesh Publications, 1998.
4. Antenna Theory Analysis and Design -Constantine A. Balanis, Wiley India.
5. Antenna Theory – J. D. Krauss, PHI

REFERENCE BOOKS:

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley

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Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4. Antennas and Wave Propagation- K D Prasad, Kataria Sons.

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IT-313 ARTIFICIAL INTELLIGENCE

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Scope of AI**,** Objectives of Artificial Intelligence, The AI Problems, Applications of AI, Importance of AI, Problem Spaces and Production System, Components of Production System, Production Systems- Characteristics, Types, Applications; Control Strategies, water-jug, 8–Puzzle and other advance Problems.

Introduction to Programming: LISP, PROLOG, LOTUS. [HOURS-6]

UNIT II:

Search Techniques: State space search, Search space control-depth-first, breadth-first search; heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis, Game theorem proving, AI techniques- search knowledge, abstraction, Searching And-Or Graphs, A * search, AO * search. [HOURS-6]

UNIT III:

Knowledge Representation: Issues, Logic- Propositional, Predicate, resolution, symbol tableaux method; modus ponens, Rule based Systems, Forward reasoning, backward reasoning. [HOURS-5]

UNIT IV:

Structured Knowledge Representation: Procedural and Declarative Knowledge, Semantic Nets, slots, Frames, common sense reasoning, Thematic role frames, conceptual dependency, scripts. [HOURS-5]

UNIT V:

Uncertainty and Learning: Monotic and Non-Monotonic Reasoning, Probabilistic Reasoning, Bayes theorem, Dempster Shafer theorem, Use of certainty factors, fuzzy logic, Concept of learning, learning automation, genetic algorithm, learning by inductions, Neural Nets, Natural Language Processing, Computer Vision and speech recognition, robotics. [HOURS-10]

UNIT VI:

Expert Systems: Need and justification for expert systems, Architecture of Expert Systems, Knowledge Acquisition, Tools of Expert Systems, Case studies: MYCIN, RI, DENDRAL. [HOURS-8]

TEXT BOOKS:

1. E. Rich and K. Knight, “Artificial intelligence”, TMH, 3rd ed., 2009
2. N.J. Nilsson, “Principles of AI”, Narosa Publ. House, 1990.

REFRENCE BOKS:-

1. D.W. Patterson, “Introduction to AI and Expert Systems”, PHI, 1992.
2. Peter Jackson, “Introduction to Expert Systems”, AWP, M.A., 1992.
3. R.J. Schalkoff, “Artificial Intelligence - an Engineering Approach”, McGraw Hill Int. Ed., Singapore, 1992.
4. M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

www.semesterhub.com

IT-314 DIGITAL SIGNAL PROCESSING

L T P Credits **Total Hours:40**
3 1 0 4

UNIT I

Introduction: Continuous and Discrete- Time Signal, Frequency Concept of Continuous Time and Discrete- Time Signal Element of Digital Signal Processing System.

Discrete-Time Representation of Signals & Systems: Discrete Time Signals, Classification of Discrete-Time Signals, Basic Operations on Signals, Classification of Discrete-Time System, Impulse Response of System Analysis of Linear- Time Invariant: Convolution Sum, Properties of Linear- Time Invariant Causality and Stability condition for LTI Discrete-Time System, Finite Impulse Response (FIR) and infinite Impulse Response (IIR) System. [HOURS-8]

UNIT II

Frequency Domain Representation of Discrete-Time Signal and Signals: Discrete-Time Fourier Transform(DTFT) and IDFT, Condition for Convergence of DTFT , DTFT properties, Computation of the DTFT and IDFT of real sequences, Linear Convolution using the DTFT. [HOURS-6]

UNIT III

Discrete Fourier Transform Frequency Domain Sampling: Definition of Discrete Fourier Transform (DFT), Properties of DFT, , Computation of the DTFT and IDFT, Circular Convolution, Linear Convolution using DFT. FFT Algorithms (Radix 2 only): Decimation in Time FFT, Decimation in Frequency FFT , Goertzel Algorithm. [HOURS-8]

UNIT IV

z-Transforms: Definition of z-transforms Inverse -transform, Properties of z-transform, One Sided z- Transform, System function, Poles and Zeros of System function, Stability Condition. [HOURS-4]

UNIT V

Digital Filter Structure: System Describe by Difference Equation Block, Diagram Representation, Signal Flow Graph Representation, Structures for IIR Filter: Direct Form, Cascaded Form, Parallel Form, Structures for FIR Filter: Direct Form, Cascaded form Lattice realization. [HOURS-4]

UNIT VI

Digital Filter Design: Ideal Filter Characteristic, Causality, Practical Filter Specification, IIR Filter Design Methods: Impulse invariance, Bilinear Transform, Design of Butterworth and Chebyshev Filters. FIR filters Design using Rectangular Window, Hamming Window, Hamming Window, and Blackman Window. [HOURS-10]

TEXT BOOKS:

1. John G. Proakis & Dimitris G. Manolakis. "Digital Signal Processing Principles Algoriths and applications", PHI.
2. Allan Y. Oppenhein & Ronald W. Schater , "Digital Signal Processing", PHI.
3. O. P. Verma, "Digital Signal Processing", Dhanpat Rai & Co.

REFERENCE BOOKS:

1. Sanjit K. Mitra, "Applications DSP: A Computer based approach", TMH.
2. Ten, "Digital Signal Processing Principles fundamentals and applications", Academic

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IT-315 SOFTWARE QUALITY AND TESTING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Software Quality, Quality Attributes, Software Quality Control and Software Quality Assurance, Evolution of SQA, Major SQA activities, Major SQA issues, Zero defect Software, The Philosophy of Assurance, The Meaning of Quality, The Relationship of Assurance to the Software Life-Cycle, SQA Techniques. [HOURS-6]

UNIT II:

SQA Cycle: Reviews, Walkthrough, Inspection, and Configuration Audits.
Verification & validation: reliability measures, V&V planning, software inspections, automated analysis, software development.
Trend Analysis: Error Quality, Error Frequency, Program Unit Complexity, Compilation Frequency. [HOURS-4]

UNIT III:

Corrective Action: Requirement for Corrective Action, Determining the Action to be Taken, Implementing the Correcting for corrective Action, Periodic Review of Actions Taken. Traceability, Records, Software Quality Program Planning.
Social Factors: Accuracy, Authority, Benefit, Communication, Consistency, and Retaliation. [HOURS-10]

UNIT IV

Introduction to Software Testing: Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, Specification-based testing techniques, Code-based testing techniques, Unit testing, Integration testing, System testing, Regression testing, Methods of test data, generation and validation, Program slicing and its application, Reliability analysis, oracles System and acceptance testing. [HOURS-10]

UNIT-V

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.
Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing. [HOURS-5]

UNIT-VI

Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.
Testing Tools: Static Testing Tools, Dynamic Testing Tools. [HOURS-5]

TEXT BOOKS:

1. Robert Dunn, “Software Quality Concepts and Plans”, Prentice-Hall, 1990.
2. Alan Gillies, “Software Quality, Theory and Management”, Chapman and Hall, 1992.
3. Michael Dyer, “The Cleanroom approach to Quality Software Engineering”, Wiley & Sons, 1992.
4. Pressman, “Software Engneering: A Practitioner's Approach”, TMH.

REFERENCE BOOKS:

1. Daniel Freedman, Gerald Weinberg, “Handbook of Walkthroughts, Inspections and Technical Reviews”, Dorset House Publishing, 1990.

www.semesterhub.com

2. Tom Gilb, “Principles of Software Engineering Management”, Addison-Wesley, 1988.
3. Watts Humphrey, “Managing the Software Process”, Addison-Wesley, 1990.

www.semesterhub.com

Practical Paper I

IT-316 Information Security Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-311

Practical Paper II

IT-317 RF Engineering Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-312

Practical Paper III

IT-318 Digital Signal Processing Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-314

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IT-401 INTERNET AND WEB ENGINEERING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Concept of Networking and Layers of OSI Model. Client Server Model, Static & Dynamic Web pages, Common Gateway Interface, Web servers, Application servers.

