DIVISION

OF

INFORMATION TECHNOLOGY

Code	Subject Name	Credit
IT201	Digital Integrated Circuits	3:1:0
IT202	Digital Integrated Circuits Lab	0:0:2
IT203	Communication Engineering	4:0:0
IT204	Computer Architecture	4:0:0
IT205	Data Communication and Computer Networks	4:0:0
IT206	Interactive Multimedia	3:1:0
IT207	Interactive Multimedia Lab	0:0:2
IT208	Internetworking	4:0:0
IT209	Modern Communication Technology	4:0:0
IT210	Data Structures	4:0:0
IT211	File Design & Data Structures Lab	0:0:2
IT301	Neural Networks and Applications	4:0:0
IT302	Multimedia and Virtual Reality Systems	4:0:0
IT303	Advanced Networks	4:0:0
IT304	TCP/IP Networking	4:1:0
IT305	Mobile Computing	4:0:0

IT201 DIGITAL INTEGRATED CIRCUITS

Credit: 3:1:0
Marks (40 + 60)

Unit I : Number Systems

Need for binary numbers, Conversions: binary to decimal, decimal to binary, octal to decimal, decimal to octal, hexadecimal to binary and vice versa. ASCII code, Excess-3 code, Gray code.

Arithmetic Circuits: Binary Addition, subtraction, multiplication, division, signed, unsigned numbers, 2's complement arithmetic, arithmetic building blocks: adder, subtractor.

Unit II : Logic Circuits Analysis And Design

Binary number system, NOT, OR, AND, NAND, NOR gates, Boolean algebra, laws and theorems, sum of products, products of sum method, Karnaugh map.

Data Processing Circuits: Multiplexer, Demultiplexer, Decoder, Encoder, XOR gate, Parity Generator and Checker, ROM, PAL.

Unit III : Digital ICs

TTL circuits and CMOS circuits, 7400 devices, TTL parameters, AND-OR-invert gate, open collector gates, Three state TTL devices, External drive for TTL loads, positive and negative logic.

CMOS Circuits: E-type MOSFET, MOS inverter, 74C00 CMOS characteristics, TTL-CMOS interface, TTL clock, 555 timer and applications.

Unit : IV
RS, JK and D Flip-flops, Schmitt trigger, Types of shift register, synchronous and asynchronous counter, counters, Shift Counters.

Unit : V
Semiconductors Memories: Memory Addressing, ROMs, PROMs, EPROMs, RAMs, DRAMs, memory cells. D/A and A/D conversion.

(In all the five units, trouble-shooting section not included)

Text Book

1. Albert Paul Malvino and Donald P. Leech, *Digital Principles and Applications*, Fourth Edition, Tata McGraw Hill, 1991.

Reference Book

1. M. Morris Mano, *Digital Logic and Computer Design*, Second Edition, Prentice-Hall of India Private Limited, 1990.

IT 202 DIGITAL INTEGRATED CIRCUITS LAB

Credit: 0:0:2
Marks (50 + 50)

1. Summing amplifier using op-amp
2. Integrator and differentiator using op-amp
3. Active filter using op-amp
4. 555 Timer
5. Counters using flip-flops
6. Decoder and Encoder
7. Multiplexer and Demultiplexer
8. Shift register using flip flops
9. Parity generator and checker
10. Half adder and full adder using gates

IT 203 COMMUNICATION ENGINEERING

Credit: 4:0:0
Marks (40 + 60)

Unit : I
Noise and its effects, sources and types of noise, need for modulation, basis of AM, modulation index, and signal power, SSB, the roll of the receiver, receiver techniques and stages, AM demodulation, SSB and CW demodulation, AM features and drawbacks, concept of frequency modulation, FM spectrum and bandwidth, transmitters, receiver functions, FM demodulation, phase modulation, comparison of AM, FM and PM, FM receivers.
(Sections 3.6, 3.7, 4.1 - 4.3, 4.5, 5.1, 5.2, 5.6, 5.7, 5.9, 6.1 - 6.5, 6.7, 6.8)

Unit : II

Twisted pair and coaxial cables, Impedance and line fundamentals, waveguides, line and load matching, propagation and the function of antennas, propagation modes, antenna fundamentals, elementary antennas, advanced single-element antennas.
(Sections 7.4, 8.1, 8.3, 8.4, 9.1, 9.2, 9.4, 9.5, 9.7)

Unit : III

Analog to digital converters, digital to analog converters, pulse code modulation, delta modulation, asynchronous systems and synchronous systems, error detection and correction, basic digital modulation and demodulation, Quadrature Amplitude Modulation.
(Sections 11.1, 11.2, 11.4, 12.6, 12.7, 13.1, 13.2)

Unit : IV

Imaging basis, TV signal, color TV, TV receivers, Facsimile, the RS-232 Interface standard, RS-232 operation, RS- 232 ICs, Modem functions, communications and orbits, satellite design, ground station, cellular concepts, cellular system implementation.
(Sections 14.1 – 14.5, 17.1 – 17.3, 17.5, 19.1 – 19.3, 20.1, 20.2)

Unit : V

Radar concepts and display, Multiplexing introduction, space division multiplexing, frequency division multiplexing, time division multiplexing, multiple stage multiplexing, Fiber optics system characteristics, the optical fiber, sources and detectors, complete systems.
(Sections 21.1, 22.1 – 22.5, 24.1 – 24.4)

Text Book

1. William Schweber, *Electronic Communication Systems - A Complete Course*, Third Edition, Prentice-Hall International, 1999.

Reference Book

1. Taub and Schilling, "Principles of Communication", Second Edition, Tata McGraw Hill, 1991

IT204 COMPUTER ARCHITECTURE

Credit: 4:0:0
Marks (40 + 60)

Unit : I

Register transfer and microoperations, Register transfer language, Register transfer, Bus and memory transfers, Arithmetic, logic and shift micro operations

Basic computer organization and design: Instruction Codes, Computer Instructions, Timing and Control Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt.
(Chapter 4 & 5)

Unit : II

Central processing unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC). (Chapter 8)

Unit : III

Microprogrammed control: Control Memory, Address Sequencing.

Processings: Parallel Processing, Pipelining, Vector Processing, Array Processors, and Characteristics of Multiprocessors

Computer arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms. (Chapter 7,10)

Unit : IV

Input-output organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Direct Memory Access (DMA). (Chapter 11)

Unit : V

Memory organization: Memory Hierarchy, Main Memory, Associative Memory, Cache Memory, Virtual Memory.(chapter 12)

Text book

1. M. Morris Mano, *Computer System Architecture*, Third Edition, Prentice Hall of India, 1996. (Chapters 4,5,7,8,10-12 only)

Reference books

1. William Stallings, *Computer Organization and Architecture*, Fourth Edition, Prentice Hall of India, 1996.
2. Thomas C. Bartee, "Computer Architecture and Logic Design", McGraw Hill International Edition, 1991
3. John P. Hayes, "Computer Architecture and Organisation" McGraw Hill International Edition, 1998

IT205 DATA COMMUNICATION AND COMPUTER NETWORKS

Credit: 4:0:0

Marks (40 + 60)

Unit I : Physical Layer

Uses of Computer Networks – Network Hardware – Network Software – Reference Models – Example Networks – Example Data Communication Services – Network Standardization – The Theoretical Basis for Data Communication – Transmission Media – Wireless Transmission – The Telephone System – Narrow band ISDN , Broadband ISDN and ATM – Cellular Radio – Communication Satellites

Unit II : Data Link Layer
Data Link Layer Design Issues – Error Detection and Correction – Elementary Data Link Protocols – Sliding Window Protocols – Protocol Specification and Verification – Example Data Link Protocols – The Channel Allocation Problem – Multiple Access Protocols – IEEE Standard 802 for LANS and MANS – Bridges – High Speed LANS – Satellite Networks

Unit III : Network Layer
Network Layer Design Issues – Routing Algorithms – Congestion Control Algorithms – Internetworking – The Network Layer in the Internet – The Network Layer in ATM Networks
Transport Layer
Transport Service – Elements of Transport Protocols – A simple transport protocol – The Internet Transport Protocols (TCP and UDP) – The ATM AAL Layer Protocols – Performance Issues

Unit IV : Application Layer
Network Security – Domain Name System (DNS) – Simple Network Management Protocol (SNMP) – Electronic Mail – Usenet News – The World Wide Web – Multimedia

Unit V : ATM Networks
Introduction - ATM – Historical perspective – protocol architecture – logical connectives – cells – transmission of ATM cells – SDH – SONET – Switches.
ATM Protocol – Connection setup – routing , switching.

Text Book:

1. Andrew S.Tanenbaum , Computer Networks, Prentice Hall of India ,1997
4. Rainer Handel, Manfred N.Huber, Stefan Schroder, ”ATM Networks”, Addison Wesley, 1999.

Reference Books:

1. W.Stallings ,Data and Computer Communication, Prentice Hall of India ,New Delhi, Fourth Edition ,1996
2. F.Halsai ,Data Communications, Computer Networks and Open Systems, Addison-Wesley Publications , Third Edition ,1994.
3. Peterson, Computer Networks, Second edition.

IT206 INTERACTIVE MULTIMEDIA

Credit: 3:1:0
Marks (40 + 60)

Unit I : Uses Of Multimedia Information
Multimedia and personalized computing, multimedia systems: the challenges. Architectures and issues for distributed multimedia systems: distributed multimedia systems – synchronization, Orchestration, and QOS architecture – the role of standard, a framework for multimedia systems. Digital sound – digital audio signal processing, Transmission of digital sound – digital audio signal proessing, digital music making – brief survey of speech recognition and regeneration – digital audio and the computer. Video technology: Rester

Scanning principles – sensors for TV Cameras – color fundamentals – video performance measurements – analog video artifacts – video equipments – worldwide television standards.

Unit II : Digital Video And Image Compression

Evaluating A compression system – redundancy and visibility – video compression techniques – the IPEG image compression standard – the MEPG motion video compression standard – DVI technology, Multimedia information systems – Middle ware system Services, Architecture – goals of Multimedia system service architecture – media stream protocol – multimedia device presentation service and user interface.

Unit III : Multimedia File Systems And Information Models

The case for multimedia information systems – File system support for continuous media – data models for multimedia and hypermedia information Multimedia presentation and authoring: current state of the industry – design paradigms and user interface – barriers to widespread use.

Unit IV : Multimedia Communications Systems

Multimedia services over the public network: Requirements, Architecture and Protocols – Applications – Network services – network protocols – Multimedia interchange: Quick Time Movie File (QMF) format – MHEG (Multimedia and Hypermedia Information Encoding Expert Group) – format function and representation summary – real-time interchange – Multimedia conferencing: teleconferencing systems – requirements for multimedia communications – shared application architectures and embedded distributed objects – multimedia conferencing architectures.

Unit V : Multimedia Group Ware

Seams and design approaches – architecture of team workstation – experimental use of team workstation – nomenclature – video versus computing – HDTV, ATV, EDTV, IDTV – standardization issues – knowledge – based Multimedia systems – problems facing multimedia systems – the anatomy of an intelligent multimedia systems.

Text Book

1. John. F. Koegelbuford, Multimedia systems, AWP, 1994.

Reference Book

1. Nigel Chapman, Jenny Capman, “Digital Multimedia”, John Wiley & Sons, 2000.

IT207 INTERACTIVE MULTIMEDIA LAB

Credit: 0:0:2
Marks (50 + 50)

1. Spotlight effect in Flash
2. Designing Calculator in Flash
3. Bouncing ball in Flash
4. Calling flash file in HTML

5. Editing picture using Photoshop
6. Image processing techniques using Matlab
    a) 2D Fourier Transform
    b) Image enhancement

IT208 INTERNETWORKING

Credit: 4:0:0
Marks (40 + 60)

Pre-requisite: IT205 Data Communication And Computer Networks

Unit I : **Introduction**
Introduction – layering – DNS - encapsulation – de-multiplexing – client /server model – port numbers – standardization process – the internet.
Link layer : introduction – Ethernet and IEEE 802 encapsulation – trailer encapsulation – SLIP – PPP- Loop back interface – MTU .
Internet protocol: introduction – IP header – IP routing – subnet addressing – subnet mask- special case of IP addresses – a subnet example.

Unit II : Address resolution protocol
Introduction – an example – ARP cache – ARP packet format – ARP examples –Proxy ARP – ARP command.
RARP: Introduction – RARP packet format – RARP examples – RARP server design.
ICMP: Introduction – ICMP message types – ICMP address mask request and reply- ICMP timestamp request and reply- 4.4 BSD processing of ICMP Messages.

Unit III : Ping program
Introduction – ping program – IP record route option – IP time stamp option.
Trace route program: Introduction – trace route program operation – LAN output – WAN output- IP source routing option.
IP routing: Introduction – routing principles – ICMP host – ICMP redirect errors
Dynamic Routing protocols: introduction – dynamic routing – RIP- OSPF – BGP – CIDR.
UDP: introduction – UDP header – UDP checksum – IP Fragmentation – UDP Server design.

Unit IV : DNS
Introduction- basics – message format – simple example – pointer quires – resource records – caching – UDP
TFTP: introduction –protocol – security . BOOTP: introduction – packet format – server design – through router .
TCP : Introduction – services – headers – connection establishment and termination –timeout of connection establishment- maximum segment size- half –close – state transition diagram – reset segments – simultaneous open and close- options – server design.

Unit V : SNMP
Introduction – protocol – structure of management information – object identifiers – management information base – instance identification .

Telnet **:** rlogin protocols – examples – telnet protocol and examples . FTP – protocol – examples – SMTP protocols – examples –NFS – TCP/IP Applications.

Text Book:

1. W. Richard Stevens , *TCP/IP Illustrated Volume – I " The Protocols "*, Addison Wesley Longman, 1994.

Reference Book:

1. Jaiswal .S,*TCP\IP principles,Architecture,Protocols And Implementation*,First Edition, Galgotia Publications Pvt Ltd,1996.

IT209 MODERN COMMUNICATION TECHNOLOGY

Credit: 4:0:0
Marks (40 + 60)

Unit : I

The elements of technical communication – Topology of networks – Devices with hardware control – Terminals with software Control – efficiency – switching techniques – packet switching – circuit switching – comparison – X.25

Unit : II

IDN – ISDN structure / architecture – connections - Standards and Interfaces – transmission structure – user network interface configuration – ISDN protocol architecture – ISDN addressing – ISDN terminals.

Unit : III

Basic user network interface – primary rate user – network interface – U interface – ISDN data link layer – LAPD – Terminal adapt ion – bearer channel – Data link control .

Unit IV

ISDN Network layer
Overview – basic cell control – control of supplementary services – summary.

Unit : V

Broadband ISDN and ISDN services
Broad band architecture – BISDN standards – services – requirement – architecture – ISDN services – service capabilities – bearer services and tele services – basic and supplementary services – ISDN in commercially used network – ISDN in private house holds – ISDN telephone – ISDN video telephone – telefax etc.

Text Book

1. William Stallings , " ISDN and broadband ISDN with frame relay and ATM", Pearson Education Asia, Fourth Edition – 2001

Reference Book

1. Dr. Horst – Edgar martin, "Communication with ISDN", Markt & Technik – Galgotia Print, 1991.
2. ISDN – Gary C. Kebler, 2nd edition, McGraw Hill, 1995.

IT210 DATA STRUCTURES

Credit: 4:0:0
Marks (40 + 60)

Unit : I

Algorithms for Data Structures - Specifics of PSEUDO - Data types, constants, Variables and expressions, Program modules in PSEUDO Logic and Control structures in PSEUDO - Linked lists, arrays, ssingly linked lists - Insertions and deletions - variations on linked list structures, Dummy Headers, Circular linked lists, Doubly linked circular list - Fixed length string method - workspace/Index table method Processing efficiency considerations of the workspace/Index talk method - Garbage collection - Linked list method.

Unit : II

Circular implementation of a queue - Linked list implementation of a queue, priority queues - stacks - Array implementations of a stack, linked list implementation of a stack, parsing and Evaluation of Arithmetic expressions using stacks, postfix, prefix and lnfex notations converting Infix expressions to postfix, Evaluating post fix expression - Recursion, Tower of Hanoi Problem, Recursive Algorithms, implemented non-recurisvely, recursion, stacks and backtracking. the 8 queues problem.