[HOURS-6]

UNIT II:

Web Technologies: TCP/IP, HTTP, HTTPs, Telnet, FTP, WWW, URL, Email, Domain Name Service, Web Browsers, Search Engines-Architecture, Crawlers, Type of crawlers, search tools; Chat & Bulletin Board Services, SNMP, VPN, VoIP & Internet Telephony.

[HOURS-10]

UNIT III:

Security: Concept of Internet security, Firewall-Functioning, types of Firewall, IP Security-Architecture, Authentication header, Encapsulating security payloads, combining security associations, IKE.

Cyber Laws: Introduction, The rights the various parties have with respect to creating, modifying, distributing, storing and copying digital data- concurrent responsibilities and potential liabilities. [HOURS-6]

UNIT IV:

Web Design: Key issues in web site design, Use of Different HTML tags in web pages, Building HTML documents, Cascading Style Sheets-Internal, Inline and external style sheets, Java Script, Dynamic HTML with Java Script, XML technologies – XML, DTD, XSD, XSLT, XQuery, XPath. [HOURS-10]

UNIT V:

Java Beans and Servlets: Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API, Introduction to Servlets, Lifecycle, JSDK, Servlet API, Servlet Packages-HTTP package, working with Http request and response, Security Issues.

[HOURS-8]

TEXT BOOKS:

1. "Professional JAVA Server Programming", Allamaraju and Buest ,SPD Publication
2. "Beginning J2EE 1.4" Ivor Horton, SPD Publication.
3. "Deitel and Deitel "Internet and World Wide Web: How to Program", 4e, Pearson Education
4. Anders Moller, Schwartzbach, "An Introduction to XML and Web Technologies", Pearson Education.
5. B. A. Forouzan, "Data Communications and Networking (3rd Ed.)", TMH

REFERENCE BOOKS:

1. "Advanced Programming for JAVA 2 Platform" Austin and Pawlan, Pearson.
2. Krishnamoorthy & S. Prabhu, "Internet & Java Programming", New Age Publication.
3. Deitel and Deitel, Nieto, Lin, Sadhu, "XML: How to Program", 4e, Pearson Education.

www.semesterhub.com

IT-402 DISTRIBUTED SYSTEMS AND COMPUTING

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Introduction: Definition of a Distributed Systems, Goals, Architectures, Architectures versus Middleware, Types of distributed systems, Examples of distributed Systems, limitations. [HOURS-4]

UNIT II:

Processes: Threads, Virtualization**,** Client-Server Model, Code Migration

Communication: Fundamentals, Remote procedure call, Communication between distributed objects, Events and notifications, Inter-Process Communication, Message oriented, Stream Oriented and multicast communication. [HOURS-5]

UNIT III:

Synchronization: Time and clock Synchronization in Distributed systems. Mutual Exclusion, Election Algorithms

Naming: Names, Identifiers, Addresses, Flat naming, Structured naming, Attribute based naming. [HOURS-6]

UNIT IV:

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. [HOURS-5]

UNIT V:

Consistency and Replication: System model and group communication, Consistency Models, Consistency Protocols, Transactions with replicated data.

Distributed shared memory and deadlocks, processes and processors.

Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System. [HOURS-10]

UNIT VI:

Security: Introduction, Secure channels, Access Control, Security Management, Security Techniques

Fault Tolerance: Failure Models, Process Resilience, Reliable Group Communication, Recovery Techniques

Case studies: Mach, Amoeba, Chorous. [HOURS-10]

TEXT BOOKS:

1. G. Couloris, "Distributed System, Concept & Design," Addison Wesley 1994.
2. Tanenbaum, "Distributed Systems," PHI

REFERENCE BOOKS:

1. P. K. Sinha, "Distributed Operating Systems," PHI

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IT-403 FINANCIAL AND ORGANIZATIONAL MANAGEMENT

L	T	P	Credits	Total Hours: 20
2	0	0	2	

UNIT I:

Introduction: Production Function types of manufacturing systems productivity and quality management, ISO-9000 systems, CMM System.

Management concepts: Development of management principles, scientific management, human relations aspects. Industrial psychology, personnel management, and labour relations, methods of remuneration. [HOURS-5]

UNIT II:

Plant Organization: Organization, Principles of organization, organization structure – line and staff organizations.

Plant location, layout: Process layout, Product layout and combination layout – methods of layout, economic of layout. [HOURS-5]

UNIT III:

Production planning and control: Types of Product, Demand, Demand Forecasting, marketing strategies, Scheduling and control of scheduling; production control.

Work and method study: Definition and concepts: method study-procedures, symbols, advantages. Flow process charts. Motion study-micro motion, SIMO charts, procedures system concepts value and ABC analysis: system concepts, classification, analysis, techniques.

[HOURS-5]

UNIT IV:

Industrial maintenance: types, organization of maintenance department. Breakdown and preventive maintenance.

Inventory control and replacement analysis: Introduction, replacement policy and methods adopted. Project Management – CPM and PERT. [HOURS-5]

TEXT BOOKS:

1. Stephen P. Robbins, David & Decenzo, "Fundamentals of Management", 3rd Edition, Pearson Education, 2002.
2. Stoner, et. al., "Management", 6th Edition, PHI, 2002.
3. J. S. Chandan, "Organisational Behaviour", Vikas Publishing House, 2004.

REFERENCES BOOKS:

1. Joseph W. Weiss, "Organisational Behaviour & Change, Managing Diversrity, Cross-Cultural Dynamics & Ethics", 2nd Edition, Vikas Publishing House, 2003
2. Richard Pettinger, "Introduction to Management", 3rd Edition, Palgrave McMillan, 2002.
3. Udai Pareek, "Understanding Organisational Behaviour", 1st Edition, Oxford University Press, 2004.
4. Fred Luthans, "Organisational Behaviour," 9th Edition, McGraw Hill

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International Edition, 2004.

www.semesterhub.com

Practical Paper I

IT-406 Internet and Web Engineering Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-401

Practical Paper II

IT-407 Distributed Systems and Computing Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-402

Practical Paper III

IT-408 Elective I Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-404

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IT-411 MOBILE COMMUNICATION

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Issues in mobile communication, overview of wireless telephony: cellular concept, air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems.

Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signaling. [HOURS-6]

UNIT II:

Cell Coverage concepts: General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model – characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation, Characteristics of basic antenna structures, antenna at cell site, mobile antennas. [HOURS-6]

UNIT III:

Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signaling.

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes.

Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP. [HOURS-8]

UNIT IV:

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, Introduction to wireless mark up Languages (WML).

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000. [HOURS-8]

UNIT V:

Wireless Local Loop (WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols, Quality of services in 3G, Introduction to 4G. [HOURS-5]

UNIT VI:

Satellite communication: Geosynchronous and geostationary satellites, VSAT system, SCPC, Overview of FDMA , TDMA and CDMA, CDDMA, Satellite link budget analysis, Overview of Circuit switching and packet switching, Overview of Modems, Overview of high data Digital Subscriber loops (ADSL, VDSL), Local Microwave Distribution Services (LMDS), AIN(Advanced Intelligent Network). [HOURS-7]

TEXT BOOKS:

1. Yi-Bing Lin & Imrich Chlamtac, “Wireless and Mobile Networks Architectures”, John Wiley & Sons, 2001.
2. Raj Pandya, “Mobile and Personal Communication systems and services”, Prentice Hall of India, 2001.

REFERENCE BOOKS:

1. Hansmann, “Principles of Mobile Computing”, Wiley Dreamtech, 2004.
2. Mark Ciampa, “Guide to Designing and Implementing wireless LANs”, Thomson learning, Vikas Publishing House, 2001.

www.semesterhub.com

3. Ray Rischpater, “Wireless Web Development”, Springer Publishing, 2000.
4. P.Stavronlakis, “Third Generation Mobile Telecommunication systems”, Springer Publishers, 2001.

www.semesterhub.com

Practical Paper I

IT-414 Elective II Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-412

Practical Paper II

IT-415 Mobile Communication Lab

L	T	P	Credits
0	0	2	2

Based on course work corresponding IT-411

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IT-404 ELECTIVE-I

1. IT IN MARKETING MANAGEMENT

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Introduction: Introduction to Marketing function; genesis, the marketing concept, Marketing Management system: Objectives, its interfaces with other functions in the organization. [HOURS-7]

UNIT II:
Environment of Marketing: Economic Environment, Market: market segmentation. Consumer-buyer behavior models. Socio-cultural environment. Legal environment. Ethical issues in marketing. [HOURS-8]

UNIT-III
Marketing Strategy: Marketing planning and Marketing programming. The concept of marketing mix. Product policy; the concept of product life cycle. New product decisions. Test marketing pricing management of distribution: channels of distribution. Advertising and production. The concept of Unique Selling Proposition. [HOURS-8]

UNIT-IV
Implementation and Control: The marketing organization–alternative organizations structures; the concept of product management. Administration of the marketing programme sales forecasting; marketing and sales budgeting. [HOURS-8]

UNIT V:
Sales Management: management of sales force. Delphi methods, other simulation methods, Evaluation of marketing performance; sales analysis; control of marketing effort; marketing audit, CRM, SCM. [HOURS-7]

UNIT VI
Case studies: Any two case studies related to IT marketing. [HOURS-2]

TEXT BOOKS:

1. Philip Kotler, "Marketing Management".
2. Stanton, "Fundamentals of Marketing".

REFERENCE BOOKS:

1. V.S.Ramaswamy and S.Namakumari, "Marketing Management".
2. Philip Kotler and Gary Armstrong, "Principles of Marketing", 9th Edition.

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2. OPTIMIZATION TECHNIQUES

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Basics of Optimization Techniques: Historical Development, Engineering application of Optimization, Formulation of design problems as mathematical programming problems, classification of optimization problems, Constrained and Un-constrained Optimization.

[HOURS-6]

UNIT II:

Linear Programming Problem: Convex Sets**,** Hyper plane, Graphical method, Simplex method, Revised simplex method, Duality in linear programming (LP), Sensitivity analysis, other algorithms for solving LP problems, Transportation, assignment and other applications.

[HOURS-8]

UNIT III:

Non-Linear Programming Problem: Quadratic Forms, Convex Non-linear Programming Problem, Method of Lagrange multipliers, Kuhn–Tucker Theory, Convex Quadratic Programming Problem, Separable Programming, Geometric Programming, Polynomial Programming Problem. [HOURS-7]

UNIT IV:

Dynamic Programming: Introduction, Forward and Backward dynamic Programming, Recursive Relations, Search Techniques, Uniform, Sequential, and Fibonacci search Techniques, Univariate search methods, Steepest Descent method, Conjugate Directions method, Flecture Reev Methods. [HOURS-8]

UNIT V:

Queuing Systems: Introduction, Characteristics of Queuing Models, Models for arrival and service time, Kendall's notation for representing Queuing Models, Birth and Death Processes, Queue Model I: M/M/1:GD/ ∞/ ∞, Queue Model I: M/M/1:GD/K/ ∞. [HOURS-6]

UNIT VI:

Advanced Techniques of Optimization: Introduction, Particle Swarm Optimization, Bacteria Foraging, Ant Colony Optimization, and Genetic algorithms for optimization and search.

[HOURS-5]

TEXT BOOKS:

1. "Engineering optimization: Theory and practice"-by S. S.Rao, New Age International (P) Limited, 3rd edition, 1998.
2. "Introduction to Optimization Operations Research" by J. C. Pant, Jain Bros, New Delhi, 7/e 2008.

REFERENCE BOOKS:

1 " Optimization Methods in Operations Research and systems Analysis" – by K.V. Mital and C. Mohan, New Age International (P) Limited, Publishers, 3rd edition, 1996.
2. Operations Research – by Dr. S.D.Sharma.
3. "Operations Research : An Introduction" – by H.A. Taha, PHI Pvt. Ltd., 6th edition

www.semestehub.com

4. Linear Programming – by G. Hadley.

www.semesterhub.com

3. NUMERICAL ALGEBRA AND SCIENTIFIC COMPUTING

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT-I

Introduction: Errors in numerical computation, Mathematical preliminaries, Errors and their analysis, Machine Computations, Computer Software. [HOURS-6]

UNIT II:

Algebraic and Transcendental Equations: Bisection method, Iteration method, Method of False Position, rate of convergence, Method for complex root, Muller's Method, Quotient Difference method, Newton-Raphson Method. [HOURS-8]

UNIT III:

Interpolation: Errors in Polynomial interpolation, Finite differences, Decision of errors, Newton's formula for interpolation, Gauss, Sterling, Bessel's, Everett's Formula, Interpolation by unevenly spaced points, Lagrange interpolation formula, Divided Difference, Newton's General interpolation Formula. [HOURS-8]

UNIT IV:

Curve Fitting, Cubic Spline & Approximation: Method of Least Square curve fitting, Fitting a straight line, Curve fitting by sum of exponential, Data fitting with cubic splines, Approximation of functions. [HOURS-7]

UNIT V:

Numerical Integration and Differentiation: Numerical differentiation, Numerical integration, Trapezoidal rule, Simpson 1/3 rule, Simpson 3/8 rule, Booles & Weddles rule, Euler-Maclariaun formula, Gaussian Formula, Numerical evaluation of singular integrals. [HOURS-6]

UNIT VI:

Statistical Computations: Frequency Chart, Regression Analysis, Least Square fit, Polynomial fit, Linear and Nonlinear Regression, Multiple Regression, Statistical Quality Control Methods. [HOURS-5]

TEXT BOOKS:

1. Balagurusamy. E, "Numerical methods", Tata McGraw-Hill
2. SS Shastri, " Introductory methods of numerical analysis", PHI
3. V. Rajaraman, "Introduction to Numerical Methods", TMH

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4. CONTROL ENGINEERING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction to Control System: Linear, Non Linear, Time Varying and Linear Time Invariant System, Servomechanism, Historical Development of Automatic Control and Introduction to Digital Computer Control, Mathematical Models of Physical Systems, Differential Equations of Physical Systems, Transfer Functions, Block Diagram Algebra and Signal Flow Graphs.

[HOURS-6]

UNIT II:

Feed Back Characteristics of Control Systems: Feedback and Non-feedback Systems Reduction of Parameter Variations By Use of Feedback Control Over System Dynamics By Use of Feedback Control of Effects of Disturbance Single By Use of Feedback and Regenerative Feedback.

Control Systems and Components: DC and AC Servomotors, Synchro Error Detector, Tacho Generator and, Stepper Motors etc. [HOURS-8]

UNIT III:

Time Response Analysis, Design Specifications And Performance Indices: Standard Test Signals, Time Response of First-order Systems, Time Response of Second-Order Systems, Steady-State Error and Error Constants, Effect of Adding a Zero to a System, P, PI and PID Control Action and Their Effect, Design Specifications of Second-Order Systems and Performance Indices. [HOURS-6]

UNIT IV:

Concepts of Stability And Algebraic Criteria: The Concept of Stability, Necessary Conditions for Stability, Hurwitz Stability Criterion, Routh Stability Criterion and relative Stability Analysis.

The Root Locus Technique: The Root Locus Concept, Construction of Root Loci, Root Contours, Systems with Transportation Lag, Sensitivity of the Roots of the Characteristic equation. [HOURS-8]

UNIT V:

Frequency Response Analysis: Correlation Between Time and Frequency Response, Polar Plots, Bode Plots, and All Pass and Minimum-Phase Systems.