Unit : Ill

Tree structures, Binanry trees, implementation of Binary trees ' linear representation of a binary tree, linked representation of a binary tree, binary tree traversals, pre-order, In order, post order traversals of a binary tree - Deletion algorithm for lists maintained with binary tree. Threaded binary trees, insertions into a binary tree, height - balanced trees, AVL - rotations, General trees.

Unit : IV

Implementing a multidimensional array - sparse matrices and generalised Dope vector implementation - Linked list implementation of a sparse matrix. Graphs and networks, implementation of graphs - the adjacency matrix, Depth-first search, breadth--first search.Networks-Minimum spanning tree - The shortest path algorithm - Topological ordering.

Unit : V

Sorting: Internal sorts, the Bubble sort, the insertion sort, the selection sort, the shell sort the quick sort, the heap sort, External sorting or file sorting, the Merge sort. Search strategies: Quantity dependent search techniques, sequential search, Binary search, Binary tree search - Density dependent search techniques, Construction of Hashing function, Collision Processing - indexed search techniques Indexed indexing, Tree indexing.

Text Book

1. Introduction to Data Structures - by Bhagat Singh and Thomas L.Naps - TMH 1986.

Reference Books

1. An Introduction to data Structures with applications - by Jeanpaup Tremblay and Paul G.Sorenson - TMH, Second Edition. 1 99 1
2. Fundamental of Data Structures - by E.Horowitz and S.Sahni, Gaigotia Book source, 1983.
3. Data Structures and program design - by Robert L.Kruse, Prentice Hall of India Pvt.Ltd.,1987 - 2nd Edition.

IT211 FILE DESIGN AND DATA STRUCTURES LAB

Credit: 0:0:2
Marks (50 + 50)

1. Develop a date structure for trees. Include addition, deletion, access procedures. Apply this to problems like students list, passengers list, polynominal representations.

2. Write an algorithm for balancing a B tree, B plus tree and tree.

3. Develop data structures for multilevel indexing to store records. Write procedures for insertion, deletion and accessing a record. Calculate access times.

4. Develop file structures for a direct address calculation method (Hashing). Assume a proper disk size and hashing function.

5. Write an algorithm to convert a tree into a binary tree. Also traverse the tree. Write a search algorithm using an ordered binary tree.

6. Write algorithm to sort a list of records based on a key using a tree data structure.

7. Sort a file containing records using quick sort.

8. Merge two sorted files.

9. Write algorithm to access records based on a non-key value (inverted list - approach).

10. Insert a large file (of 1500 records) into disk using (a) contiguous allocation approach (b) linked blocks approach.

11. Given a graph, suggest a suitable data structure; develop an algorithm to detect a cycle.

12. A dictionary has words in two languages. Write search algorithms to search for w word that may be in any language.

IT301 NEURAL NETWORKS AND APPLICATIONS

Credit 4:0:0
Marks 40 +60

Unit-I

Introduction to Artificial Neural Network : Fundamentals of ANN – Biological neural network – Human and Computer – Artificial neuron, activation functions – Architecture of ANN – Training of ANN, Learning Methods – Perceptron – Limitation and overcoming the linear separability.

Unit-II

Multilayers Network: Introduction – Back propagation network – Training algorithm – Applications – practical difficulties – CPN – Training the kohonen and Grossberg layers – full CPN – Application.

Unit-III

Associative Memory & Bottzmann Machine: Associative memory definitions – BAM structure – Types of BAM – Hopfield network – Binary & continuous systems – Bottzmann machine training- SOM – Application.

Unit-IV

Adaptive Resonance Theory and Optical Neural Networks: ART architecture – classification operation – Implementation – training example – characteristics – theorems of ART – Advantages of optical neural network – Network configuration types – optical image recognition – volume holograms.

Unit-V

Applications of Neural Networks : Traveling salesman problem – Multitarget tracking – Time series prediction - Talling network and phonetic typewriter – Autonomous vehicle Navigation – Handwritten digit recognition – Image Compression using back propagation – Visual processing Networks

Text Books

1. Waserman., : "Neural Computing Theory and Practice",
2. N.K. Bose., P. Liang.,: " Neural Network Fundamentals with Graphs, Algorithms and applications",

Reference Book

1. James A. Freeman., David M. Skapura.,: Neural Networks"

IT302 MULTIMEDIA AND VIRTUAL REALITY SYSTEMS

Credit 4:0:0
Marks 40 +60

MULTIMEDIA

Unit - I

Architecture and issues for distributed multimedia systems. Digital audio representation and processing. Video technology, Digital video and image compression, Time based media representation and delivery.

Unit - II

Operating system support for continuous media applications. Middleware system services architecture. Multimedia devices, presentation services and the user interface. Multimedia file systems and information models. Multimedia presentation and authoring

Unit - III

Multimedia services over the public network; requirements, architectures and protocols. Multimedia interchange. Multimedia conferencing. Multimedia groupware: Computer and Video fusion approach to open shared workspace.

VIRTUAL REALITY

Unit IV

Virtual environment system: An introduction – terminology – classification – system architecture – synthesis – Physiology & perception in virtual environments – Enabling technology: Visual, Auditory, Haptic/Kinaesthetic environment systems.

Unit V

Software: Desktop virtual reality, VPL RB2 system, virtual environmental operating shell, Minimal Reality, World Tool Kit, Multigen, Generic Visual system – Software considerations

Virtual environment displays – position and orientation tracking – visually coupled system requirements – interaction with virtual objects – applications of virtual environments.

Text Books

1. John F. Koegel Bufford, Multimedia Systems, Addison Wesley, 1994.
2. Roy S. Kalawsky, The science of Virtual Reality and Virtual Environments , Addison Wesley 1993.

IT303 - ADVANCED NETWORKS

Credit: 4:0:0 **Marks: 40+60**

Unit-I

Circuit Switched Networks: SONET :introduction –layers – frame structure– SONET multiplexing – DWDM - Fiber to the Home – Passive optical networks- Passive Photonic

loop-Hybrid Scheme -DSL – ADSL - ISDN – BISDN- CATV- Layout-Layer network-Services

Unit-II

ATM: Main features of ATM –ATM protocols- Addressing Signaling & Routing –Meta signaling-ATM adaptation layer for signaling– Signaling Protocols for CS1-PNNI-Header Structure – ATM Adaptation layer –Type 0-Type 1-Type2-Type 3/4 –Type 5.

Unit-III

Management and control: Fault Management- ATM Traffic & Congestion control – Network status monitoring & Configuration- Flow control –error detection- error control

Internetworking with ATM: LAN- IP over ATM – Multiprotocol over ATM – Frame Relay over ATM

Unit –IV

Wireless Networks: The wireless channel – Link level design – Channel access – Network design – standards.

Unit-V

Recent Trends: Optical Networks – Cross-connects – LANS – Voice Over IP – Multimedia Networks.

Text Book:

1. Walrand. J. Varaiya, "High Performance Communication Network", Morgan Kauffman-Harcourt Asia Pvt. , Ltd., 2nd Edition- 2000.
2. Bates & Donald W. Gregory "Voice & Data Communications Handbook", McGraw hill, 3rd edition – 2000.

Reference:

1. William Stallings ,"ISDN & Broadband ISDN with frame Relay & ATM P III", Prentice Hall, 4th Edition , 2000.
2. Rainer Handel, Manfred N. Huber , Stefen Schroder "ATM Networks, Concepts, Protocols Applications, 3rd edition,1999.
3. J.F.Kurose & K.W. Ross "Computer Networking-A top-down approach featuring the internet", Addison Wesely,2001

IT304 -TCP/IP NETWORKING

Credit: 4:1:0 **Marks: 40+60**

Unit I

Introduction and overview –Network interface layer - Internet addresses
Address discovery and binding - ARP – Determining an internet address at Startup - RARP

Unit II
Internet protocol- global software organization – routing table & algorithm –fragmentation & reassembly –Error processing -ICMP.

Unit III
Internet multicasting – IGMP- User datagrams (UDP)
Socket level interface-RIP –OSPF

Unit IV
TCP-Data structures & input processing- finite stats machine implementation – output processing –timer management.

Unit V
TCP-Flow control & adaptive retransmission – urgent data processing & the push function
SNMP- MIB variables ,representations & bindings-client & server.

Text Book:
1. W.Richard Stevens, Gary R.Wright, Gary Wright, "TCP/IP - Illustrated 3rd Volume", Addison Wesley Professional; 1st edition, 2002
2. "Internetworking with TCP/IP", Volume II ,Design, Implementation &Internals, Douglas.E.Comer , David L.Stevens, Prentice Hall, Second edition 1994.

REFERENCES:
1. Douglas.E.Comer . , "Internetworking with TCP/IP", Volume I, Principles, Protocols & Architecture, Prentice Hall, Third edition,1995.
2. Gary R. Wright, W. Richard Stevens Pearson, "TCP/IP", Education Aisa Pvt. Ltd., Third Indian reprint 2000.

IT305- MOBILE COMPUTING

Credit 4:0:0 **Marks: 40+60**

Unit-I
Introduction:Applications – history – simplified reference model . **Medium access control**: MAC - SDMA – FDMA – TDMA – CDMA. **Telecommunication systems:** GSM –DECT – TETRA – UMTS and IMT – 2000.

Unit-II
Satellite systems: History – applications – Basics – Routing – Localization – Handover – examples**. Boardcast systems**: cyclic repitation of data – Digital audio broadcasting – Digital video broadcasting.
Standards: Wireless LAN – IEEE 802.11 – HIPERLAN – Bluetooth.

Unit-III
Wireless ATM : WATM working group – Services – Reference model – Functions – Radio access layer – Handover – Location management – Addressing – Mobile quality of service – Access point control protocol

Unit-IV

Network Issues: Mobile IP – DHCP –Ad hoc networks. **Mobile transport layer** – Indirect TCP – Snooping TCP – Mobile TCP – Transmission time out freezing – Selective retransmission – Transaction oriented TCP.

Unit-V

Application Issues: File systems –consistency - examples – world wide web - Wireless application protocol– Analysis of existing wireless network.

Text Book:

1. J. Schiller, "Mobile Communications", Addison Wesley, 2000.

Reference:

1. William C.Y. Lee, "Mobile Communication Design Fundamentals", John Wiley, 1993.
2. Feher K., "Wireless digital communications ", PHI, New Delhi, 1995.
3. Rappaport T.S., "Wireless Communications; Principles and Practice ", Prentice Hall, NJ, 1996.
4. Lee W.C.Y., "Mobile Communications Engineering: Theory and Applications", Second Edition, McGraw Hill, New York, 1998.

ADDITIONAL SUBJECTS

Code	Subject Name	Credit
IT212	Digital Integrated Circuits	3:1:0
IT213	Computer Architecture	4:0:0
IT214	Data Structures and Algorithms	3:1:0
IT215	Digital Integrated Circuits Lab	0:0:2
IT216	Data Structures and Algorithms Lab	0:0:2
IT217	Microprocessors and Interfacing	4:0:0
IT218	Computer Networks	4:0:0
IT219	Communication Engineering	3:0:0
IT220	Microprocessors and Interfacing Lab	0:0:2
IT221	Mobile Communication	4:0:0
IT222	High Speed Networks	3:0:0
IT223	Networking and Security Lab	0:0:2
IT224	Computer Hardware and Peripherals Lab	0:0:2
IT225	Case Tools Lab	0:0:2
IT226	Artificial Intelligence	4:0:0
IT227	Data Mining	4:0:0
IT228	Mobile Computing	4:0:0
IT229	Software Testing	4:0:0
IT230	Software Project Management	4:0:0
IT231	Software Quality Management	4:0:0
IT232	E-commerce	4:0:0
IT233	TCP/IP Protocols	4:0:0
IT234	Multimedia Systems	4:0:0
IT306	Advanced Database Technologies	4:0:0
IT307	Principles of Network Management	4:0:0
IT308	Web Services	4:0:0
IT309	Network Security	4:0:0
IT310	Internetworking	4:0:0
IT311	Internetworking and Web Technology Lab	0:0:2
IT312	Computer Network Management	4:0:0
IT313	LAN Design and Implementation	4:0:0
IT314	Mobile computing and communication	4:0:0
IT315	Multimedia Communications	4:0:0
IT316	Network design and management Lab	0:0:2

IT212 DIGITAL INTEGRATED CIRCUITS

Credits: 3 : 1 : 0 **Marks: (40 + 60)**

UNIT I

Number Systems: Review of binary, octal, decimal & hexadecimal number systems – Binary addition, subtraction, multiplication, division, representation of signed numbers – floating point number representation – BCD – ASCII – EBCDIC – Excess 3 codes – Gray code – Error detecting & correcting codes

Boolean algebra: Postulates & theorems of Boolean algebra – Canonical forms – Simplification of logic functions using Karnaugh map

(Chapters 1, 2, 3)

UNIT II

Combinational Logic: Logic gates – Implementation of combinational logic functions – encoders and decoders – multiplexers and demultiplexers – code converters – magnitude comparator – Binary adder-Subtractor – Decimal Adder - Parity generator / checker – Implementation of logical functions using multiplexers, ROM

(Sections 4.1-4.10)

UNIT III

Sequential Logic: Sequential Circuits – Latches – Flip-Flops – Shift registers – Ripple counters – Synchronous Counters – Other Counters.

(Sections 5.1-5.3, 6.1-6.5)

UNIT IV

Logic Families: Introduction – Special Characteristics – Bipolar Transistor Characteristics – RTL and DTL Circuits – Transistor-Transistor Logic – Emitter-Coupled Logic – Metal Oxide Semiconductor – CMOS

(Sections 10.1-10.8)

UNIT V

Memory and Programmable Logic: Random Access Memory – Memory Decoding – Read Only Memory – Programmable Logic Array – Programmable Array Logic – Sequential Programmable devices

(Chapter 7)

Text Book:

1. Morris Mano, *Digital Design*, Prentice Hall of India, Third Edition, 2002. (Sections on HDL excluded)

Reference Book:

1. Thomas Floyd, *Digital Fundamentals*, Pearson Education (Singapore), Eighth Edition, 2003.

IT213 COMPUTER ARCHITECTURE

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I
Introduction - Computer System: Top level view of computer function and interconnection - Cache Memory

UNIT II
Internal Memory - External Memory - Input/Output

UNIT III
Central Processing Unit-Instruction Set: Characteristics and Functions - Addressing modes and formats

UNIT IV
CPU Structure and Function

UNIT V
Control Unit: Control Unit Operation - Microprogrammed Control

Text Book:
William Stallings, *Computer Organization and Architecture,* Sixth edition, Prentice Hall of India, 2003. (Chapters 1, 3-5, 7, 9-12, 16, 17)

IT214 DATA STRUCTURES AND ALGORITHMS

Credits: 3 : 1 : 0 **Marks: (40 + 60)**

UNIT I
Stacks - Introduction to Recursion - Backtracking: Postponing the Work - Principles of Recursion
Queues - Definition - Implementation of Queues - Circular Queues - Application of Queues: Simulation
(Chapter 3, 4.1-4.4)

UNIT II
Lists - Pointers and Linked List - Linked Queues - List Specifications - Implementation of Lists - Linked Lists in Arrays
Searching: Introduction and Notation - Sequential search - Binary search - Comparison Trees
(Sections 4.5, 4.6, 5.1, 5.2, 5.5, 6.1, 6.2, 6.4, 6.5)

UNIT III
Sorting - Introduction - Insertion sort - Selection Sort - Shell sort - Divide and Conquer sorting - Merge Sort for Linked Lists - Quick sort for Contiguous List - Heaps and Heap sort
Tables and Information Retrieval: Introduction - Rectangular Arrays - Tables of various Shapes - Applications: Radix sort - Hashing

(Sections 7.1-7.9, 8.1-8.6)

UNIT IV

Binary Trees - Introduction - Binary Search Trees - Building a Binary Search Tree - Height Balance Trees

Multiway Trees: External Searching - B Trees

(Sections 9.1-9.4, 10.3)

UNIT V

Graphs-Mathematical Background - Graph Traversal - Topological Sorting - A Greedy Algorithm: Shortest Path

The Polish Notation: The Problem - The Idea - Evaluation of the Polish Notation - Translation from Infix form to Polish form

(Sections 11.1-11.5, 12.1-12.4)

Text Book

1. Robert L. Kruse, Bruce P. Leung and Clovis L. Tondo, *Data Structures and Program Design in C*, Prentice- Hall, Second Edition, 1997.