Stability In Frequency Domain: Mathematical Preliminaries, Nyquist Stability Criterion, Definition of Gain Margin and Phase Margin, Assessment of Relative Stability Using Nyquist Criterion and Closed-Loop Frequency Response. [HOURS-7]

UNIT VI:

Introduction to Design: The Design Problem, Preliminary Considerations of Classical. Design, Realization of Basic Compensators, Cascade Compensation in Time Domain Cascade Compensation in Frequency Domain, Tuning of PID Controllers. [HOURS-5]

TEXT BOOKS:

1. Nagrath & Gopal ‘Control Systems Engineering’, New Age International. Publishers
2. Ogata ‘Modern Control Engineering’, Prentice Hall.

REFERENCE BOOKS:

www.semesterhub.com

1. Kuo B.C. ‘Automatic Control System’, Prentice-hall Of India Pvt Ltd
2. Scheultz & Melsa ‘Linear Control Systems’, Tata Mcgraw Hill .

www.semesterhub.com

5. SIMULATION AND MODELING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:
Basic Simulation Modeling: The Nature of Simulation Systems, Models- Types, Components, Steps in Modeling –Simulation of statistical queuing, manufacturing and material handling, Simulation Discrete-Event Simulation Simulation of a Single-Server Queuing. Alternative Approaches to Modeling and Coding Simulations, Parallel and Distributed Simulation, Simulation across the Internet and Web-Based Simulation, Steps in a Sound Simulation Study. [HOURS-6]

UNIT II:
Types of Simulation: Continuous Simulation, Combined Discrete-Continuous Simulation Monte Carlo Simulation. Advantages, Disadvantages, and Pitfalls of Simulation. [HOURS-8]

UNIT III:
Modeling Complex Systems: Introduction, List Processing in Simulation, Approaches to Storing Lists in a Computer Linked Storage Allocation. [HOURS-6]

UNIT IV:
A Simple Simulation Language: simlib. Single-Server Queuing Simulation with simlib, Time-Shared Computer Model, Job-Shop Model Efficient Event-List Manipulation. [HOURS-8]

UNIT V:
Simulation Software: Comparison of Simulation Packages with Programming Languages Classification of Simulation Software General-Purpose Simulation Packages Object-Oriented Simulation. [HOURS-6]

UNIT VI:
Detailed Simulation Modeling: Building Valid, Credible, and Appropriately Detailed Simulation Models Experimental Design, Sensitivity Analysis, and Optimization Simulation of Manufacturing Systems. [HOURS-6]

TEXT BOOKS:

1. Simulation Modeling and Analysis Third Edition By Law Kelton (Mc-Graw Hill)
2. J.Banks, John.S.Carson and B.L.Nelson, "Discrete Event System Simulation", 1996, PHI.

REFERENCE BOOKS:

1. Gorden G., System simulation, Prentice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Spuet, Computer Aided Modeling and Simulation, W.I.A.
4. Shannon R.E., System simulation, Prentice Hall.
5. Allan Carrie, "Simulation and Modeling" McGraw Hill.

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6. INTELLECTUAL PROPERTY RIGHTS

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Scope of Cyber Laws: Nature of Cyber Space, Cyber Property, Cyber Personality, Cyber Transactions. Law of Digital Contracts – Digital Contract – Definition; Formation of Digital. Contracts, System of Digital Signature, Role and Function of Certifying Authorities, the Science of Cryptography. [HOURS-6]

UNIT II:

Nature of Intellectual Property: Patents, Designs, Trademarks and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. [HOURS-6]

UNIT III:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications Information Technology Act, 2000, International Scenario in Cyber Laws, IPR Policies. WIPO, National IPR Policy. [HOURS-8]

UNIT IV:

New Developments in IPR Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs. Product Design Importance of product design in industry. [HOURS-8]

UNIT V:

Principal requirements of good product design. Factors and considerations affecting product design. Ergonomic factor in product design. Product design methodology and techniques. Basic elements and concepts of visual design. [HOURS-6]

UNIT VI:

Product Design Standards: Standards related to Materials, forms, functions, color, graphics, product development and testing. Packaging materials their characteristics and applications. Packaging design considerations. [HOURS-6]

TEXT BOOKS:

1. "Introduction to intellectual property: Theory and Practice", By World Intellectual Property Organization.

2. "Intellectual Property Rights: Innovation, Governance and the Institutional Environment", Birgitte Andersen, Edward Elgar Publishing Limited.

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IT-412 ELECTIVE-II

1. ADVANCES IN SOFTWARE ENGINEERING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Software Configuration Management: SCM Process, Objects in Software configuration, Version control, Change control, Configuration audit, Status reporting, SCM standards.

Software Quality Assurance: Quality Concepts, Quality Movement, SQA Activities and Formal Approaches to SQA. [HOURS-10]

UNIT II:

International Standards: Importance and defining software quality, ISO 9126, BS 6079 planning steps, ISO 12207 approach to software lifecycle data.

System Design: Problem partitioning, abstraction, top down and bottom up – design, structured approach, information hiding, programming style, and internal documentation, verification, metrics, monitoring and control. [HOURS-8]

UNIT III:

Functional Oriented and Object Oriented Software Design: Overview of SA/SD Methodology- structured analysis, data flow diagrams; extending DFD to real time systems, Object oriented design, Graphical representation of OOD, Generic OO development paradigm. design specification and verification matrices, monitoring and control, Cohesiveness, coupling, 4GL. [HOURS-6]

UNIT IV:

Software Testing and Debugging: Software Testing Fundamentals, Text Case Design, White - Box Testing, Basis Path testing, Control Structure Testing, Black Box Testing and Testing for Specialized Environments, Architectures and Applications. Program Error, Debugging Process (Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault, Testing) Debugging Example. [HOURS-6]

UNIT V:

Advanced Studies in Software Engineering Topics: Web application development engineering, Process, Modeling activity, Analysis modeling for WebApps, Design- functional, information & interaction, testing WebApps-content, navigation, configuration, and performance testing. Component based software engineering, software system maintenance, software verification for quality assurance, software engineering support tool. [HOURS-6]

UNIT VI:

Project Management of Software Projects: Introduction**,** CASE tools, Re-engineering, forward engineering, client/server software engineering, outsourcing, Software project management, standards. [HOURS-4]

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TEXT BOOKS:

1. "Software Engineering", Shari Lawrence Pfleeger, Joanne M. Atlee, Third Edition, Pearson 2006, ISBN 0-13-146913-4.
2. "Software Requirements", Karl E. Wiegers, Microsoft Press, 1999.

REFRENCE BOOKS:

1. "Software Engineering", Shari Lawrence Pfleeger, Joanne M. Atlee, Third Edition, Pearson 2006, ISBN 0-13-146913-4.
2. Fundamentals of Software Engineering", Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli Second Edition, Pearson 2003, ISBN 0-13-305699-6.

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2. FAULT TOLERANT SYSTEMS

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT-I

Fundamental Concepts: Definitions of fault tolerance, fault classification, fault tolerant attributes and system structure.