Reference Book:

1. Mark Allen Weiss, *Data Structures and Algorithm Analysis in C*, Pearson Education, 1997.

IT215 DIGITAL INTEGRATED CIRCUITS LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 Experiments will be notified by the HOD from time to time

IT216 DATA STRUCTURES AND ALGORITHMS LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 experiments will be notified by the HOD from time to time

IT217 MICROPROCESSORS AND INTERFACING

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction – 8088 & 8086 Microprocessors architecture – software model of 8088/8086 Microprocessor – Memory address space & data organization – Data types – Segment registers and memory segmentation – Dedicated reserved and general use Memory –

Instruction Pointer – Data Registers – Pointers & Index Registers – Status Registers – Generating a Memory Address – The Stack – I/O Address space (Chapter 2)

UNIT II

Instruction set – Addressing Modes – Integer instructions and computations – Control flow instructions and Program structures. (Chapters 3.3 -3.5, 5, 6)

UNIT III

Memory I/O Interfaces: Minimum-mode & Maximum-mode systems – Minimum-mode and Maximum-mode Interface signals – Electrical Characteristics – Bus cycle & Time states – Hardware organization of the memory address space – Address Bus status codes – Memory control signals – Read/Write Bus Cycles – Memory Interface Circuits – Types of I/O – Isolated I/O interface – I/O Data Transfer – I/O Instructions – I/O Bus Cycles (Chapter 8)

UNIT IV

I/O Interface circuits: core and special purpose I/O Interfaces – Byte wide I/O ports using Isolated I/O – I/O Handshake and parallel printer interface – 8255A Programmable Peripheral Interface – Memory Mapped I/O 8254A - Programmable Interval Timer- 8237A Programmable Direct Memory Access controller – Serial Communication Interface – Programmable Communication Interface Controllers – Keyboard & Display Interfaces – 8279 Programmable Keyboard/Display Controller. (Chapter 10)

UNIT V

Interrupt Interface of 8088 & 8086 Microprocessors: Interrupt mechanism – Types & Priority – Interrupt Vector Table – Interrupt Instructions – Enable/Disable of Interrupts – External Hardware – Interrupt sequence – 8259A Programmable Interrupt Controller – Interrupt Interface Circuits using 8259A – S/W Interrupts – Non-Maskable Interrupt Reset – Internal Interrupt functions. (Chapter 11)

Text Book

1. Walter A. Triebel, Avatar Singh, The *8088 & 8086 Microprocessor, program, Interfacing, Software, Hardware and Applications*, Prentice Hall of India, Fourth Edition, 2002.

Reference Book:

1. Hall D.V, *Microprocessor and Interfacing – Programming and Hardware*, Tata McGraw Hill, 1991.

IT218 COMPUTER NETWORKS

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction: The uses of computer networks - Network hardware - Network software - Reference models - Example of networks- Network standardization - The physical layer: The theoretical basis for data communication - Guided Transmission media - Wireless transmission – PSTN (Chapter 1, 2.1-2.3, 2.5)

UNIT II

The Data Link Layer: Data link layer design issues - Error detection and correction - Elementary data link protocols - Sliding window protocols - Example of data link protocols - The channel allocation problem - Multiple Access protocols - Ethernet - Wireless LANS- Data link layer Switching (Chapter 3, 4.1-4.4, 4.7)

UNIT III

The network layer: Network layer design issues - Routing algorithms - Congestion control algorithms - Internetworking- Network layer in Internet (Chapter 5)

UNIT IV

The transport layer: The Transport service - Elements of Transport protocols - Simple transport protocol - Internet transport protocols UDP- Internet transport protocols TCP (Chapter 6)

UNIT V

The application layer: Domain name system - Electronic mail - World Wide Web – Multimedia (Chapter 7)

Text Book:

1. Andrew S. Tanenbaum, *Computer Networks*, Fourth Edition, Prentice Hall of India, 2003.

Reference Book:

1. William Stallings, *Data and Computer Communications*, Fourth Edition, Prentice Hall of India, 2004.

IT219 COMMUNICATION ENGINEERING

Credits: 3 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Decibels and noise-Amplitude Modulation - Receivers for AM: RF stage - IF stage (Chapters 3-5)

UNIT II

Frequency and Phase Modulation - Wire and Cable Media: Parameters - Balanced and Unbalanced Lines - Drivers and Receivers - Twisted pair and Coaxial Cables - Time Domain Reflectometry - Propagation and Antennas (Chapters 6,7, 9)

UNIT III

Digital Communication Fundamentals - Digital Communication Systems - Digital Modulation and Testing (Chapter 11-13)

UNIT IV
TV/Video, Facsimile - Telephone System - RS 232 Interface Standard, Modems and High Speed Ports Links (Chapters 14, 16, 17)

UNIT V
Satellite Communication - Navigation, Global Positioning System - Cellular Telephone - Advanced Wireless Systems - Radar Systems
(Chapter 19-21)

Text Book

1. William Schweber, *Electronic Communication Systems - A Complete Course*, Fourth Edition, Prentice-Hall International, 2002.

IT220 MICROPROCESSOR AND INTERFACING LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 experiments will be notified by the HOD from time to time

IT221 MOBILE COMMUNICATION

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I
Wireless Transmission: Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular Systems
Medium Access Control: Motivation, SDMA, FDMA, TDMA, CDMA - Comparison

UNIT II
Telecommunication Systems: GSM, DECT, TETRA, UMTS and IMT- 2000
Satellite Systems: Basics - Routing - Localization - Handover

UNIT III
Broadcast Systems: Cyclic repetition of data - Digital audio broadcasting, Digital video broadcasting
Wireless LAN: Infrared Vs radio transmission, Infrastructure and ad hoc networks, IEEE 802.11, HYPERLAN, Bluetooth.

UNIT IV
Wireless ATM: Motivation, Working group, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Quality of service, Access point control protocol
Mobile network layer: Mobile IP, Dynamic host configuration protocol, Ad-hoc networks

UNIT V

Mobile transport layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmission/ fast recovery, Selective retransmission, Transaction oriented TCP
Support for mobility: File systems, World Wide Web, Wireless application protocol

Textbook

1. Jochen Schiller, *Mobile Communications*, Addison Wesley, 2000.

Reference Book

1. Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, Second Edition, John Wiley and Sons, 2001.

IT222 HIGH SPEED NETWORKS

Credits: 3 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Circuit Switched Networks: Performance of circuit switched networks – SONET – Dense Wave Division Multiplexing (DWDM) – Fiber – Digital Subscriber Line (DSL) – Intelligent Networks – CATV

UNIT II

ATM: Main features of ATM – Addressing Signaling & Routing – ATM Header Structure – ATM Adaptation layer – Management and control – BISDN
Internetworking with ATM: Multiprotocol Encapsulation over AAL5 – LAN Emulation over ATM – IP over ATM – Multiprotocol over ATM – Frame Relay over ATM

UNIT III

Wireless Networks: Introduction – The wireless channel – Link level design – Channel access – Network design – Standards – Future System and Standards

UNIT IV

Control of Networks: Objectives and methods of control – Circuit – Switched Networks – Datagram networks – ATM Networks

UNIT V

Optical Networks: Optical Links – WDM System – Optical Cross connects – Optical LANs – Optical Paths and Networks – Switching

Textbook:

1. Jean Walrand and Pravin Varaiya, *High Performance Communication Networks*, Second Edition, Morgan Kaufmann, 2000.
   (Chapters 5-8, 11, 12)

IT223 NETWORKING AND SECURITY LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 experiments will be notified by the HOD from time to time

IT224 COMPUTER HARDWARE AND PERIPHERALS LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 experiments will be notified by the HOD from time to time

IT225 CASE TOOLS LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 experiments will be notified by the HOD from time to time

IT226 ARTIFICIAL INTELLIGENCE

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction – Foundations of AI, History of AI, State of the Art Intelligent Agents: Agents and Environments, Good Behaviour, Nature of Environments, Structure of Agents - Problem Solving: Solving problems by searching – Problem solving agents, Example Problems. Searching for solutions, Uninformed Search Strategies, Avoiding repeated search states, searching with partial information

UNIT II

Informed Search and exploration: Informed Search Strategies, Heuristic functions, Local Search Algorithms and Optimization Problems, Local Search in continuous spaces, Online Search Agents and Unknown environments

Adversial Search: Games, Optimal Decisions in Games, Alpha-Beta Pruning, Imperfect Real-Time Decisions, Games that include an Element of Chance, State-of-the-art Game Programs

UNIT III

Knowledge and Reasoning: Logical Agents – Knowledge-Based Agents, The Wumpus world, Logic, Propositional Logic, Reasoning patterns in PL, Effective Propositional inference, Agents based on PL

First-Order Logic: Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic

Inference in First-Order Logic: Propositional vs First-Order Logic inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution

UNIT IV

Knowledge Representation: Ontological Reasoning, Categories and Objects, Actions. - Situations and Events, Mental Events and Mental Objects, The Internet Shopping World, Reasoning Systems for Categories, Reasoning with Default Information, Truth Maintenance Systems

Planning: The Planning Problem, Planning with State-Space search, Partial-Order Planning, Planning graphs, Planning with Propositional Logic

UNIT V

Uncertainity: Acting under Uncertainity, Basic Probability Notation, The Axioms of Probability, Inference using Full-Joint Distributions, Independence, Bayes' Rule and its useMaking Simple Decisions: Combining Beliefs and Desires under Uncertainity, Basis of Utility Theory, Utility Functions, Multiattribute Utility Functions, Decision Networks, The Value of Information, Decision-Theoretic Expert Systems Learning: Learning from observations – Forms of Learning, Inductive Learning, Learning Decision Trees, Ensemble Learning

Text Book

1. Stuart Russell, Peter Norvig, "*Artificial Intelligence – A Modern Approach*" – Second Edition, Pearson Education, 2004. (Chapters 1-4, 6-11, 13, 16,18)

IT227 DATA MINING

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction: Data Mining – Functionalities – Patterns Classification - Major issues - Data Warehouse and OLAP technology for data mining: data warehouse - multidimensional data model - data warehouse architecture – implementation - development of data cube technology - data mining to data warehousing

UNIT II

Data Preprocessing: Reason for data preprocess - data cleaning - data integration and transformation - data reduction - discretization and concept hierarchy generation - data mining primitives, Languages and System Architecture: data mining primitives - data mining query language - Designing graphical user interfaces-architectures of data mining Systems

UNIT III

Concept Description: Data Generalization and Summarization - Analytical Characterization - Mining class Comparisons - Mining Descriptive Statistical Measures in Large databases - Discussion - Mining Association Rules in Large Databases: Association Rule Mining - Mining Single-Mining Multilevel Association Rules from Transaction Databases - Mining multidimensional Association Rules from Relational Databases and Data Warehouses - Association Mining to Correlation Analysis - Constraint Based Association Mining

UNIT IV

Classification and Prediction: Issues Regarding Classification and Prediction - Classification by decision Tree Induction - Bayesian Classification - Classification by Backpropagation - Classification Based on Concepts from Association Rule Mining - Classification Methods - Prediction - Classifier Accuracy - Cluster Analysis: Types - Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Density Based Methods - Grid Based Methods - Model Based Clustering Methods - Outlier Analysis

UNIT V

Multidimensional Analysis and Descriptive Mining of Complex Data Objects - Mining spatial Databases - Mining Multimedia Databases - Mining Time Series And Sequence Data Mining Text Databases - Mining The World Wide Web - Applications and Trends in Data Mining: Data Mining Applications - Data Mining System Products And Research Prototypes - Additional Themes on Data Mining - Social Impacts of Data Mining-Trends In Data Mining

Text Book

1. Jiawei Han, Micheline Kamber, *Data Mining concepts and Techniques*, Morgan Kaufmann Publishers, 2002. (Chapters 1-8)

Reference Book

1. Mehmed Kantardzic, *Data Mining Concepts, Models, Methods and Algorithms*, John Wiley & Sons Publications, 2003.

IT228 MOBILE COMPUTING

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Pervasive Computing - Information Access Devices - Smart Identification - Embedded Controls - Entertainment Systems

UNIT II

Software: Java - Operating Systems: Windows CE – Palm OS - Symbian OS - Java Card-Client Middleware - Security

UNIT III

Connecting the world: Internet Protocols and Formats - Mobile Internet - Voice - Web Services - Connectivity

UNIT IV

Service Discovery - Back-End Server Infrastructure: Gateways - Application Servers - Internet Portals-Synchronization

UNIT V

Home Services - Communication Services - Home Automation - Security Services - Travel and Business Services - Consumer Services

Text Book

1. Uwe Hansmann, Lothar Merk, Martin S.Nicklous and Thomas Stober, *Principles of Mobile Computing* ,Springer International Edition, Second Edition, 2003.

IT229 SOFTWARE TESTING

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Software testing – Role of software testing – A Structured approach – Test strategy – Methods for developing test strategy – Testing methodologies

UNIT II

Tools and Techniques – Eleven step software testing process – Testing the validity of software estimate – Testing the status of the software system – Test plan

UNIT III

Requirement phase testing – Risk matrix test tool – Walkthrough test tool – Design phase testing – Design review test tool – Execute test and record results – Test data and volume test tools

UNIT IV

Installation and Documentation: Acceptance test – Evaluate test effectiveness – Testing software changes – Develop/Update the training material – Creating test documentation – Test plan documentation – Test Analysis report documentation

UNIT V

Testing software applications: Rapid prototyping – Spiral testing – Testing Client Server System – Testing web based systems – Workbench – Selecting tests – Selecting tools

Text Book

1. William Perry, *Effective Methods for Software Testing*, Second Edition, John Wiley and Sons, 2000. (Chapters 1-10, 12-21)

Reference Book:

1. Ron Patton, *Software Testing,* SAMS Publishers, 2001.

IT230 SOFTWARE PROJECT MANAGEMENT

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

What is a Project - Traditional Project Management - Scoping the Project - Identifying Project Activities

UNIT II

Estimating Duration, Resource Requirements and Cost - Constructing and Analyzing the Project Network Diagram - Finalizing the Schedule and Cost Based on Resource Availability - Organizing and Conducting the Joint Project Planning Session

UNIT III

Recruiting Organizing and Managing the Project Team - Monitoring and Controlling Progress - Closing out the Projects - Critical Chain Project Management

UNIT IV

Introduction to the Adaptive Project Framework - Version Scope - Cycle Plan - Cycle Build - Client Checkpoint - Post-Version Review - Variations to APF

UNIT V

Organizational Considerations - Project Portfolio Management - Project Support Office

Text Book

1. Robert K. Wyzocki, Rudd McGary, *Effective Project Management*, WILEY-Dreamtech India Pvt. Ltd., 2003.

IT231 SOFTWARE QUALITY MANAGEMENT

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Theory of Software Quality: Introduction –Quality-Software Quality - Views of Quality – Hierarchical Models of Quality: Hierarchical Model – Hierarchical Models of Boehm and McCall- Interrelation of Quality Criteria

UNIT II

Measuring Software Quality: Measuring Quality Software Metrics- Metrics cited in the Literature-Problem with the metrics-Overall Measure of Quality-Developments in measuring Quality – The Work Gilb-The COQUAMO Project-Quality Profiles

UNIT III

The Case for Tools and Methods: Growth of Software Engineering Methods: Methodologies based upon the Water Fall Life Cycle –CASE Tools – Contribution of Methods and Tools to Quality –Alternative approaches Software Quality- Standards Based on the Software Engineering Life Cycle –Quality Management Systems –A Historical Perspective –Terms-Elements of QMS –The Key to Quality Management – Quality in Software – the Problem of User Requirements- A QMS for Software – Quality Assurance or Quality improvement

UNIT IV

The ISO9000 Series of Quality Management Standards –The Purpose of standards –The ISO9000 Series –ISO9000-3- The Impact of ISO9000 and TickIT- Models and Standards for Process Improvements-Capability Maturity Model –Individual Levels of the CMM –Role of CMM – SPICE

UNIT V

Case Studies: Introduction to Case Studies – Total Quality in the Kitchen –Sherwood Computer Services-Benefits of Quality – Trends in Quality: The Future

Text Book:

1. Alan C Gillies, *Software Quality Theory and Management*, Thomson, Second Edition, 2003.

Reference Book:

1. Stephen H.Kan, *Metrics and Models in Software Quality Engineering*, Pearson Education, Second Edition, 2003.

IT232 E-COMMERCE

Credits: 4 : 0 : 0 **Marks (40 + 60)**

UNIT I

Introduction – Internet and World Wide Web – Client Side Programming

UNIT II

Server side Programming: Servlet Fundamentals – Database Connectivity – Session Tracking

UNIT III

Basic Cryptography for enabling e-commerce – Internet Security – Advanced Technologies for e-commerce

UNIT IV

Internet Payment Systems – Consumer oriented e-commerce – Business oriented e-commerce

UNIT V

Web Advertising and Web Publishing – Building the Virtual Book Store

Text Book

1. Henry Chan, Raymond Lee, Tharam Dillon and Elizabeth Chang, *E-Commerce Fundamentals and Applications*, John Wiley and Sons Ltd., 2001.