Fault-Tolerant Design Techniques: Information redundancy, hardware redundancy, and time redundancy. [HOURS-10]

UNIT-II

Dependability Evaluation Techniques: Reliability and availability models: (Combinatorial techniques, Fault-Tree models, Markov models), Performability Models. [HOURS -5]

UNIT-III

Architecture of Fault-Tolerant Computers (case study): General-purpose systems, high-availability systems, long-life systems, critical systems. [HOURS -5]

UNIT-IV

Software Fault Tolerance: Software faults and their manifestation, design techniques, reliability models. [HOURS -5]

UNIT- V

Fault Tolerant Parallel/Distributed Architectures: Shared bus and shared memory architectures, fault tolerant networks. [HOURS -5]

UNIT-VI

Recent topics in fault tolerant systems: Security, fault tolerance in wireless/mobile networks and Internet, Case studies. [HOURS -10]

TEXT BOOKS:

1. Fault-Tolerant Computer System Design D.K. Pradhan, 2003
2. Design and Analysis of Fault-Tolerant Digital Systems, B.W.Johnson, Addison-Wesley, 1989

REFRENCE BOOKS:

3. Fault-Tolerant Computing, Theory and Techniques, Volumes I and II, D.K. Pradhan, Prentice Hall, 1986
4. Reliable Computer Systems: Design and Evaluation, D.P.Siewiorek and R.S.Swartz, Digital Press, 1992
5. Probability and Statistics with Reliability, Queueing and Computer Science Application K.S.Trivedi, Prentice Hall, 1982

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3. TOTAL QUALITY MANAGEMENT

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT-I

Introduction Quality: Quality planning and control, Economics of quality control, Specifications, tolerances and process capability studies, Total quality control, Quality assurance, Quality system, Concepts in quality circles, Use of decision trees, OR models and simulation in process control, Quality incentives. [HOURS -12]

UNIT-II

Process control: Statistical control charts for variables, control charts for attributes. Other variations of control charts. Demerits of quality rating plan. Multi characteristics control charts. Sampling inspection single, double and sequential sampling plans. Design of sampling plans for attributes and variables. Economics of sampling plan. [HOURS -12]

UNIT-III

Quality Assurance: Motivation for quality assurance, Zero defect programs, Quality control Circles, ISO Systems CMM systems. Product quality and reliability. Failure data analysis and life testing. Redundancy in design. [HOURS -10]

UNIT-IV

Detailed study of Case studies. [HOURS -6]

TEXT BOOK:

1. Dale H.Besterfiled, et al., "Total Quality Management", Pearson Education, Inc. 2003. (Indian reprint 2004). ISBN 81-297-0260-6.

REFERENCES BOOKS:

1. James R.Evans & William M.Lidsay, "The Management and Control of Quality", (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. "Total Quality Management", McGraw-Hill, 1991.
3. Oakland.J.S. "Total Quality Management", Butterworth Hcinemann Ltd., Oxford, 1989.
4. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International 1996.
5. Zeiri. "Total Quality Management for Engineers", Wood Head Publishers, 1991.

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4. PATTERN RECOGNITION

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Basics of pattern recognition: Bayesian decision theory, Classifiers, Discriminant functions, Decision surfaces, Normal density and discriminant functions, and Discrete features.

[HOURS- 5]

UNIT II:

Parameter estimation methods: Maximum- Likelihood estimation, Gaussian mixture models, Expectation-maximization method, Bayesian estimation Methods, Hidden Markov models for sequential pattern classification, Discrete hidden Markov models, Continous density hidden Markov models, Dimension reduction methods, Fisher discriminant analysis, Principal component analysis. [HOURS-10]

UNIT III:

Non-parametric techniques for density estimation: Parzen-window method, K-Nearest Neighbour method, Linear discriminant function based classifiers, Perceptron, Support vector machines. [HOURS-4]

UNIT IV:

Multilayer Neural Networks: Feed forward operations and classifications, back propagation algorithm, error factors, back propagation as feature & mapping, Bayer theory and probability, practical techniques for improving back propagation, regularization, complexity adjustment and pruning. [HOURS-6]

UNIT V:

Stochastic methods: Stochastic search, Boltzman learning, boltzman networks of graphical models, evolutionary methods, genetic progrances. [HOURS-10]

UNIT VI:

Non-metric methods for pattern classification: Non-numeric data or nominal data, Decision trees, Unsupervised learning and clustering: Criterion functions for clustering, Algorithms for clustering: K-means, Hierarchical and other methods, Cluster validation. [HOURS-5]

TEXT BOOKS:

1. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification" 2nd Edition, John Wiley
2. John Hertz, Andres Krogh & Richard G. Palmer, "Introduction to the theory of Neural Computation", Addison Wesley

REFERENCE BOOKS:

1. K. S. Fu, *Syntactic Pattern Recognition and Applications*, Prentice Hall, Eaglewood cliffs, N.J., 1982.
2. C. M. Bishop, *Neural Network for Pattern Recognition*, Oxford University Press, New York, 1998.

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3. E. Gose, R. Johnsonbaugh, and S. Jost, *Pattern Recognition and Image Analysis*, Prentice Hall of India, NewDelhi, 1999

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5. OPTICAL COMMUNICATION

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT-I

Optical fiber fundamentals: Solution to Maxwell's equation in a circularly symmetric step index optical fiber, linearly polarized modes, single mode and multimode fibers, concept of V number, graded index fiber. [HOURS -4]

UNIT- II

Total number of guided modes (no derivation), polarization maintaining fibers, attenuation mechanisms in fibers, dispersion in single mode and multimode fibers, dispersion shifted and dispersion flattened fibers, attenuation and dispersion limits in fibers, Kerr nonlinearity, self phase modulation, combined effect of dispersion and self phase modulation, nonlinear Schrodinger equation (no derivation), fundamental soliton solution. [HOURS -10]

UNIT-III

Optical sources: LED and laser diode, principles of operation, concepts of line width, phase noise, switching and modulation characteristics – typical LED and LD structures. [HOURS -6]

UNIT-IV

Optical detectors: P-N detector, pin detector, avalanche photodiode – Principles of operation, concepts of responsivity, sensitivity and quantum efficiency, noise in detection, typical receiver configurations (high impedance and transimpedance receivers). [HOURS -8]

UNIT-V

Optical amplifiers: Semiconductor amplifier, rare earth doped fiber amplifier (with special reference to erbium doped fibers), Raman amplifier, Brillouin amplifier – principles of operation, amplifier noise, signal to noise ratio, gain, gain bandwidth, gain and noise dependencies, intermodulation effects, saturation induced crosstalk, wavelength range of operation.

[HOURS -12]

TEXT BOOKS:

1. Leonid Kazovsky, Sergio Benedetto and Alan Willner: `Optical Fiber Communication Systems', Artech House.
2. John Senior: `Optical Fiber Communications', PHI.

REFRENCE BOOKS:-

1. Silvello Betti, Giancarlo De Marchis and Eugenio Iannone: `Coherent Optical Communications Systems', John Wiley.
2. G.P.Agrawal: `Nonlinear Fiber Optics', Academic Press.

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6. ROBOTICS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT-I

Introduction: Automation and Robotics, CAD/CAM and Robotic.

Matrix algebra, Inversion of Matrices, Rotational groups, matrix representation of co-ordinate transformation. [HOURS -10]

UNIT-II

Manipulator kinematics: kinematics: Introduction, solvability, algebraic solution by reduction to polynomial, standard frames, repeatability and accuracy, computational considerations.

Manipulator dynamics: introduction, acceleration of rigid body, mass distribution, Newton's equation, Euler's equation, Iterative Newton-Euler dynamic formulation, closed dynamic equation, Lagrangian formulation of manipulator dynamics, dynamic simulation, computational consideration. [HOURS -10]

UNIT-III

Trajectory Generation: Introduction, general considerations in path description and generation, joint space schemes, Cartesian space schemes, Path generation in runtime, Planning path using dynamic model. [HOURS -5]

UNIT-1V

Linear control of manipulators: Introduction, feedback and closed loop control, second order linear systems, control of second-order systems, Trajectory following control, modeling and control of a single joint. [HOURS -5]

UNIT-V

Motion Analysis: Homogeneous transformations as applicable to rotation and translation problems.

Robot actuators and Feed back components: Actuators, Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components: position sensors–potentiometers, resolvers, encoders–Velocity sensors. [HOURS -5]

UNIT-VI

Robot Programming languages & systems: Introduction, the three level of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages. [HOURS -5]

TEXT BOOKS:

1. John J. Craig, "Introduction to Robotics", Addison Wesley publication
2. Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, "Robotic Engineering – An integrated approach", PHI Publication.
3. K.S. Fu, R.C. Gonzalez and C.S.G. Lee, "Robotics: Control, Sensing, Vision and Intelligence", TMH.

REFRENCE BOOKS:-

1. "Industrial Robotics", Groover M P, Pearson Edu.
2. "Robotics and Control", Mittal R K & Nagrath I J, TMH.