IT233 TCP/IP PROTOCOLS

Credits: 4 : 0 : 0 **Marks: (40 +60)**

UNIT I

Introduction - Link Layer – IP – ARP – RARP – ICMP

UNIT II

Ping Program – Traceroute Program – IP Routing - Dynamic Routing Protocols – UDP – Broadcasting and Multicasting

UNIT III

IGMP – DNS – TFTP – BOOTP – TCP – TCP Connection Establishment and Termination – TCP Interactive Data Flow

UNIT IV

TCP Bulk Data Flow – TCP Timeout and Retransmission – TCP Persist Timer – TCP Keepalive Timer – TCP Futures and Performance – SNMP

UNIT V

Telnet and Rlogin – FTP – SMTP – NFS – TCP Applications

Text Book:

1. W. Richard Stevens, *TCP/IP Illustrated Volume – I, The Protocols,* Pearson Education, 2000

Reference Book:

1. Douglas E. Comer, *Internetworking with TCP/IP – Principles, Protocols and Architecture,* Pearson Education, Fourth Edition, 2000.

IT234 MULTIMEDIA SYSTEMS

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction: Branch- overlapping Aspects of Multimedia- Content- Global Structure- Multimedia Literature - Multimedia: Media and Data Streams: Medium- Main Properties of a Multimedia System- Multimedia- Traditional Data Stream Characteristics- Data Streams Characteristics for Continuous Media- Information Units - Sound/Audio: Basic Sound Concepts- Music- Speech - Image and Graphics: Basic Concepts- Computer Image Processing -Video and Animation- Basic Concepts- Television- Computer based Animation.

UNIT II

Data Compression: Storage Space- Coding Requirements- Source, Entropy, and Hybrid Coding- Some Basic Compression Techniques- JPEG- H-261 (px64)- MPEG- DVI-: Optical Storage: History- Basic Technology- Video Disks and Other WORMs- Compact Disk Digital Audio- Compact Disk Read Only Memory- CD-ROM Extended Architecture- Further CD-ROM based Developments- Compact Disc Write Once- Compact Disk Magneto Optical- The Prospects of CD Technologies - Computer Technology: Communication Architecture- Multimedia Workstations.

UNIT III

Multimedia Operating Systems: Introduction- Real-Time- Resource Management- Process Management- File Systems- Additional Operating System Issues- System Architecture- Concluding Remarks - Networking Systems: Layers, Protocols, and Services- Networks- Local Area Networks (LANs)- Metropolitan Area Networks (MANs)- Wide Area Networks (WANs).

UNIT IV

Multimedia Communication Systems: Application Subsystem- Transport Subsystem- Quality of Service and Resource Management:-Data Base Systems : Multimedia Database Management System- Characteristics of an MDBMS- Data Analysis- Data Structure- Operations on Data- Integration in a Database Model - Documents, Hypertext and Hypermedia : Documents- Hypertext and Hypermedia: Document Architecture SGML- Document Architecture ODA- MHEG .

UNIT V

User Interface: General Design Issues- Current Work- Extension through Video and Audio- Video at the User Interface- Audio at the User Interface- User: friendliness as the Primary Goal-Synchronization: Introduction- Notion of Synchronization- Presentation Requirements- A Reference Model for Multimedia Synchronization- Synchronization- Case Studies.

Text Book

1. Ralf Steinmetz and Klara Nahrstedt, *Multimedia: Computing, Communications and Applications*, Pearson Education Asia, 1995. (Chapters 1-15)

Reference Book:

1. Nigel Chapman and Jenny Chapman, *Digital Multimedia*, John Wiley and Sons Private Limited, 2001.

IT306 ADVANCED DATABASE TECHNOLOGIES

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Overview of Transaction Management: The ACID Properties – Transactions and Schedules – Concurrent Execution of Transactions- Lock- Based Concurrency Control – Performance of Locking- Transaction Support in SQL – Introduction to Crash Recovery
Concurrency Control: 2PL, Serializability and Recoverability – Introduction to Lock Management – Lock Conversions- Dealing with Deadlocks- Specialized Locking Techniques – Concurrency control without Locking. Crash Recovery: Introduction to ARIES – The Log – Other Recovery- Related Structures – The Write- ahead Log Protocol – Check pointing – Recovering from a System Crash – Media Recovery. (Chapters 16-18)

UNIT II

Physical Database Design and Tuning: Introduction to Physical Database Design – Guidelines fro Index Selection – Clustering and Indexing – Tools to assist Index Selection – Overview of Database Tuning – Choices in tuning the Conceptual Schema – Choices in Tuning Queries and Views – Impact of Concurrency – Case Study: The Internet Shop. Security and Authorization: Introduction to database Security- Access Control- Discretionary and mandatory access control – Security for Internet applications – Additional Issues related to Security.
(Sections 20.1, 20.2, 20.4, 20.6-20.11, Chapter 21)

UNIT III

Parallel and Distributed Databases: Architecture for parallel databases – Parallel Query Evaluation- Parallelizing Individual Operations- Parallel Query Optimization – Types of Distributed Databases – distributed DBMS Architecture – Storing data in Distributed DBMS – Distributed catalog management - Distributed Query Processing- updating Distributed Data- Distributed Transactions - Distributed Concurrency Control – Distributed recovery. Deductive Databases: Introduction to recursive queries- theoretical Foundations - recursive queries with negation.
(Chapter 22, Sections 24.1-24.3)

UNIT IV

Information retrieval and XML data: Colliding worlds: Databases, IR and XML – Introduction to information retrieval- Indexing for text search – Web search engines – managing text in a DBMS- a data model for XML- X Queries: Querying XML data – Efficient evaluation of XML queries. (Chapter 27)

UNIT V

Spatial data Management: Types of spatial data and queries – Application involving Spatial data- Introduction to spatial Indexes – Indexing based on space filling curves- Grid files – R-trees- issues in High dimensional indexing- Advanced Transaction processing- Data Integration – Mobile databases- Main memory databases- Multimedia databases- Geographic Information System – Temporal Databases- Biological Databases- Information Visualizations (Chapter 28, 29)

Text Book

1. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, Tata McGraw Hill, 2003.

Reference Book:

1. Elmasri, Navathae, *Fundamentals of Database Systems*, Third Edition, Pearson Education, 2000.

IT307 PRINCIPLES OF NETWORK MANAGEMENT

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction-Analogy of telephone network management -Data and Telecommunication network-Distributed Computing Environments-TCP/IP Based Networks –Communication Protocols and standards-Network Management: Goals, Organization and Functions-Network Management System Platform.

UNIT II
SNMPV Network Management – History – Internet or Organizations and standards – SNMP Models – Organization Model – Information Model – Communication Model-Functional Model.

UNIT III
SNMP V2 – System Architecture – Structure Of Management Information – MIB – Protocol – Compatibility with SNMPV1 – SNMPV3 – Documentation – Architecture-Applications – MIB security – User band security model access control .

UNIT IV
Remote Monitoring – RMON SMI and MIB – RMON1 – RMON2 – ATM Remote Monitoring – Case Study of Internet Traffic Using RMON-Network Management Tools – Network Statistics Measurement Systems – History of Enterprise Management – Network Management Systems – Commercial Network Management Systems – system Management – Enterprise Management Solution.

UNIT V
Web based Management – Web Interface – Desktop Management Interface – Enterprise Management – WBEM –Java Management Extension.

Text Book:
Mani Subramanian, *Network Management Principles and Practice*, Addison Wesley, 2000.

Reference Book
1. Stephen B. Morris, Network Management, MIBs and MPLS, Pearson Education, 2003.

IT308 WEB SERVICES

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I
Evolution and Emergence of Web Services – Introduction to Web Services – Building the Web Services Architecture

UNIT II
Web Services Architecture and Technologies – Developing Web Services using SOAP – Description and Discovery of Web Services – Creating .Net Interoperability

UNIT III
Exploring Java Web Services Developer Pack – Introduction to Java Web Services Developers Pack (JWSDP) – XML Processing and Data Binding with Java APIs

UNIT IV
XML Messaging using JAXM and SAAJ – Building RPC Web Services with JAX – RPC – Java API for XML Registers

UNIT V

Security in Web Services – Web Services Security – Web Services Strategies and Solutions – Introduction to SUN ONE

Text Book

1. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, *Developing Java Web Services*, Wiley Publishing Inc., 2004. (Chapters 2-14)

Reference Book

1. Sandeep Chatterjee, James Webber, *Developing Enterprise Web Services*, Pearson Education, 2004.

IT309 NETWORK SECURITY

Credits: 4 : 0 : 0 **Marks: (40 +60)**

Unit I

Security Services, Mechanisms, and Attacks. Block Cipher Principles, Data Encryption Standards, Strength of DES, Triple DES, AES Cipher, RC4 Stream Cipher
(Chapters 1,3,5,6)

Unit II

Principles of Public-Key Cryptosystems, RSA algorithm, Key Managements- Diffie-Hellman Key Exchange- Elliptic Curve Cryptography.
(Chapters 9, 10)

Unit III

MD5 Message Digest Algorithm - Secure Hash Algorithm -HMAC- Digital Signature Standard. Kerberos - X.509 Authentication Service
(Chapters 12, 14)

Unit IV

Pretty Good Privacy- S/MIME – IP Security: Overview – Architecture – Authentication Header – Encapsulation Security Payload – Combining Security Associations.
(Chapters 15, 16)

Unit V

Web Security: Considerations – Secure Sockets Layer Security- Secure Electronics Transaction – Intruders – Intrusion Detection – Password Management – Viruses and Related Threats and Countermeasures – Firewall Design – Trusted Systems
(Chapters 17-20)

Text Book

1. William Stallings, *Cryptography and Network Security*, Third edition, Pearson Education, 2003, ISBN 81-7808–902-5

Reference Book

1. Man Young Rhee, *Internet Security*, Wiley, 2003, ISBN 0-470-85285-2

IT310 INTERNETWORKING

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

Unit I

Introduction - Link Layer – IP – ARP – RARP – ICMP

Unit II

Ping Program – Traceroute Program – IP Routing - Dynamic Routing Protocols – UDP – Broadcasting and Multicasting

Unit III

IGMP – DNS – TFTP – BOOTP – TCP – TCP Connection Establishment and Termination – TCP Interactive Data Flow

Unit IV

TCP Bulk Data Flow – TCP Timeout and Retransmission – TCP Persist Timer – TCP Keep alive Timer – TCP Futures and Performance – SNMP

Unit V

Telnet and Rlogin – FTP – SMTP – NFS – TCP Applications

Text Book

1. W. Richard Stevens, *TCP/IP Illustrated Volume – I, The Protocols*, Pearson Education, 2000, ISBN: 81-7808-101-6.

Reference Book

1. Douglas E. Comer, *Internetworking with TCP/IP – Principles, Protocols and Architecture*, Pearson Education, Fourth Edition, 2000, ISBN: 81-203-2065-4.

IT311 INTERNETWORKING AND WEB TECHNOLOGY LAB

Credits: 0 : 0 : 2 **Marks: (50 + 50)**

12 experiments will be notified by HOD from time to time

IT312 COMPUTER NETWORK MANAGEMENT

Credits: 4:0:0 **Marks: (40 + 60)**

Unit I

Data Communications and Network Management Overview: Analogy of telephone Network Management-Data and Telecommunication Network-Distributed Computing Environments-TCP/IP-Communications protocols and Standards-Case Histories- Information Technology Managers-Network Management-Network System Management-Network Management System Platform-Current Status. Review of Computer Network Technology: Network Topology-LAN-Network Node Components-WAN-Transmission Technology-Integrated Services

Unit II

Basic Foundations: Network Management Standards-Model-Organization Model-Information Model-Communication Model-ASN.1-Encoding Structure-Macros-Functional Model. SNMPv1 Network Management: History-Internet Organizations and Standards-SNMP model-Organization Model-System Overview-Information Model

Unit III

SNMPv1 Network Management: Communication Model-Functional Model
SNMP Management: SNMPv2: Changes in SNMPv2-System Architecture-Structure of Management Information-Management and information base-Protocol-compatibility with SNMPv1. SNMP Management: SNMPv3: -Documentation-Documentation Architecture-Architecture-Applications-User based Security Model-Access Control

Unit IV

SNMP Management: RMON: - Remote Monitoring- SMI and MIB-RMON1-RMON2-ATM remote monitoring-case study. Network Management Tools and Systems: Tools-Network Statistics Measurement Systems-Enterprise-Network Management Systems-Commercial Network Management Systems-Systems Management-Enterprise Management Solutions

Unit V

Network Management Applications: Configuration Management-Fault Management-Performance Management-Event Correlation Techniques-Security Management-Accounting Management-Report Management-Policy based Management-Service level Management. Web-Based Management-NMS with Web Interface and Management-Web Interface to SNMP Management-Embedded Web base Management-Desktop Management Interface-Enterprise Management-WBEM-Java Management Extensions-Management of a storage Area Network Future Directions

Text Book:

1. Mani Subramanian, *Network Management*, Pearson Education, 2000
   ISBN: 81-7808-595-X. (Chapters 1-8, 12-14)

Reference Book:

1. Stephen B. Morris, *Network Management – MIB AND MPLS*, Pearson Education, 2003, ISBN: 81-291-0346-7.

IT313 LAN: DESIGN AND IMPLEMENTATION

Credits: 4 : 0 : 0 **Marks: (40+60)**

Unit I

Introduction: Networks – LAN definition, Components, Models, Applications – Data Communication Models: Layered Architecture – OSI Model – TCP/IP Protocol Suite – IEEE Standards – Data Transmission – Analog and Digital Signals – Digital And Analog Transmission – Multiplexing – Data Rate – Transmission Media: Guided Media – Unguided Media – Transmission Impairment – Performance

Unit II

Error Detection: Types of Errors – Detection – Vertical, Longitudinal and Cyclic Redundancy Checks – Error Correction – LAN Topologies – Bus, Ring, Star and Hybrid Topologies – Flow and Error Control – Medium Access Methods: Random Access – Controlled Access

Unit III

Logical Link Control: Services – LLC Protocol – Service/ Protocol Association – Ethernet 10 Mbps: Access Method CSMA/CD – Layers – Mac Sublayer – Physical Layer – Implementation – Ethernet Evolution: Fast and Gigabit Ethernet: Bridged Ethernet – Switched Ethernet – Full Duplex Ethernet – MAC Control – Fast Ethernet – Mac Sublayer – Physical Layer – Implementation – Gigabit Ethernet – Mac Sublayer – Physical Layer – Implementation – Token Bus: Physical Vs Logical Topology – Token Passing – Service Classes – Ring Management - Layers – Mac Sublayer – Physical Layer.

Unit IV

Token Ring: Access Method: Token Passing – Layers – Mac Sublayer – Physical Layer – Ring Management – Priority and Reservation Levels – Implementing Priorities –ATM LANS: Architecture – LANE – Client Server Model – LANE Operation – Frame Format – Wireless LANs: Wireless Transmission – ISM Frequency Band – Architecture – Mac Sublayer – Physical Layer –High Data Rate Standard – LAN performance: Parameters – Efficiency – Efficiency of CSMA/CD and Token Ring

Unit V

Connecting LANS: Repeaters – Bridges – Routers – Gateways – other devices – TCP/IP: Overview – Network Layer – Addressing Subnetting – Other Protocols in the Network Layer – Transport Layer – IPV6 & ICMPV6 – Data Encryption: Conventional Methods – Public Key Methods – Authentication – Network Management: Configuration, Fault, Performance, Security and Accounting Management- SNMP

Text Book:

Behrouz A. Forouzan, *Local Area Network,* Tata Mc-Graw Hill, 2003, ISBN: 0-07-048666-2. (Chapters 1- 20)

IT314 MOBILE COMPUTING AND COMMUNICATION

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

Unit I

Introduction - Antennas - Signal propagation – Multiplexing – Modulation - Spread Spectrum - Cellular systems - Medium access control-SDMA, FDMA, TDMA, CDMA – Comparison of S/T/F/CDMA - Telecommunication systems – GSM - DECT – TETRA - UMTS – IMT 2000 - Satellite systems-Applications – Basics – Routing – Localization – Handover - Broadcast systems - Cyclic repetition of data - Digital audio broadcasting - Digital video broadcasting

Unit II

Wireless LAN - Infrared Vs Radio transmission - Infrastructure and adhoc networks - IEEE 802.11 – HIPERLAN – Bluetooth - Wireless ATM - WATM services - Reference model-functions - Radio access layer – Handover - Location Management – Addressing -Mobile quality of service - Access point control protocol

Unit III

Mobile network layer - Mobile IP - Dynamic host configuration protocol - adhoc networks - Mobile transport layer - Traditional TCP - Indirect TCP - Snooping TCP - Mobile TCP - Fast retransmit/ fast recovery - Transmission/ time-out freezing - Selective retransmission - Transaction oriented TCP - Support for mobility - File systems - World Wide Web - Wireless application protocol

Unit IV

Pervasive Computing – Devices - Information Access Devices – Handheld Computer -Palm OS-Based Devices - Windows CE-based Handheld Computer - EPOC based – Handheld Computer-Sub-Notebooks-Phones-Data transmission Capabilities-Smart Phones - Screen Phones - Smart Identification – Smart Cards-Smart Labels - Smart tokens - Embedded Controls - Smart Sensors and Actuators - Smart Appliances - Appliances and Home Networking - Automotive Computing - Entertainment Systems – Television Systems - Game Consoles.

Unit V

Software – Java – Language Characteristics-Java Class Library-Java Edition –Micro Edition – Personal Java and Embedded Java – Development tools for Java- Operating Systems - Windows CE – Palm OS – Symbian OS – Java card – Client Middleware-Programming APIs-Smart Card Programming - Messaging Components – Database Components-Security - Cryptographic Patterns and Methods - Cryptographic tools- Secure Socket Layer – New Services - Home Services - System View- Communication Services - Home Automation – Energy Services - Security Services - Remote Home Health Care Services - Travel And

Business Services – Consumer Services - Interactive Advertisements – Loyalty - Shopping - Payments Services

Text Books:

1. 1.Jochen Schiller, *Mobile Communication*, Pearson Education, 2000, ISBN: 81-297-0350-5. (Chapters 1-5, 6-9, 21-23)
2. Uwe Hansmann, Lothar Merk, Martin S.Nicklous and Thomas Stober, *Principles of Mobile Computing*, Second Edition, Springer International Edition, 2003.

Reference Book:

1. Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, JohnWiley and Sons Inc., 2001, ISBN 0-471-39492-0.

IT315 MULTIMEDIA COMMUNICATIONS

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

Unit I

Coding of Multimedia Signals – Quantization and Coding – Scalar quantization – Coding Theory – Rate distortion optimization of quantization – Entropy coding – Vector quantization – Sliding block coding

Unit II

Still Image coding – Compression of binary images – Vector quantization of images – Predictive coding – Transform coding – Fractal coding – Region based coding

Unit III

Video Coding – Methods without video compression – Hybrid video coding – Motion compensation prediction – Coding using wavelet transform – Spatio-Temporal frequency coding with motion compensation – Encoding of motion parameters

Unit IV

Audio coding – Coding of speech signals – Waveform coding of Audio signals – Parmetric coding of audio and sound signals – Transmission and storage – Convergence of digital multimedia services – Adaptation to channel characteristics – Digital broadcast – Media streaming – Content based media access – Content protection – Composition and mixing of usual signals – Warping and morphing – Viewpoint adaptation – Frame rate conversion – Rendering of image and video signal composition and rendering of audio signals

Unit V

Multimedia representation standards – Interoperability and Compatibility – Definitions at system level – Still image coding – Video coding – Audio coding – Multimedia content description standard MPEG7 - Multimedia framework MPEG21

Textbook:

Jens-Reiner Ohm, *Multimedia Communication Technology*, Springer, 2004,

ISBN: 3-540-01249-4. (Chapters11-17)

IT316 NETWORK DESIGN AND MANAGEMENT LAB

Credits: 0 : 0 : 2 Marks: (50 + 50)

12 experiments will be notified by HOD from time to time

ADDITIONAL SUBJECTS

Code No.	Subject Name	Credits
IT235	Computer Architecture	4 : 0 : 0
IT236	Communication Engineering	4 : 0 : 0
IT237	High Speed Networks	4 : 0 : 0
IT238	Data Mining	4 : 0 : 0
IT239	Mobile Computing	4 : 0 : 0
IT240	Signals and Systems	4 : 0 : 0
IT317	Mobile Computing and Communication	4 : 0 : 0
IT318	Grid Computing	4 : 0 : 0
IT319	Performance Evaluation of Computer Networks	4 : 0 : 0
IT320	Semantic Web	4 : 0 : 0
IT321	Optical Networks	4 : 0 : 0
IT322	Information Security Lab	0 : 0 : 2
IT323	Wireless Networks Lab	0 : 0 : 2

IT235 COMPUTER ARCHITECTURE

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Computer organization & architecture, Function & Structure, Top level view of computer components, Computer function, Interrupts, Multiple interrupts, Cache memory. (Chapters 1, 3.1, 3.2, 4)

UNIT II

Computer memory systems overview, Semiconductor main memory, Error correction, Advanced DRAM organization, External devices & I/O modules, Programmed I/O, Interrupt driven I/O, Direct Memory Access. (Chapters 5, 7.1-7.5)

UNIT III

Computer Arithmetic - M/C instruction characteristics, Types of operands, Types of operation, Transfer of control, Pentium operations, PowerPC operations, Assembly language, Addressing, Pentium & PowerPC addressing modes. (Chapters 9, 10, 11.1, 11.2)

UNIT IV

Processor & Register organization, Instruction cycle, Instruction pipelining, Intel 80486 pipelining, Pentium & Power PC processors. (Chapter 12)

UNIT V

Micro operations, Control of the CPU, Intel 8085, Hardwired implementation, Microprogrammed control basic concept, Microinstruction sequencing, Microinstruction execution. (Chapters 16, 17.1-17.3)

Text Book:

1. William Stallings, *Computer Organization and Architecture*, Sixth Edition, Prentice Hall India, 2003. ISBN: 81-7808-792-8.

IT236 COMMUNICATION ENGINEERING

Credits: 4: 0: 0 **Marks: (40 + 60)**

UNIT I

Introduction-Decibels and Noise-Amplitude Modulation - Receivers for AM: RF stage - IF stage-Frequency and Phase Modulation.(Chapters 1,3-6)

UNIT II

Wire and Cable Media: Parameters - Balanced and Unbalanced Lines - Drivers and Receivers-Twisted pair and Coaxial Cables-Propagation and Antennas-Digital information (Chapters 7, 9,10)

UNIT III

Digital Communication Fundamentals-Digital Communication Systems - Digital Modulation and Testing. (Chapters 11-13)

UNIT IV

Telephone System - RS 232 Interface Standard, Modems and High Speed Ports Links. (Chapters 16, 17)

UNIT V

Satellite Communication - Navigation, Global Positioning System - Cellular Telephone - Advanced Wireless Systems- Radar Systems. (Chapters 19, 20, 21)

Text Book:

1. William Schweber, *Electronic Communication Systems - A Complete Course*, Fourth Edition, Prentice-Hall International, 2002. ISBN-81-203-2229-0

IT237 HIGH SPEED NETWORKS

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Overview: History of Communication Networks – Networking Principles – Future Networks. Performance of circuit switched networks – SONET – Dense Wave Division Multiplexing (DWDM) – Fiber – Digital Subscriber Line (DSL) – Intelligent Networks – CATV

UNIT II

ATM: Main features of ATM – Addressing Signaling & Routing – ATM Header Structure – ATM Adaptation layer – Management and control – BISDN

Internetworking with ATM: Multiprotocol Encapsulation over AAL5 – LAN Emulation over ATM – IP over ATM – Multiprotocol over ATM – Frame Relay over ATM

UNIT III

Wireless Networks: Introduction – The wireless channel – Link level design – Channel access – Network design – Standards – Future System and Standards

UNIT IV

Control of Networks: Objectives and methods of control – Circuit – Switched Networks – Datagram networks – ATM Networks

UNIT V

Optical Networks: Optical Links – WDM System – Optical Cross connects – Optical LANs – Optical Paths and Networks – Switching. Global Multimedia Network: Attributes of the Global Network – Technology areas – Challenges.

Textbook:

1. Jean Walrand and Pravin Varaiya, *High Performance Communication Networks*, Second Edition, Morgan Kaufmann, 2000. (Chapters 1, 5-8, 11 - 13)

IT238 DATA MINING

Credits: 4: 0: 0 **Marks: (40 + 60)**

UNIT I

Introduction: Data Mining – Functionalities – Patterns Classification - Major issues - Data Warehouse and OLAP technology for data mining: data warehouse - multidimensional data model - data warehouse architecture – implementation - development of data cube technology - data mining to data warehousing.

UNIT II

Data Preprocessing: Reason for data preprocess - data cleaning - data integration and transformation - data reduction - discretization and concept hierarchy generation - data mining primitives, Languages and System Architecture: data mining primitives - data mining query language - Designing graphical user interfaces-architectures of data mining Systems.

UNIT III

Concept Description: Data Generalization and Summarization - Analytical Characterization - Mining class Comparisons - Mining Descriptive Statistical Measures in Large databases - Discussion - Mining Association Rules in Large Databases: Association Rule Mining - Mining Single-Mining Multilevel Association Rules from Transaction Databases - Mining multidimensional Association Rules from Relational Databases and Data Warehouses - Association Mining to Correlation Analysis - Constraint Based Association Mining.

UNIT IV

Classification and Prediction: Issues Regarding Classification and Predication - Classification by decision Tree Induction - Bayesian Classification - Classification by Backpropagation - Classification Based on Concepts from Association Rule Mining - Classification Methods -Prediction - Classifier Accuracy.

UNIT V

Cluster Analysis: Types - Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Density Based Methods - Grid Based Methods - Model Based Clustering Methods - Outlier Analysis.

Text Book:

1. Jiawei Han and Micheline Kamber, *Data Mining concepts and Techniques*, Morgan Kaufmann Publishers, 2002 ISBN 81-8147-049-4. (Chapters 1-8)

Reference Book:

1. Michael J.A.Berry and Gordon S.Linoff, "Mastering Data Mining-The art and Science of Customer Relationship Management", Wiley2000, ISBN *9971-51-369-2*.

IT239 MOBILE COMPUTING

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Pervasive Computing - Information Access Devices - Smart Identification - Embedded Controls. (Chapter 1- 4).

UNIT II

Software: Java - Operating Systems: Windows CE – Palm OS - Symbian OS - Java Card-Client Middleware- Security (Chapter 6-9).

UNIT III

Connecting the world: Internet Protocols and Formats - Mobile Internet - Voice - Web Services. (Chapter 10- 13).

UNIT IV

Connectivity - Service Discovery - Back-End Server Infrastructure: Gateways - Application Servers. (Chapter14-17)

UNIT V

Internet Portals - Synchronization -Home Services - Travel and Business Services - Consumer Services. (Chapter 18, 20 –23)

Text Book:

1. Uwe Hansmann, Lothar Merk, Martin S.Nicklous and Thomas Stober, *Principles of Mobile Computing*, Second Edition, Springer, 2003, ISBN 81-8128-073-3.

IT240 SIGNALS AND SYSTEMS

Credits: 4 : 0 : 0

Marks: (40 + 60)

UNIT I

Signals and Systems: Introduction – Continuous Time and Discrete Time signals – Transformations of independent variable – Exponential and sinusoidal signals – Unit Impulse and Unit Step functions – Continuous Time and Discrete Time systems – Basic system properties. (Chapter 1)

UNIT II

Linear Time Invariant Systems: Introduction – Discrete Time LTI systems : Convolution sum – Continuous Time LTI systems: Convolution Integral – Properties of Linear Time-Invariant systems – Causal LTI systems described by differential and difference equations – Singularity functions. (Chapter 2)

UNIT III

Filtering – Frequency shaping and selective filters – Time and frequency characterization: Introduction – Magnitude phase representation of fourier transform – Magnitude phase representation of the frequency response of LTI system – Time Domain properties of ideal frequency selective filters – Time Domain and Frequency Domain aspects of non ideal filters – First order, Second order continuous time system - First order, Second order discrete time system – Example of time and frequency domain analysis of systems.(Section 3.9,Chapter 6).

UNIT IV

Sampling: Introduction – Representation of continuous time signal by its samples: Sampling Theorem – Reconstruction of signal from its samples using interpolation – Effect of undersampling: aliasing – Discrete time processing of continuous time signals – Sampling of discrete time signals – Analysis and Characterization of LTI system using the Laplace Transform, System function algebra and block diagram representation – Unilateral Laplace transform. (Chapter 7, Section 9.7-9.9)

UNIT V

The Z-transform: Introduction – Region of convergence of Z transform – The inverse Z transform – Geometric evolution of the fourier transform from the Pole-Zero plot – Properties of the Z transform – Some common Z transform pairs - Analysis and Characterization of LTI system using the Z Transform – System function algebra and block diagram representation – Unilateral Z transform. (Chapter 10)

Text Book:

1. Alan V. Oppenheim and Alan S. Willsky, *Signals and Systems*, Second Edition, Prentice Hall India, 1997, ISBN 81-203-1246-5.

Reference Book:

1. Rodger E. Ziemer, William H. Tranter and D. Ronald Fannin, *Signals and Systems – Continuous and Discrete*, Fourth Edition, Pearson Education Inc., 1998, ISBN 81-7808-296-9.

IT317 MOBILE COMPUTING AND COMMUNICATION

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction –Wireless transmission: Antennas - Spread Spectrum - Cellular systems - Medium access control: SDMA- FDMA- TDMA-CDMA– Comparison of S/T/F/CDMA - Telecommunication systems: GSM - DECT – TETRA - UMTS and IMT 2000 - Broadcast systems : Cyclic repetition of data - Digital audio broadcasting - Digital video broadcasting. (Text 1: Chapters 1, 2.3, 2.7, 2.8, 3, 4, 6)

UNIT II

Wireless LAN : Infrared Vs Radio transmission - Infrastructure and adhoc networks - IEEE 802.11 – HIPERLAN– Bluetooth- Wireless ATM: WATM services - Reference model-functions - Radio access layer – Handover - Location Management – Addressing -Mobile quality of service - Access point control protocol. (Text 1: Chapters 7, 8.3-8.11)

UNIT III

Mobile network layer: Mobile IP - Dynamic host configuration protocol - adhoc networks - Mobile transport layer : Traditional TCP-- Indirect TCP - Snooping TCP - Mobile TCP - Fast retransmit/ fast recovery - Transmission/ time-out freezing - Selective retransmission - Transaction oriented TCP - Support for mobility : File systems - World Wide Web - Wireless application protocol. (Text 1: Chapters 9-11)

UNIT IV

Pervasive Computing – Information Access Devices - Smart Identification - Embedded Controls - Entertainment Systems. (Text 2: Chapters 1– 5)

UNIT V

Software – Java-Operating Systems-Client Middleware-Security-New services-Home Services - Travel and Business Services- Consumer Services
(Text 2: Chapters 6 –9, 21-23)

Text Books:

1. Jochen Schiller, *Mobile Communication*, Pearson Education, 2000. ISBN 81-7808-170-9.
2. Uwe Hansmann, Lothar Merk, Martin S.Nicklous and Thomas Stober, *Principles of Mobile Computing*, Second Edition, Springer International Edition, 2003. ISBN 81-8120-073-3.