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IT405 OPEN ELECTIVE I

1. ADVANCED MICROPROCESSOR ARCHITECTURE

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT-I

Introduction: Introduction to Micro Processor and micro computer: Modern microprocessors and microcomputers, Review of 8086. [HOURS -4]

UNIT-II

Introduction to 80386: Memory management unit – Descriptors, selectors, description tables and TSS – Real and protected mode – Memory paging – Pentium processor -Special features of the Pentium processor – Branch prediction logic –Superscalar architecture, microprocessors - state of the art. 8087 co-processor architecture and configuration, Memory (RAM and ROM) interfacing, memory address decoding. [HOURS -12]

UNIT-III

8051 Microcontroller: Overview of 8051 family, architecture of 8051, Program counter, ROM space in 8051, data types and directives, flags and PSW register, register bank and stack, Addressing modes. Instruction set-.Arithmetic instructions JUMP, LOOP, CALL instructions, time delay generations. Assembly Language programming in 8051 (some simple programs): programs using arithmetic and logic instructions, single bit instructions and programs, Timer/counter programming, 8051 serial communication programming, programming timer interrupts. Interfacing with 8255PPI, Stepper motor, keyboard, DAC, external memory [HOURS -14]

UNIT-IV

Pentium: Architecture of Pentium processor, Real and protected modes of operation, addressing modes and instruction set of Pentium processor, concept of RISC and CISC micro processors. Super scalar architecture, MMX technology, Enhanced power management, multiprocessing with reference to Pentium processors. [HOURS -10]

TEXT BOOKS:

1. Ramesh S. Gaonkar, "The Microprocessor: Architecture, interfacing, programming and design," Penram International.
2. Douglas V Hall, "Introduction to Microprocessor and interfacing," McGraw Hill

REFERENCE BOOKS:

1. B. Ram, "Microprocessor and applications, PHI
2. Gibson, "Introduction to Microprocessor,"
3. Kenneth J. Ayala, "The 8051 Micro-controller: Architecture, Programming and Applications," Penram International Publication

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2. ADVANCEMENT IN DATABASE MANAGEMENT SYSTEM

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT-I

Introduction to Object Oriented Databases: Representation of Objects, Concurrency and Recovery in O-O databases, Integrity persistence, Constraints, DML and Query Languages for O-O databases. [HOURS -8]

UNIT-II

Introduction to ERP, Vendors of ERP, BPS, Different components of ERP, client/server architecture, EDI introduction, EDI components, distributing process, workflow security, supply chain management & ERP, legal issues, case studies. [HOURS -8]

UNIT-III

Introduction to Data Mining and Data warehousing: Overview of Knowledge discovery process, Decision-Tree Building, Over fitting, Data mining architectures. Introduction to knowledge Discovery paradigms like Induction, Neural Networks, genetic algorithms etc.

Data-ware house concepts, Data warehousing planning and strategy, Warehousing planning and strategy, Warehouse architectures. Data-ware house implementation, schema design.

[HOURS -12]

UNIT-IV

Introduction to Distributed Databases, Distributed DBMS Architectures, Distributed query processing, updated Distributed Data, Distributed Transactions and Concurrency Control. **Expert data bases:** use of rules of deduction in data bases, recursive rules.

Fuzzy data bases: fuzzy set & fuzzy logic, use of fuzzy techniques to define inexact and incomplete data bases. [HOURS -12]

TEXT BOOKS:

1. W. Kim, *Modern Database Systems* , Addison Wesley Pub. Co., 1995.
2. J.D. Ullman. *Principles of Database and Knowledge Base Systems* , Vol I & II, Computer Science Press, 1988.

REFERENCE BOOKS:-

1. W. Kim. *Introduction to Object Oriented Databases* , MIT Press, 1992.
2. J. Minker (Editor). *Foundation of Deductive Databases and Logic Programming*.

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3. DIGITAL IMAGE PROCESSING

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT-I

Introduction And Digital Image Fundamentals: The origins of Digital Image Processing, Fundamentals Steps and elements of Image Processing, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations. [HOURS-4]

UNIT-II

Image Enhancement in the Spatial Domain: Some basic Gray Level Transformations, Histogram Processing, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods**.** Fuzzy Techniques for Intensity Transformation and Spatial Filtering. [HOURS-8]

UNIT-III

Image Enhancement in the Frequency Domain: Introduction to 2-Discrete Fourier Transform, Propertied of 2-Discrete Fourier Transform, 2-D Convolution Theorem, Frequency Domain Filtering Smoothing and Sharpening using Frequency Domain Filters. [HOURS-8]

UNIT-IV

Image Restoration: Model of Restoration Process, Noise Models, Restoration in the presence of Noise-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Minimum Mean Square Error Filtering, Constrained Least Square Filtering.

Introduction to Color Image Processing. **[**HOURS-8]

UNIT-V

Image Compression: Coding, Interpixel and Psycho visual Redundancy, Image Compression models, Error free comparison, Lossy compression, Image compression standards.

[HOURS-6]

UNIT-VI

Image Segmentation: Point, Line and Edge Detection, Edge Detection methods: Sobel, Laplacian, Canny. Edge linking and Boundary detection, Global Thresholding, Region Based Segmentation. [HOURS-6]

TEXT BOOKS:

1. Rafael C. Gonzalez & Richard E. Woods, “Digital Image Processing”, AWL.
2. A.K. Jain, “Fundamental of Digital Image Processing”, PHI.

REFERENCE BOOKS:-

1. Rosefield Kak, “Digital Picture Processing”.
2. W.K. Pratt, “Digital Image Processing”.
3. Li Tan, “Digital Signal Processing: Fundamentals and Applications”, Academic Press.
4. Bernd Jahne and Horst HausBecker, “Computer Vision and Application”, Academic Press.

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4. BIO-INFORMATICS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis. [HOURS-1]

UNIT II:

The Information Molecules And Information Flow: Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, Transcription, Translation, Genes- the functional elements in DNA, Analyzing DNA, DNA sequencing, Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction, Basics, problems in molecular approach and the bioinformatics approach. [HOURS-7]

UNIT III:

Perl & R: Perl Basics, R basics, Perl applications for bioinformatics- Bioperl, Introduction to biostatics.

Bioinformatics Databases: nucleotide sequence database, protein sequence database, protein structure database, motif databases. [HOURS-10]

UNIT IV:

Sequence Alignment and Searching: single sequence alignment, dynamic programming, heuristic methods, scoring matrix, multiple sequence alignment, clustalW, HMM.

Protein Structure Alignment: structure superposition, structure alignment, Different structure alignment algorithms. [HOURS-10]

UNIT V:

Protein Structure: secondary structure predictions, Hydrogen bond, Methods for predicting secondary structure, tertiary structure modeling, Comparative modeling, Threading,

Phylogenetics: Models, assumptions, and interpretations, multiple alignments to phylogeny, Neighbor joining, Maximum likelihood and parsimony, Computer tools for phylogenetic analysis. [HOURS-12]

TEXT BOOKS:

1. David W. Mount, “Bioinformatics: Sequence and Genome Analysis.” Cold Spring Harbor Laboratory Press.
2. Andreas D. Baxevanis, Bioinformatics, A Practical Guide to the Analysis of Genes and Proteins.Wiley-Interscience

REFRENCE BOOKS:-

1. D. R. Westhead, Instant Notes, Bioinformatics, BIOS Scientific Publishers Ltd
2. Cynthia Gibas and Per Jambeck, Developing Bioinformatics Computer Skills, O’Reilly Publishers.
3. Beginning Perl for Bioinformatics, O'Reilly Media.
4. Building Bioinformatics Solutions: with Perl, R and MySQL, Oxford University Press, USA.

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5. INTRUSION DETECTION AND INFORMATION WARFARE

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT-I

Introduction: Introduction to Intrusion Detection and Snort, Network Traffic Analysis Working with Snort Rules, Plugins, Preprocessors and Output Modules, Using Snort with MySQL, Using ACID and Snort Snarf with Snort, Miscellaneous Tools, Intrusion Prevention. [HOURS -10]

UNIT-II

Intrusion detection techniques: techniques to provide privacy in Internet Application and protecting digital contents (music, video, software) from unintended use, authentication. System and Application Security- mail security (PGP etc) file System security, program and security, memory security, Sandboxing. [HOURS -10]

UNIT-III

Security threads protection intruders : Viruses-trusted system. Secure programming languages-concepts structured multiprogramming, shared classes, cooperating sequential processes, structure of the multiprogramming system RC-4000 software. Information Warfare: offensive information warfare, defensive information warfare. [HOURS -10]

UNIT-IV

Key management in Group communication systems, Router security, Denial of service and side-channel attacks, Intrusion detection systems, Intrusion detection techniques-centralized and distributed. [HOURS -10]

TEXT BOOKS:

1. Computer Security, Dicter gouman, John Wiley & Sons
2. Computer Security: Art and Science, Mathew Bishop, Addison-Wisley

REFERENCE BOOKS:

1. Introduction to computer Security- Mathew Bishop, Addison-Wisley
2. Network security, Kaufman, Perlman and Speciner, Pearson Education
3. Cryptography and Network Security, william Stallings, Pearson Education

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6. SEMANTIC WEB

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT-I

Introduction: Structured Web Documents in XML, The Semantic Web Vision, Today's Web, From Today's Web to the Semantic Web Layered approach to Semantic Web Technologies, Overview of Structured Web Documents in XML, XML Language Overview, Structuring, Namespaces, Addressing and Querying XML Documents, Processing of documents.

[HOURS -10]

UNIT-II

Describing Web Resources in RDF Understanding content: Metadata, metadata standards, XML metadata specification, , XML-Based Syntax, RDF- Basics, Schema-Direct Inference System for RDF, Querying in RQL. [HOURS -8]

UNIT-III

Web Ontology Language: OWL Web Ontology Language, Future Extensions, case study of any one ontology editor i.e. Sesame or Protege, Monotonic Rules syntax and Semantics, Nonmonotonic Rules syntax and semantics. [HOURS -10]

UNIT-IV

Semantic Applications: Demonstrating power of semantic technology for search, personalization, contextual directory and custom/enterprise applications; next generation semantic content management , Contributions of IR, AI, Logic, NLP, DB and IS to Semantic Web, Ontology integration versus interoperation. [HOURS -12]

TEXT BOOKS:

1. *The Semantic Web: A guide to the future of XML, Web Services and Knowledge Management*, Wiley Publishing, 2003, Michael C. Daconta, Leo J. Obrst, Kevin T. Smith,
2. Shelley Powers, *Practical RDF*, 2003, 1st Edition, O'Reilly.
3. Elliotte Rusty Harold, *Processing XML with Java*, 2003, Addison-Wesley.

REFERENCE BOOKS:

1. *A Semantic Web Primer*, MIT Press, 2004, Grigoris Antoniou and Frank van Harmelen.
2. *Spinning the Semantic Web - Bringing the World Wide Web to Its Full Potential*, MIT Press, 2002, Dieter Fensel, James A. Hendler, Henry Lieberman, and Wolfgang Wahlster (Eds.)
3. *XML Bible, 2nd Edition*. Hungry Minds, New York, NY 2001, Elliotte Rusty Harold.

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IT-413 OPEN ELECTIVE II

1. VIRTUAL REALITY

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT-I

Introduction: The three I's of Virtual reality, five classic components of Virtual reality systems, Realtime computer graphics, Overview of application areas.

Virtual Reality Systems: The virtual environment, the computer environment, VR technology, Modes of Interaction. [HOURS -8]

UNIT-II

Virtual Reality Hardware: Sensor hardware, display systems, acoustic hardware, integrated VR systems

Input Devices : Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces. [HOURS -6]

UNIT-III

3D Computer Graphics: The virtual world space, Perspective projection, Stereo vision, 3D clipping, Color theory, 3D modeling, illumination models, shading algorithms, Hidden surface removal, realism. [HOURS -8]

UNIT-IV

Geometrical transforms: Frames of reference, 3D transforms, instances, picking, flying, scaling the VE, Collision detection.

Animating the Virtual Environment: Introduction to animation, The dynamics of numbers, updating real-time graphics, shape and object in betweening, free-form deformation.

[HOURS -6]

UNIT-V

Human Factors: Perception, Persistence of vision, Stereopsis, Sound perception, Equilibrium.

Virtual Reality Programming: Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes, 3D Sprites, animated 3D sprites. [HOURS -6]

UNIT-VI

Physical Simulation: Simulation of physical systems, mathematical modeling, collisions, projectiles, introduction to dynamics, motion kinematics. [HOURS -6]

TEXT BOOKS:

1. John Vince, "Virtual Reality systems", Addison-Wesley, 1995
2. R. Carey and G. Bell, "The Annotated Vrml 2.0 reference", Addison Wesley, 1997
3. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc.

REFERENCE BOOKS:-

1. M. McCarthy and A. Descartes, "Reality Architecture: Building 3D worlds in Java and VRML", Prentice Hall, 1998
2. S. Diehl, "Distributed Virtual Worlds: Foundations and Implementation Techniques Using Vrml, Java and Corba, Springer Verlag, 2001

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3. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier(Morgan Kaufmann).
4. 3D Modeling and surfacing, Bill Fleming, Elsevier(Morgan Kauffman).

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2. ADVACEMENT IN WEB TECHNOLOGY

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

EJB: Introduction, Comparison of EJB & Java Beans, Applications, Drawbacks, Different types of enterprise beans – Session beans, Entity beans, Message driven beans, Services provided by EJB container. [HOURS -6]

UNIT II:

JAVA and J2EE design patterns and their implementation: MVC, Singleton, Factory, Database connectivity, Middleware and Web services. [HOURS -6]

UNIT III:

Client & server side programming: Enterprise architecture styles: Single tier, 2-tier, 3-tier, n-tier; Relative comparison of the different layers of architectures. RMI: Introduction and applications, Architecture, Use of RMI Registry. [HOURS -8]

UNIT IV:

Java Naming and Directory Interface (JNDI): Introduction and applications, Comparison between LDAP and JNDI
Java Data Objects (JDO): Introduction, Integration of EJB and JDO, JDO & RMI
Jini: Introduction, Applications, Security Model, Limitations. [HOURS -8]

UNIT V:

Java Database Connectivity (JDBC): Introduction, Database driver, Different approaches to connect an application to a database server, Establishing a database connection and executing SQL statements, JDBC prepared statements, JDBC data sources. [HOURS -8]

UNIT VI:

XML: Java & XML, XML syntax, Document type definition, Parsers, SAX parsers, DOM parsers, SAX vs. Dom, JAXP and JAXB. [HOURS -8]

TEXT BOOKS:

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

REFERENCE BOOKS:

1. "Internet & Java Programming", Krishnamoorthy & S. Prabhu, New Age Publication.

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4. EMBEDDED AND REAL TIME SYSTEMS

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction: Definition of embedded system, Constraints on embedded systems vs. standalone systems, specifications and modeling of embedded systems, components of embedded systems.

Code compression: techniques- dictionary based, using mismatches,bit mask based, decompression engine, application aware code compression- mask selection, dictionary selection. [HOURS -8]

UNIT II:

Hardware/software functional partitioning: Relevant hardware technologies: Discrete logic, CPLDs, FPGAs, ASICs, Software environments: HLL vs. assembly coding, DSP vs. general purpose computer vs. RISC.

Embedded Software Development Tools: Host and target systems, Cross Compilers, Linkers, Locators for embedded systems, Getting embedded software in to the target system.

Debugging techniques: Testing on Host machine, Instruction Set Emulators, Logic analyzers, In-circuit Emulators and Monitors, Functional Validation of Programmable Architectures

[HOURS -9]

UNIT III:

Concept of Real Time System: Issues, reference model, Performance measures, types of real time systems.