Reference Book:

1. Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, JohnWiley and Sons Inc., 2001. ISBN 0-471-39492-0.

IT318 GRID COMPUTING

Credits: 4 : 0 : 0
Marks: (40 + 60)

UNIT I

Early grid activities – Current grid activities – An overview of grid business areas – Grid applications – Grid infrastructure – Organizations developing Grid standards and best practice guidelines – Global grid forum – Organizations developing grid computing tool kits and the framework – Organizations building and using grid based solutions to solve computing, data and network requirements – Commercial organizations building and using grid based solutions – The Grid problem – Autonomic computing – Business on demand and infrastructure virtualisation – Service oriented architecture and Grid – Semantic Grids

UNIT II

Service oriented architecture – Web service architecture XML, Related technologies and their relevance to web services – XML messages and enveloping – Service message description mechanisms – Relationship between web service and grid service – Web service interoperability and the role of the WS-I organization – OGSA architecture and goal – Commercial data center – National fusion collaboratory – Online media and entertainment – Native platform services and transport mechanisms – OGSA hosting environment – Core networking services transport and security – OGSA infrastructure – OGSA basic services

UNIT III

Grid services – A high level introduction to OGSI – Technical details of OGSI specification – Introduction to service data concepts – Grid service: Naming and change management recommendations – Common management model – Service domains – Policy architecture – Security architecture – Metering and accounting – Common distributed logging – Distributed data access and replication

UNIT IV

GT3 software architecture model – Service-programming model

UNIT V

Acme search service implementation in a top down approach – Resource discovery and monitoring – Resource allocation – Data management – Information services – Index services – Resource information provider service – Resource management services – Data management services – OGSI.NET framework implementation

Text Book:

1. Joshy Joseph and Craig Fellenstein, *Grid Computing*, Pearson Education, 2004. ISBN 81-297-0527-3.

Reference Book:

1. Ian Foster and Carl Kesselman, *The Grid: Blueprint for a New Computing Infrastructure*, Second Edition, Morgan Kaufmann, 2004.

IT319 PERFORMANCE EVALUATION OF COMPUTER NETWORKS

Credits: 4 : 0 : 0

Marks: (40 + 60)

UNIT I

Introduction to queuing paradigm – Queuing theory – Queuing models – Case studies: Performance model of a distributed file service – Single bus multiprocessor modeling – Teranet, a light wave network, Performance model of a shared medium packet switch. Introduction to single queuing system – The M/M/1 queuing system – Little's law – Reversibility and Burke's theorem – The state dependent M/M/1 queuing system – The M/M/1/N queuing system: The finite buffer case – The M/M/α queuing system: Infinite number of services – The M/M/m/m queue: A loss system – Central server CPU model – Transient solution of the M/M/1/α queuing system.

UNIT II

The M/G/1 queuing system – Priority system for multi class traffic – Introduction to networks of queues – The product form solution – Algebraic topological interpretation of the product form solution – Recursive solution of non-product form networks – Queuing networks with negative customers.

UNIT III

Introduction to numerical solution of models – Closed queuing networks: Convolution algorithm – Mean value analysis – PANACEA: approach for large markovian-Norton's equivalent for queuing networks – Simulation communication networks.

UNIT IV

Introduction to stochastic petrinets – Bus oriented multiprocessor model – Toroidal MPN lattices – The dining philosophers problem – A station oriented CSMA/CD protocol model – The alternating bit protocol – SPN's without product form solution – Introduction to discrete time queuing system – Discrete time arrival processes – The Geom/Geom/m/N queuing system and The Geom/Geom/m/1 system.

UNIT V

Case studies: Queuing on a space division packet switch, Queuing on a single buffered banyan network, DQDB erasure station location – Introduction to network traffic modeling – Continuous time models – Discrete time models – Solution methods – Burstiness – Self similar traffic.

Text Book:

1. Thomas G. Robertazzi, *Computer Networks and System: Queuing theory and Performance Evaluation*, Third Edition, Springer, 2000. ISBN 0-387-95037-0.

IT320 SEMANTIC WEB

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction – Need for semantic web – Provisions and Possibilities of semantic web – Languages and Ontologies – SHOE language – Implementation – DAML-ONT Ontology language – Language extension – Axiomatic semantics of DAML-ONT

UNIT II

Ontologies and Schemas – OIL Ontology language – XML schema – RDF schema – Application to online resources – Brokering reasoning components on the web – UPML – Ontologies – Simple ontologies and uses – Structured ontologies and uses – Structured ontologies and uses – Ontology acquisition – Ontology related implications and Needs

UNIT III

Sesame – RDF and RDF schema – Need for an RDF/S query language – Sesame's architecture – Sesame's Functional modules – Evolving Web – Web problem solving – Domains – Enabling infrastructure – Knowledge mobility – Need for knowledge mobility – New generation knowledge bases – Resilient hyper-knowledge bases – TRELLIS

UNIT IV

Complex relationships for semantic web – Knowledge modeling – Information scapes – Knowledge discovery – Visual Interfaces – Semantic portal: SEAL approach – Ontology and knowledge bases – Ontology engineering – SEAL Infrastructure and Core modules – Semantic ranking – Semantic personalization

UNIT V

Semantic gadgets – Representation – Semantic discovery – Contracting for the use of services – Composition of services – Static semantics – Dynamic semantics – Sources of dynamic semantics – Web agents – Information retrieval and theorem proving perspectives – Glue – Features – Comparison – Semantic Annotation – External annotation framework – Annotation based transcoding system – HTML Page splitting – Task achieving agents – Standards – Web based application

Text Book:

1. Diester Fensel, James Hendler, Henry Lieberman, Wolfgang Wahlster, *Spinning the Semantic Web*, The MIT Press, 2003. ISBN 0-262-06232-1.

IT321 OPTICAL NETWORKS

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Introduction – Telecommunication network architecture – Services – Circuit switching – Optical Networks – Optical layer – Optical packet switching – Transmission basics – Network evolution – Client layers – SONET/SDH – ATM – IP – Storage Area Networks – Gigabit Ethernet.

UNIT II

WDM network elements – Optical line terminals – Optical line amplifiers – Optical Add/Drop multiplexers – Optical cross connects – WDM Network design – Cost Trade offs – LTD and RWA problems – Dimensioning wavelength – Routing networks – Statistical dimensioning models – Maximum load dimensioning models.

UNIT III

Control and Management – Network Management function – Optical layer services and - Layers with in optical layer – Performance and fault management configuration management – optical safety. Network suitability – Basic concepts – protection in SONET / SDH IP networks – Optical layer protection schemes – Interworking layers.

UNIT IV

Access Networks – Network architecture overview – Enhanced HFC – Fiber to the curb (FTTC) photonic packet switch – Optical TDM – Synchronization – Header processing – Buffering – Burst switching – test beds.

UNIT V

Deployment considerations – evolving telecommunication network – Designing the transmission layer – Using SDM, TDM, WDM - Long haul network metro networks.

Text Book:

1. Rajiv Ramaswami, Kumar N Sivarajan, *Optical Networks – A Practical Perspective*, Morgan Kaufmann Publishers, 2004. ISBN 1-55860-445-6.

IT322 INFORMATION SECURITY LAB

Credits : 0:0:2 **Marks : 50 + 50**

12 experiments will be notified by the HOD from time to time

IT323 WIRELESS NETWORKS LAB

Credits : 0:0:2 **Marks : 50 + 50**

12 experiments will be notified by the HOD from time to time

LIST OF ADDITIONAL SUBJECTS

Code	Subject Name	Credit
IT241	Communication Engineering	4 : 0 : 0
IT242	Principles of Mobile Communication	4 : 0 : 0
IT243	User Interface Design	4 : 0 : 0
IT244	LAN Design and Implementation	4 : 0 : 0
IT245	Satellite Communication	4 : 0 : 0
IT246	Geographical Information System	4 : 0 : 0
IT247	Bio-Informatics	4 : 0 : 0
IT324	Case Tools Lab (IT225)*	0 : 0 : 2
IT325	Advanced Communication Engineering	4 : 0 : 0
IT326	Principles of Digital Multimedia	4 : 0 : 0
IT327	Advanced Computer Graphics	4 : 0 : 0
IT328	Web Design	4 : 0 : 0
IT329	Digital Image Processing	4 : 0 : 0
IT330	Digital Signal Processing	4 : 0 : 0
IT331	Multimedia Communication	4 : 0 : 0
IT332	Computer Animation	4 : 0 : 0
IT333	3D Modeling and Rendering	4 : 0 : 0
IT334	Virtual Reality Technology	4 : 0 : 0
IT335	Digital Signal and Image Processing Lab	0 : 0 : 2
IT336	Web Design Lab	0 : 0 : 2
IT337	Animation Lab	0 : 0 : 2
IT338	Audio and Video Lab	0 : 0 : 2
IT339	Multimedia System Design Lab	0 : 0 : 2
IT340	Virtual Reality Lab	0 : 0 : 2
IT341	Mobile Communication	4 : 0 : 0
IT342	Wireless Security	4 : 0 : 0
IT343	Software Project Management	4 : 0 : 0

* new code only

IT241 COMMUNICATION ENGINEERING

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Decibels and Noise – Amplitude Modulation – Receivers for AM: RF stage – IF stage (Chapter 3 – 5)

UNIT II

Frequency and Phase Modulation – Wire and Cable Media: Parameters – Balanced and Unbalanced Lines – Drivers and Receivers – Propagation and Antennas – Digital Information. (Chapter 6,9,10)

UNIT III

Digital Communication Fundamentals – Digital Communication Systems – Digital Modulation and Testing. (Chapter 11 – 13)

UNIT IV

TV/Video , Facsimile – RS 232 Interface Standard, Modems and High Speed Ports Links (Chapter 14,17)

UNIT V

Satellite Communication – Navigation, Global Positioning System – Cellular Telephone (Chapter 19,20)

Text Book:

William Schweber . *Electronic Communication System – A Complete Course*, Fourth Edition, Prentice Hall International, 2002. ISBN: 81-203-2229-0.

IT242 PRINCIPLES OF MOBILE COMMUNICATION

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Introduction - Wireless Transmission: Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular Systems
Medium Access Control: Motivation, SDMA, FDMA, TDMA, CDMA - Comparison

UNIT II

Telecommunication Systems: GSM, DECT, TETRA, UMTS and IMT- 2000
Satellite Systems: Basics - Routing - Localization - Handover

UNIT III

Wireless LAN: Infrared Vs radio transmission, Infrastructure and ad hoc networks, IEEE 802.11, HYPERLAN, Bluetooth.

UNIT IV

Wireless ATM: Motivation, Working group, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Quality of service, Access point control protocol
Mobile network layer: Mobile IP, Dynamic host configuration protocol, Ad-hoc networks

UNIT V

Mobile transport layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmission/ fast recovery, Selective retransmission, Transaction oriented TCP
Support for mobility: Wireless application protocol

Textbook:

Jochen Schiller, *Mobile Communications*, Second Edition, Pearson Education, 2004. ISBN 81-297-0350-5. (Chapters 1-5, 7-9, 10.3)

Reference Book:

Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, Second Edition, John Wiley and Sons, 2001.

IT243 USER INTERFACE DESIGN

Credits: 4: 0: 0 **Marks: (40 + 60)**

UNIT I

Human factors of interactive software-Theories, principles, and guidelines-Managing design processes.
(Sections 1.1-1.6, 2.1-2.9, 3.1-3.9)

UNIT II

Expert reviews, usability testing, surveys, and continuing assessments-Software tools-Direct manipulation and virtual environments.
(Sections 4.1-4.7, 5.1-5.4, 6.1-6.8)

UNIT III

Menu selection, form filling, and dialog boxes-Command and natural languages-Interaction devices.
(Sections 7.1-7.8, 8.1-8.8, 9.1-9.7)

UNIT-IV

Response time and display rate-Presentation styles: Balancing function and fashion-printed manuals, online help, and tutorials-Multiple-window strategies.
(Sections 10.1-10.5, 11.1-11.5, 12.1-12.4, 13.1-13.6)

UNIT-V

Computer-Supported cooperative work-Information search and visualization-Hypermedia and the World Wide Web.
(Sections 14.1-14.6, 15.1-15.5, 16.1-16.6)

Text Book:

Ben Shneiderman, *Designing the user interface-Strategies for effective human-computer interaction*, Third Edition, Pearson Education, 1998.

IT244 LAN DESIGN AND IMPLEMENTATION

Credits: 4 : 0 : 0 **Marks: (40+60)**

UNIT I

Introduction: Networks – LAN definition, Components, Models, Applications – Data Communication Models: Layered Architecture – OSI Model – TCP/IP Protocol Suite – IEEE Standards – Data Transmission – Analog and Digital Signals – Digital And Analog Transmission – Multiplexing – Data Rate – Transmission Media: Guided Media – Unguided Media – Transmission Impairment – Performance

UNIT II

Error Detection: Types of Errors – Detection – Vertical, Longitudinal and Cyclic Redundancy Checks – Error Correction – LAN Topologies – Bus, Ring, Star and Hybrid Topologies – Flow and Error Control – Medium Access Methods: Random Access – Controlled Access

UNIT III

Logical Link Control: Services – LLC Protocol – Service/ Protocol Association – Ethernet 10 Mbps: Access Method CSMA/CD – Layers – Mac Sublayer – Physical Layer – Implementation – Ethernet Evolution: Fast and Gigabit Ethernet: Bridged Ethernet – Switched Ethernet – Full Duplex Ethernet – MAC Control – Fast Ethernet – Mac Sublayer – Physical Layer – Implementation – Gigabit Ethernet – Mac Sublayer – Physical Layer – Implementation – Token Bus: Physical Vs Logical Topology – Token Passing – Service Classes – Ring Management - Layers – Mac Sublayer – Physical Layer.

UNIT IV

Token Ring: Access Method: Token Passing – Layers – Mac Sublayer – Physical Layer – Ring Management – Priority and Reservation Levels – Implementing Priorities –ATM LANS: Architecture – LANE – Client Server Model – LANE Operation – Frame Format – Wireless LANs: Wireless Transmission – ISM Frequency Band – Architecture – Mac Sublayer – Physical Layer –High Data Rate Standard – LAN performance: Parameters – Efficiency – Efficiency of CSMA/CD and Token Ring

UNIT V

Connecting LANS: Repeaters – Bridges – Routers – Gateways – other devices – TCP/IP: Overview – Network Layer – Addressing Subnetting – Other Protocols in the Network Layer – Transport Layer – IPV6 & ICMPV6 – Data Encryption: Conventional Methods – Public Key Methods – Authentication – Network Management: Configuration, Fault, Performance, Security and Accounting Management- SNMP

Text Book:

Behrouz A. Forouzan, *Local Area Network*, Tata Mc-Graw Hill, 2003, ISBN: 0-07-048666-2. (Chapters 1- 20)

IT245 SATELLITE COMMUNICATION

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I

Orbits and Launching Methods: Introduction - Kepler's First, Second and Third laws - Definitions and terms for Earth - Orbiting Satellites - Orbital Elements - Apogee and Perigee Heights - Orbital Perturbations - Inclined Orbits - Sun Synchronous Orbits
(Chapter 2)

UNIT II

Geostationary Orbit: Introduction - Earth Eclipse of Satellite - Sun Transit Outage - Launching Orbits
Radio Wave Propagation: Atmospheric Losses- Ionospheric Effects
Polarization: Antenna Polarization - Polarization of Satellite Signals
Antennas: Reciprocity Theorem For Antennas - The Isotropic Radiator and Antenna Gain - The Half-Wave Dipole - Aperture Antennas - The Parabolic Reflector - The Offset Feed.
(Chapters 3-6)

UNIT III

Space Segment: Introduction - Power Supply - Attitude Control - Station Keeping - Thermal Control - TT&C subsystem – Transponders - Antenna Subsystem.
Earth Segment: Introduction – Receive - Only Home TV Systems - Master Antenna TV System - Community Antenna TV System - Transmit-Receive Earth Stations
Error Control Coding: Linear Block Codes - Cyclic Codes- Convolution Codes
(Chapters 7, 8, 11)

UNIT IV

Space Link: Introduction - Equivalent Isotropic Radiated Power - Transmission Losses - Link Power Budget Equation - System Noise - Carrier to Noise Ratio - Uplink - Downlink Interference: Interference between Satellite Circuits (B1 and B2 Modes) - Energy Dispersal - Coordination
(Chapters 12, 13)

UNIT V

Satellite Access: Introduction - TDMA - FDMA - CDMA Satellite Services and the Internet: Orbital Spacing - Power Rating and Number of Transponders - Frequencies and Polarization - Transponder Capacity - Bit Rates for Digital Television - MPEG Compression Standards - Forward Error Correction - Home Receiver Outdoor Unit (ODU) - Home Receiver Indoor Unit (IDU) - Downlink Analysis - Uplink
(Chapters 14, 15)

Text Book:

Dennis Roddy , *Satellite Communications,*Third edition ,Tata McGraw Hill, 2001.