Task Assignment and Scheduling: Different task model, Scheduling hierarchy, Offline vs Online Scheduling, Clock Driven, uniprocessor scheduling: fixed priortity and dynamic priority algorithms, scheduling for critical sections, multiprocessor scheduling, available scheduling tools. [HOURS -7]

UNIT IV:

RTOS: overview, time services and scheduling mechanisms, basic kernel services, features of RTOS, processor reserves and resource kernel,real time kernels, therotical foundations of real time systems, open system architecture, copabities of commercial RTOS.

Real time databases: basic definations, temporal data: characteristics, performance metric, timing constraints on database operations, representation of data items in a real time database, concurrency control in real time databases, maintaining serialization consistency.

[HOURS -8]

UNIT V:

Real Time Communication: buffering data, time relative data**,** Message queue, Mailboxes, critical regions, semaphores, deadlock, priority inversion, and priority based services disciplines for switched networks, weighted round robin service disciplines, MAC protocols of broadcast networks, internet& resource reservation protocol, and real time protocol.

Real time synchronization: clocks, clock synchronization, need for it, non-fault tolerant

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synchronization algorithm, fault tolerant synchronization in hardware, synchronization in software. [HOURS-8]

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TEXT BOOKS:

1. Jane .W. S. Liu, “Real Time Systems” Pearson Education.
2. David A. Simon, “An Embedded Software Primer” , Pearson Education.

REFERENCE BOOKS:

1. Krishna .C.M “Real Time Systems” Mc-Graw Hill Publication.
2. Daniel W.Lewis, “Fundamentals of Embedded Software Where C and Assembly Meet”, Pearson Education
3. Albert Cheng,”Real time system- scheduling, analysis and verification,” wiley publications.

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4. VLSI TECHNOLOGY

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Introduction to CMOS circuits: MOS Transistors, MOS transistor switches, CMOS Logic, The inverter, Combinational Logic, NAND gate, NOT Gate, Compound Gates, Multiplexers, Memory-Latches and Registers.

Circuits and System Representation: Behavioral Representation, structural representation, and physical representation. [HOURS -4]

UNIT II:

CMOS Processing Technology: Silicon Semiconductor Technology- An Overview, wafer processing, oxidation, epitaxy deposition, Ion-implantation and diffusion, The Silicon Gate Process- Basic CMOS Technology, basic n-well CMOS process, p-well CMOS process, Twin tub process, Silicon on insulator, CMOS process enhancement-Interconnect, circuit elements, 3-D CMOS. [HOURS -9]

UNIT III:

Layout Design Rule: Layer Representations, CMOS n-well Rules, Design Rule of background scribe line, Layer Assignment, SOI Rule. Latch up: Physical origin of Latch up, Latch up triggering, Latch prevention, Internal Latch up prevention techniques, I/O Latch up Prevention Switching Characteristics: analytic delay models, empirical delay model, and gate delay. HOURS -7]

UNIT IV:

Power Dissipation: Static dissipation, Dynamic dissipation, short-circuit dissipation, total power dissipation.

CMOS design Methods: Design Strategies, Structural design strategies, Hierarchy, Regularity, Locality. [HOURS -6]

UNIT V:

Programmable Logic, Programmable Logic structure, Programmable interconnect, and Reprogramable Gate Array: Xilinx Programmable Gate Array, Algortomix, concurrent logic, Gate array design, Full custom mask design. [HOURS-6]

UNIT VI:

Design Methods: Behavioural Synthesis, RTL synthesis, Placement, Routing, Layout Synthesis.

Design Capture Tools: HDL Design, Schematic, Layout Design, Floorplanning, Chip composition

Design Verification: Simulation, Timing verifier, Netlist Comparison. [HOURS -8]

TEXT BOOKS:

1. Neil H.E. Weste and Kamran Eshraghian ,"Principles of CMOS VLS Design – A System Perspective ", Addison Wesley Pub.
2. Demassa & Ciccone ,"Digital Integrated Circuits ", Willey Pub.

REFERENCE BOOKS:

1. Wayne Wolf ,"Modern VLSI Design: system on silicon ", Addison Wesley Longman

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Publisher
2. Douglas A. Pucknell & Kamran Eshranghian ,"Basic VLSI Design", PHI
3. Jan M. Rabaey,"Digital Integrated Circuits: A Design Perspective", PHI

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5. DATA MINING AND DATA WAREHOUSING

L	T	P	Credits	Total Hours: 40
3	1	0	4	

UNIT I:

Data Warehousing: An Introduction to data ware housing, types of databases for data mining, characteristics, issues of data mining. [HOURS-2]

UNIT II:

Data Ware house: introduction, multidimensional data model- data cubes, types of schemas, examples, measures.

Data Ware house Architecture: design & construction, three tier data, back end tools & utilities, metadata repository. [HOURS-8]

UNIT III:

Data Preprocessing: reason for preprocessing**,** Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

[HOURS-6]

UNIT IV:

Data Mining Techniques and Algorithms: Process of data mining.

concept description: different methods-atribute oriented induction

associations and correlations- Apriori algorithm- using candidate generation, rules from frequent itemsets,improving efficiency; kinds of association rules- multilevel, multi dimensional.

[HOURS-8]

UNIT V:

classification and prediction: types of classification algorithm- Bayesian, rule based, decision tree, SVM, backpropagation, types of prediction methods: linear regression, non-linear regression.

cluster analysis: types of data- interval scaled, binary categorical, ordinal, ratio scaled; major clustering methods- overview of grid based, model based, density based, partioning based, hierarchical based methods [HOURS-8]

UNIT VI:

On Line Analytical processing: OLTP and OLAP systems, Data Modeling, OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse. [HOURS-8]

TEXT BOOKS:

1. Paulraj Ponniah, “Data Warehousing Fundamentals”, John Wiley.
2. M.H. Dunham, “Data Mining Introductory and Advanced Topics”, Pearson Education.

REFERENCE BOOKS:

1. Han, Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufmann
2. Pieter Adriaans, Dolf Zantinge , “Data Mining”, Pearson Education Asia
3. Ralph Kimball, “The Data Warehouse Lifecycle toolkit”, John Wiley.
4. M Berry and G. Linoff, “Mastering Data Mining”, John Wiley.
5. W.H. Inmon, “Building the Data Warehouses”, Wiley Dreamtech.
6. R. Kimball, “The Data Warehouse Toolkit”, John Wiley.

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6. SOFT COMPUTING TECHNIQUES

L T P Credits **Total Hours: 40**
3 1 0 4

UNIT I:

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. [HOURS -10]

UNIT II:

Advanced Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedge. Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, and Fuzziness of Fuzzy Sets. Fuzzy Models, Introduction of Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks. [HOURS -8]

UNIT III:

Neural Networks: History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning.

Algorithms: ANN training Algorithms-perceptrons, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks. [HOURS -10]

UNIT IV:

Learning Techniques: Introduction, Evolutionary Techniques, Swarm Intelligence, Bacterial Foraging, Ant Colony Optimization, and Genetic Algorithm. [HOURS -8]

UNIT V:

Applications: Fuzzy Logic, Neural Networks, and learning techniques in Medicine, Economics, Image Processing, Biometrics, and in other branches of Science and Engineering.

[HOURS-6]

TEXT BOOKS:

1. "An Introduction to Neural Networks", Anderson J.A., PHI, 1999.
2. "Introduction to the Theory of Neural Computation", Hertz J. Krogh, R.G. Palmer, Addison-Wesley, California,

REFERENCE BOOKS:

1. "Fuzzy Sets & Fuzzy Logic", G.J. Klir & B. Yuan, PHI, 1995.
2. "An Introduction to Genetic Algorithm", Melanie Mitchell, PHI, 1998.
3. "Neural Networks-A Comprehensive Foundations", PHI, New Jersey, 1999.
4. "Neural Networks: Algorithms, Applications and Programming Techniques", Freeman J.A. & D.M. Skapura, Addison Wesley, Reading, Mass (1992).

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