Reference Book:
Timothy Pratt, *Satellite Communicationss*, John Willey & Sons, 2000.

IT246 GEOGRAPHICAL INFORMATION SYSTEM

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I
Introduction to GIS - Maps and GIS- Digital Representation of Geographical Data

UNIT II
Data Quality and Data Standards - Raster –Based GIS Data Processing- Vector –Based GIS Data Processing

UNIT III
Visualization of Geographic Information and Generation of Information and generation of Information Products - Remote Sensing and GIS Integration

UNIT IV
Digital Terrain Modeling - Spatial Analysis and Modeling

UNIT V
GIS Implementation and project Management - GIS Issues and Prospects

Textbook:
C.P. Lo and Albert K.W. Yeung, *Concepts and Techniques of Geographic Information System*, Prentice Hall of India, 2002.

Reference Book:
Ian Heywood, Sarah Cornelius and Steve Carver, *Introduction to Geographical Information System*, Second Edition, Pearson Education Edition, 2003.

IT247 BIO-INFORMATICS

Credits: 4 : 0 : 0 **Marks: (40+60)**

UNIT I
Bio-Informatics: Introduction – Information Search – Data Retrieval – Genome Analysis and Gene Mapping

UNIT II
Alignment of Pairs of Sequences – Alignment of multiple sequences – Phylogenic analysis – Tools for similarity search and sequence alignment

UNIT III
Profiles and hidden Markov models – Gene Identification – Prediction Gene expressions – Micro Arrays

UNIT IV
Protein Classification and Structure Visualization – Protein Structure Prediction – Proteomics

UNIT V
Computational Methods for Pathways and System Biology – Introduction to drug discovery – Drug discover technology and strategies – Computer aided drug design

Text Book:
S.C. Rastogi, N. Mendiratta and P. Rastogi, *Bio-Informatics Methods and Applications Genomics, Proteomics and Drug Discovery*, Prentice Hall India Ltd., 2004.

Reference Books:

1. Andreas D.Baxevanis, B.F.Francis Quellete, *Bio-informatics - A Practical guide to the analysis of genes and proteins*, Second Edition, John Wiley and Sons, 2002.
2. Dan E. Krane, Michael L. Raymer, *Fundamental Concepts of Bio-Informatics*, Pearson Education Inc., 2003.

IT325 ADVANCED COMMUNICATION ENGINEERING

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I: Digital and Data communications
Digital communications-Introduction, Digital communication, Shannon limit for information capacity, Digital radio, Digital amplitude modulation, Frequency shift keying, Phase shift keying, Quadrature amplitude modulation, Bandwidth efficiency, Carrier recovery, differential phase shift keying, Clock recovery, Probability of error and bit error rate - History of data communication standards organizations for data communication, Data communication circuits, Data communication codes, Error control, Synchronization.

UNIT II: Data Communication protocols and network configurations
Open systems interconnection, Data transmission modes, Asynchronous protocols, Synchronous protocols, Public data network, CCITT X.25 user-to-network interface protocol, Integrated services digital network, Local area networks, Token passing ring, Ethernet, Fiber distributed data interface.

UNIT III: Digital Transmission and Multiplexing:
Pulse modulation, Pulse code modulation, Delta modulation PCM, Adaptive Data modulation PCM, Differential pulse code modulation, Pulse transmission, Signal power in binary digital signals, Time-division multiplexing, T1 digital carrier system, CCITT time division multiplexed carrier system, Codecs, Combo chips, North American digital hierarchy line encoding.

UNIT IV: Microwave Radio Communications & system gain, Optical fiber Communications

Frequency Vs Amplitude modulation, Simplified FM microwave radio system, FM microwave radio repeaters, Diversity, Protection switching, FM microwave radio stations, Path characteristics, System gain, History of fiber optics, Optical fibers Vs metallic cable facilities, Electromagnetic spectrum, Optical fiber communications system.

UNIT V: Satellite Communication

History of satellites, Orbital satellites, Geostationary satellites, Orbital patterns, Look angles, Orbital classification, Spacing & frequency allocation, Radiation patterns: Footprints, Satellite system parameters, Satellite system link equations, Link budget.

Text book:

Wayne Tomasi, *Advanced Electronic Communications Systems*, Prentice-Hall International Inc., 1998, ISBN: 0-13-649278-9.

Reference books:

1. Forouzan, *Introduction to Data Communication and Networking*, TMH, 1998.
2. Tri T. Ha, *Digital Satellite Communication*, Second Edition, McGraw Hill, 1990.

IT326 PRINCIPLES OF DIGITAL MULTIMEDIA

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Multimedia Authoring and Data Representations: Introduction to Multimedia – Multimedia and Hypermedia – World Wide Web – Overview of Multimedia Software Tools – Multimedia Authoring – Some useful editing and authoring tools – VRML – Graphics/Image Data Types – Popular file formats – Color science – Color models in images – Color models in video – Types of video signals – Analog video – Digital video.

UNIT II

Digitization of sound – MIDI – Quantization and transmission of audio – Multimedia data compression: lossless compression algorithms – Lossy compression algorithms – Image compression standards.

UNIT III

Basic video compression techniques – Introduction to video compression – Video compression based on motion compensation – Search for motion vectors – H.261 – H.263 – MPEG video coding – MPEG 1 – MPEG 2 – Overview of MPEG 4 – Object based visual coding in MPEG 4 – Synthetic object coding in MPEG 4 – MPEG 4 Object types – Profiles and Levels – MPEG 4 part 10/H.264 – MPEG 7 – MPEG 21.

UNIT IV

Basic audio compression techniques – ADPCM in speech coding – G.726 ADPCM vocoders. MPEG Audio compression: Psychoacoustics – MPEG audio – Other commercial audio codecs – The future of MPEG 7 and MPEG 21.

Computer and multimedia networks: Basics of computer and multimedia networks – Multiplexing technologies – LAN and WAN – Access networks – Common peripheral interfaces.

UNIT V

Multimedia network communication and applications: Quality of multimedia data transmission – Multimedia over IP – Multimedia over ATM networks – Transport of MPEG 4 – Media on Demand.

Wireless Networks: Radio propogation models – Multimedia over wireless networks – Content based retrievel in digital libraries – Image retrieval – C- BIRD – Case study – Synopsis of current image search systems – Relevance feedback – Quantifying results – Querying over videos – Querying on other formats – Outlook for content based retrievels.

Text Book:

Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, Pearson Education, 2004. ISBN 81-297-0438-2.

Reference Books:

1. J-R Ohm, *Multimedia Communication Technology*, Springer-Verlag, 2004. ISBN 3-540-01249-4.
2. Daniel Cunliffe, Geoff Elliott, *Multimedia Computing*, Crucial, 2003. ISBN 1-903337-18-6.

IT327 ADVANCED COMPUTER GRAPHICS

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Introduction to computer graphics- - Usage of computer generated pictures - Elements of pictures created in computer graphics - Graphics display devices - Graphics input primitives and devices - Getting started making pictures - Drawing basic graphics primitives - Making line drawings - Simple interaction with the mouse and keyboard.

UNIT II

More drawing tools – Introduction - World windows and view ports - Clipping lines - Developing the canvas class - Relative drawing - Figures based on regular polygons - Drawing circles and arcs using the parametric form of a curve

UNIT III

Vector tools for graphics – Introduction - Review of vectors - The dot product – The cross product of two vectors - Representations of key geometric objects - Finding the intersection of two line segments - Intersections of lines with planes, and clipping - Polygon intersection problems.

UNIT IV

Transformations of objects-introduction to transformations - 3D affine transformations - Changing coordinate systems - Using affine transformations in a program - Drawing 3D scenes with Open GL.

UNIT V

Modeling shapes with polygonal meshes - Introduction to solid modeling with polygonal meshes – Polyhedra - Extruded shapes - Mesh approximations to smooth objects - Three dimentional viewing – Introduction - The camera revisited - Building a camera in a program - Perspective projections of 3D objects - Producing stereo views - Taxonomy of projections.

Text Book:

F.S.Hill JR, *Computer graphics using Open GL,* Second Edition, Prentice Hall, 2001. ISBN 81-203-2813-2.

Reference Book:

Edward Angel, *Interactive Computer Graphics –A Top Down approach with OpenGL,* Addison Wesley, 2000. ISBN 0-201-38597-X.

IT328 WEB DESIGN

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Introduction to computers and the internet-Introduction-What is a Computer-Programming language types-Other high level languages-structured programming-History of Internet and world wide web-Hardware trends-Key s/w trend: object technology-JavaScript-Browser portability-C & C++-Java-.NET-DHTML-Internet &WWW how to program-Microsoft Internet Explorer 6-Introduction-Connecting to Internet-Internet Explorer 6 features-Searching the Internet-Online Help & tutorials-Keeping track of your favorite sites-FTP-Customizing browser settings-Electronic mail-Instant messaging-Other web browsers-Adobe Photoshop elements: Creating web graphics-Introduction-Image Basics-Vector and raster graphics-Toolbox-Layers-screen capture-file formats

UNIT II

Introduction to XHTML: Part 1- Introduction-Editing XHTML-First XHTML example-w3c XHTML validation service-Headers-Linking-Images-Special characters and more line breakers-Unordered lists-Nested and ordered lists -Introduction to XHTML: part 2-Introduction-Basic XHTML tables-Intermediate XHTML tables and formatting-Basic XHTML forms-Internal linking-Creating and using image maps-meta elements-frameset elements-nested framesets -Cascading style sheets-Introduction-Inline styles-Embedded style sheets-conflicting styles-Linking external style sheets-W3C CSS validation service-Positioning elements-Backgrounds-Element dimensions-Text flow and the box model-User style sheets

UNIT III

JavaScript: Introduction to Scripting-Simple program-Obtaining user input with prompt dialogs-Memory concepts-Arithmetic-Decision making-JavaScript Control statements-Algorithms-pseudocode-Control structures-If selection statement-if.else selection statement-formulating algorithms-Counter controlled repetition-Sentinel controlled repetition-Nested control structures-Assignment operators-Data types-JavaScript control statements II-Essentials of computer controlled repetition-for repetition statement-exapmle-switch-do..While-break and continue-labeled break and continue-Logical operators -Javascript: functions-Program modules-program defined functions-function definitions-random number generation-game of chance-random image generator-scope rules-global functions-recursion-recursion vs iteration.

UNIT IV

JavaScript: arrays-Declaring and allocating arrays-examples-random image generator using arrays-references and referenced parameters-passing arrays to function-sorting arrays-searching arrays-multidimensional arrays0-building online quiz-javascript: objects-Thinking about objects-Math object-String object-Date object-Boolean and number object-document object-window object-using cookies-final javascript example-DHTML: object model and collections-Object referencing-Collections all and children-dynamic styles-dynamic positioning-using frames collections-navigator object-DHTML: Event Model-event onclick-event onload-error handling -tracking mouse -rollover-form processing-more form processing-event bubbling-more DHTML events.

UNIT V

DHTML filters and transitions-flip filters-Transparency-Image, asks-Miscellaneous image filters-Adding shadows to text-Creating gradients-making text glow-creating motion-using wave filter-Advance filters-blendTrans-revealtrans transition-DHTML-data binding-simple-moving within recordset-binding to an img, table-sorting table data-advanced sorting and filtering-data binding elements.

Text book:

H.M. Deital,P.J. Deitel,A.B.Goldberg, *Internet and World Wide Web: How to Program* , Pearson Education, Third edition,2005. ISBN. 81-297-0408-0.

Reference Book:

Thomas A. Powell, *Web Design: The Complete Reference*, Tata McGraw Hill, 2000. ISBN 0-07-041180-7.

IT329 DIGITAL IMAGE PROCESSING

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Introduction: What is digital image processing – The origins of digital image processing – Examples of fields that use digital image processing – Fundamental steps in digital image processing – Components of an image processing system. **Digital Image Fundamentals:**

Elements pf visual perception – Light and electromagnetic spectrum – Image sensing and acquisition – Image sampling and quantization – some basic relationships between pixels – Linear and nonlinear operations. **Image enhancement in the Spatial Domain:** Background – Some basic grey level transformations – Histogram processing – enhancement using arithmetic/logic operations – Basic of Spatial filtering – smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods (Chapters: 1,2,3)

UNIT II

Image enhancement in the Frequency domain: Background – Introduction to the Fourier transform and frequency domain – smoothing frequency domain filters – Sharpening frequency domain filters – Homomorphic filters - Implementation
(Chapter: 4)

UNIT III

Image Restoration: A model of the Image degradation / Restoration process – Noise models – Restoration in the presence of Noise only spatial filtering – Periodic noise reduction by frequency domain filtering – Linear, position invariant degradation – Estimating the degrading function – Inverse filtering – Minimum mean square error (wiener) filtering – constrained least square Filtering – Geometric mean filter – Geometric transformations (Chapter: 5)

UNIT IV

Morphological Image Processing: Preliminaries – Dilation and Erosion – Opening and Closing – The hit-or-miss Transformation – Some basic morphological algorithms – Extension to gray scale images. **Representation and Descriptions:** Representation – Boundary descriptors – Regional descriptors – Use of principal components for description – Relational descriptors. (Chapters: 9,11)

UNIT V

Image Segmentation: Detection of discontinuities – Edge linking and boundary detection – Thresholding – Region based segmentation – segmentation by morphological watersheds – The use of motion in segmentation. (Chapter: 10)

Text Book:

Rafael C. Gonzalez and Richard E. Woods, *Digital Image Processing,* Second Edition, Pearson education, 2002. ISBN: 81-7808-629-8.

Reference Book:

Arthur R. Weeks, Jr., *Fundamentals of Electronic Image Processing,* Prentice-Hall India, First Edition, 1999. ISBN-81-203-2408-0.

IT330 DIGITAL SIGNAL PROCESSING

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Z- Transforms : Introduction – Definition of the z – transform – Properties of z – transform – Evaluation of the Inverse z – transform. Linear Time Invariant Systems : Introduction – Properties of the DSP System – Difference Equation and its Relationship with System Function, Impulse Response and Frequency Response – Frequency Response

UNIT II

Discrete and Fast Fourier Transforms: Introduction – Discrete Convolution – Discrete-Time Fourier Transform(DTFT) – Fast Fourier Transform(FFT) – Computing an Inverse DFT by doing a Direct DFT – Composite radix FFT- Fast (Sectioned) Convolution – Correlation

UNIT III

Finite Impulse Response(FIR) Filters : Introduction – Magnitude Response and Phase Response of Digital Filters – Frequency Response of Linear Phase FIR Filters – Design Techniques for FIR Filters – Design of Optimal Linear Phase FIR Filters

UNIT IV

Infinite Impulse Response Filters : Introduction – IIR Filter Design by Approximation of Derivatives – IIR Filter Design by Impulse Invariant Method - IIR Filter Design by the Bilinear Transformation – Butterworth Filters – Chebyshev Filters – Inverse Chebyshev Filters – Elliptic Filters – Frequency Transaformation

UNIT V

Realisation of Digital Linear Systems – Introduction – Block Diagram and Signal flow graph – Basic structures for IIR systems - Basic structures for FIR systems

Text Book:

S. Salivahanan, A Vallavaraj, C. Gnanapriya, *Digital Signal Processing*, Tata McGraw Hill, 2000. ISBN 0-07-463996-x.

IT331 MULTIMEDIA COMMUNICATION

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Multimedia Communications – Introduction – Model – Requirements – Audio-Visual Integration – Media interaction – Lip reading – Lip synchronization – Lip tracking – Audio to visual mapping – Multimedia processing in communication – Digital media – Signal processing elements – Challenges – Perceptual coding of audio – Transform audio coders – Subband coders – Image coding – Video coding – Watermarking – Organization storage and retrieval issues – Signal processing for networked multimedia(NN) – NN for multimedia processing – Multimedia processors.

UNIT II

Distributed multimedia systems – Features – Resource management – Networking – Multimedia operating systems – Distributed multimedia servers – Distributed multimedia applications – Multimedia Communication Standards – MPEG – MPEG 2 – MPEG 4 – DMIF – MPEG 4 Video, Audio – MPEG 7 – MPEG 21.

UNIT III

ITU-T Standardization of Audio visual communication system – IETF and Internet Standards – Multimedia Communications across networks – Packet Audio/Video in the network environment – Video transport across generic networks

UNIT IV

Multimedia transport across ATM networks – Multimedia across IP networks – Multimedia across DSLs – Internet access networks – Multimedia across wireless

UNIT V

Mobiles Networks – Broadcasting networks – Digital Television infrastructure for interactive multimedia servers.

Text book:

K.R. Rao, Zaron S. Bojkovic, Dragorad A. Milocanovic, *Multimedia Communication Systems*, Prentice Hall India, 2002. ISBN 81-203-2145-6.

Reference books:

1. Fred Halsall, *Multimedia Communications*, Pearson Education, 2001. ISBN 81-7808-532-1.
2. Steve Heath, *Multimedia and Communication Technology*, Second Edition, Focal Press, 2003. ISBN 81-8147-145-8

IT332 COMPUTER ANIMATION

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I: Preproduction and Modeling Basics

Preproduction:Introduction-Storyboarding-Character and Model Design-Sound Design – Technical Tests-Producton Scheduling Modeling Basics:Introduction-Polygon Modeling-Splines and Patches-Coordinate Systems-Viewing Windows-Geometric Primitives-Transformations-Common Modeling Techniques-Hierarchies-Booleans and Trims-Basic Deformations

UNIT II: Rendering Basics

Introduction-The Camera-Lights-Surface Characteristics-Shading Algorithms-Rendering Algorithms-Background Images-Surface Texture Mapping-Solid Texture Mapping-Final Rendering

UNIT III: Animation Basics and Advanced Modeling

Animation Basics:Introduction-Keyframing-Interpolations-Parameter-curve Editing-Dope Sheet Editing-Forward Kinematics-Inverse Kinematics-Motion Paths-Shape Deformations-Camera Animation-Animating Light and Surface Properties-Pose-based Animation. Advanced Modeling:Introduction-Virtual Sculpting-Digitizing Techniques-Procedural Modeling-Stitched Patches-Subdivision Surfaces-Displacement Mapping-Hair and Fur-Paint-based Modeling-Higher-level Primitives

UNIT 4: Advanced Rendering

Introduction-Atmospheric Effects-Fractals-Lighting Subtleties-Advanced Texturing-Texturing Polygons-Background Shaders-Non-Photorealistic Rendering-Reflection Maps and Environment Procedures-More Rendering Algorithms-Rendering for Output

UNIT V: Advanced Animation and Postproduction

Introduction-Animated Fillets-Limits and Constraints-Metaballs-Expressions and Driven Keys-Motion Dynamics:Principles,Rigid Bodies-Soft-Body Dynamics-Particle Systems-Cloth Dynamics-Motion Capture-Camera-Motion Matching-Character Rigging:Movement Controls,Deformation Controls-Facial Animation –Nonlinear Animation Postproduction: Introduction-Compositing-Editing.

Text Book:

Michael O'Rourke, *Principles of Three-Dimensional Computer Animation*, Third Edition,W.W.Norton & Company Ltd.,2003. ISBN 0-393-73083-2.

Reference Books:

1. John Vince, *Essential Computer Animation*, Springer-Verlag, 2000. ISBN 1-85233-141-0.
2. Marcia Kuperberg, *A Guide to Computer Animation*, Focal Press, 2002, ISBN 0-240-51671-0.
3. Daniel Cunliffe, Geoff Elliott, *Multimedia Computing*, Crucial, 2003. ISBN 1-903337-18-6.

IT333 3D MODELING AND RENDERING

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Rendering faces for visual realism - Introduction to shading models - Flat shading and smooth shading - Removing hidden surfaces - Adding texture to faces - Adding shadows of objects - Tools for raster displays – Introduction - Manipulating pixmaps - Combining pixmaps - Bresenham's line drawing algorithms - Defining and filling regions of pixels - Manipulating symbolically defined regions - Filling polygon defined regions - Aliasing and antialiasing technique - Creating more shades and colors.

UNIT II

Curve and surface design – Introduction - Describing curves by means of polynomials - Interactive curve design - Bezier curves for curve design - Finding better blending functions -

The B-Spline basis functions and useful properties- BSpline for design - Rational Splines and NURBS curves - A Glimpse at interpolation – Modeling curvedsurfaces.

UNIT III

Color theory - Introduction-describing colors - The international commission on Illumination standard - Color spaces - Color quantization - Uniform quantization - The popularity algorithm - Median cut algorithm - Octree quantization.

UNIT IV

Hidden surface removal – Introduction - The depth buffer algorithm revisited - List priority HSR method - Scan line HSR method - Area subdivision approaches - On hidden line removal methods - HSR method for curved surfaces.

UNIT V

Ray tracing – Introduction - Setting up the geometry of ray tracing - Overview of the ray tracing process - Intersection of a ray with an object - Organizing a ray tracer application - Intersecting rays with other primitives - Drawing shaded pictures of scenes - Adding surface texture – Extents - Adding shadows for greater realism - Reflections and transparency - Compound objects: Boolean operations on objects

Text Book:

F.S.Hill,JR, *Computer graphics using Open GL,*Second Edition, Prentice Hall, 2001. ISBN 81-203-2813-2.

Reference Book:

Edward Angel, *Interactive Computer Graphics –A Top Down approach with OpenGL,* Addison Wesley, 2000. ISBN 0-201-38597-X.

IT334 VIRTUAL REALITY TECHNOLOGY

Credits: 4:0:0 **Marks: (40 + 60)**

UNIT I

Introduction-Input devices-Three dimensional position trackers-Navigation and Manipulation Interfaces-Gesture Interfaces

UNIT II

Output Devices-Graphic displays- Sound displays-Hap tic Feedback

UNIT III

Computing Architecture of VR-The Rendering Pipeline-PC Graphic Architecture-Work station based Architectures-Distributed VR Architectures

UNIT IV

Modelling – Geometric modelling- Kinematics Modelling- Physical Modelling-Behavior Modelling-Model management-VR Programming-Toolkits and Scene Graphs-World Toolkit-Java 3D-General Hap tics open Software Toolkit-People shop.

UNIT V

Human Factors in VR-Methodology and Terminology-User Performance Studies-VR health and safety Issues-VR and Society

Textbook:

Grigore C.Burdea and Philippe Coiffet, *Virtual Reality Technology*, Second Edition, Wiley Interscience, 2003.ISBN 0-471-36089-9. (Chapters 1-7).

IT335 DIGITAL SIGNAL AND IMAGE PROCESSING LAB

Credits 0:0:2 **Marks: 50 + 50**

12 experiments will be notified by the HOD from time to time

IT336 WEB DESIGN LAB

Credits 0:0:2 **Marks: 50 + 50**

12 experiments will be notified by the HOD from time to time

IT337 ANIMATION LAB

Credits 0:0:2 **Marks: 50 + 50**

12 experiments will be notified by the HOD from time to time

IT338 AUDIO AND VIDEO LAB

Credits 0:0:2 **Marks: 50 + 50**

12 experiments will be notified by the HOD from time to time

IT339 MULTIMEDIA SYSTEM DESIGN LAB

Credits 0:0:2 **Marks: 50 + 50**

12 experiments will be notified by the HOD from time to time

IT340 VIRTUAL REALITY LAB

Credits 0:0:2 **Marks: 50 + 50**

12 experiments will be notified by the HOD from time to time

IT341 MOBILE COMMUNICATION

Credits: 4 : 0 : 0 **Marks: 40 + 60**

UNIT I

Introduction - Wireless Transmission: Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular Systems
Medium Access Control: Motivation, SDMA, FDMA, TDMA, CDMA - Comparison

UNIT II

Telecommunication Systems: GSM, DECT, TETRA, UMTS and IMT- 2000
Satellite Systems: Basics - Routing - Localization - Handover

UNIT III

Broadcast Systems: Cyclic repetition of data - Digital audio broadcasting, Digital video broadcasting
Wireless LAN: Infrared Vs radio transmission, Infrastructure and ad hoc networks, IEEE 802.11, HYPERLAN, Bluetooth.

UNIT IV

Wireless ATM: Motivation, Working group, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Quality of service, Access point control protocol
Mobile network layer: Mobile IP, Dynamic host configuration protocol, Ad-hoc networks

UNIT V

Mobile transport layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmission/ fast recovery, Selective retransmission, Transaction oriented TCP
Support for mobility: File systems, World Wide Web, Wireless application protocol

Textbook:

Jochen Schiller, *Mobile Communications*, Second Edition, Pearson Education, 2004. ISBN 81-297-0350-5.

Reference Book:

Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, Second Edition, John Wiley and Sons, 2001.

IT342 WIRELESS SECURITY

Credits: 4:0:0

Marks: (40+60)

UNIT I

Introduction- Security Principles - Wi-Fi Vulnerabilities – Different Types of Attack.

UNIT II
IEEE 802.11 Protocol Primer- IEEE 802.11 WEP Working – WPA, RSN and IEEE 802.11i- Access Control: IEEE 802.1X, EAP, and RADIUS.

UNIT III
Upper- Layer Authentication - WPA and RSN Key Hierarchy- TKIP.

UNIT IV
AES- CCMP-Wi-Fi LAN Coordination: ESS and IBSS- Public Wireless Hotspots.

UNIT V
Known Attacks: A Technical Review – Actual Attack Tools – Open Source Implementation Example.

Text Book:

Jon Edney, William A.Arbaugh, *Real 802.11 Security Wi-Fi Protected Access and 802.11i*, Pearson Edition 2004, ISBN 81-297-0312-2.

IT343 SOFTWARE PROJECT MANAGEMENT

Credits: 4 : 0 : 0 **Marks: (40 + 60)**

UNIT I
What is a Project - Traditional Project Management - Scoping the Project - Identifying Project Activities

UNIT II
Estimating Duration, Resource Requirements and Cost - Constructing and Analyzing the Project Network Diagram - Finalizing the Schedule and Cost Based on Resource Availability - Organizing and Conducting the Joint Project Planning Session

UNIT III
Recruiting Organizing and Managing the Project Team - Monitoring and Controlling Progress - Closing out the Projects - Critical Chain Project Management

UNIT IV
Introduction to the Adaptive Project Framework - Version Scope - Cycle Plan - Cycle Build - Client Checkpoint - Post-Version Review - Variations to APF

UNIT V
Organizational Considerations - Project Portfolio Management - Project Support Office

Text Book:

Robert K. Wyzocki, Rudd McGary, *Effective Project Management*, WILEY-Dreamtech India Pvt. Ltd., 2003.

Code No.	Subject Name	Credits
IT248	Computer Networks	4:0:0
IT344	Internetworking	4:0:0
IT345	Network Management	4:0:0

IT248 COMPUTER NETWORKS

Credits: 4:0:0 **Marks: (40 + 60)**

Unit I

Computer Networks and the Internet- The network Edge - The network Core - Access networks and physical media - ISPs and internet backbones - Delay and loss in packet-switched networks - Protocol layers and their service models - History of computer networking and the internet. (Sections 1.2-1.8)

Unit II

Application layer -Principles of network applications- The web and the HTTP - File transfer: FTP - Electronic mail in the internet - DNS-The Internet's Directory service - (Sections 2.1-2.5)

Unit III

Transport layer - Introduction in transport-layer services - Multiplexing and de-multiplexing - Connectionless transport: UDP - Principles of reliable data transfer - Connection-oriented transport: TCP - Principles of congestion control. (Sections 3.1-3.6)

Unit IV

The network layer – Introduction - Virtual circuit and datagram networks - What's inside a router? -The internet protocol (IP): Forwarding and addressing in the internet - Routing algorithms (Sections 4.1-4.5)

Unit V

The link layer and local area networks - Link layer: Introduction and services - Error-detection and – correction techniques - Multiple access protocols - Link layer addressing-Ethernet– Network Management: Introduction-The Infrastructure for Network Management –The Internet standard management Framework. (Sections 5.1-5.5, 9.1- 9.3)

Text Book:

1. James F.Kurose and Keith W.Ross, *Computer Networking- A top Down Approach Featuring the Internet,* Third Edition, Pearson Education, Inc, 2005. ISBN: 81-297-1093-5.

IT344 INTERNETWORKING

Credits: 4:0:0 **Marks: (40+60)**

Unit I

Introduction and overview-Review of underlying network technology-Internetworking concept and Architectural model-Classful Internet addresses- Mapping Internet Addresses to physical addresses-Internet protocol: connectionless datagram delivery-Internet protocol: forwarding IP datagrams. (Chapters 1-7)

Unit II

Internet protocol: Error and control messages-classless and subnet address extensions-protocol layering-user datagram protocol-reliable stream transport service. (Chapters 8-12)

Unit III

Routing architecture-Routing between peers- routing within an autonomous system-Internet multicasting. (Chapters 13-16)

Unit IV

IP switching and MPLS-Mobile IP-Private network interconnection-Client –server model of interaction-The socket interface. (Chapters 17-21)

Unit V

Bootstrap and auto configuration-the domain name system-remote login and desktop-file transfer and access-Electronic mail-World wide web. (Chapters 18-27)

Text Book

1. Douglas E. Comer, *Internetworking with TCP/IP – Principles, Protocols and Architecture,* Pearson Education, Fifth Edition, 2006, ISBN: 81-203-2998-8.

Reference Book

1. W. Richard Stevens, *TCP/IP Illustrated Volume – I, The Protocols,* Pearson Education, 2000, ISBN: 81-7808-101-6.

IT345 NETWORK MANAGEMENT

Credits: 4:0:0 **Marks: (40 + 60)**

Unit I

Introduction-Analogy of telephone network management -Data and Telecommunication network-Distributed Computing Environments-TCP/IP Based Networks –Communication Protocols and standards-Network Management: Goals, Organization and Functions-Network Management System Platform.

Unit II

SNMPV Network Management – History – Internet or Organizations and standards – SNMP Models – Organization Model – Information Model – Communication Model-Functional Model.

Unit III

SNMP V2 – System Architecture – Structure Of Management Information – MIB – Protocol – Compatibility with SNMPV1 – SNMPV3 – Documentation – Architecture-Applications – MIB security – User band security model access control .

Unit IV

Remote Monitoring – RMON SMI and MIB – RMON1 – RMON2 – ATM Remote Monitoring – Case Study of Internet Traffic Using RMON-Network Management Tools – Network Statistics Measurement Systems – History of Enterprise Management – Network Management Systems – Commercial Network Management Systems – system Management – Enterprise Management Solution.

Unit V

Web based Management – Web Interface – Desktop Management Interface – Enterprise Management – WBEM –Java Management Extension.

Text Book:

1. Mani Subramanian, *Network Management Principles and Practice,* Addison Wesley, 2000.

Reference Book

1. Stephen B. Morris, *Network Management, MIBs and MPLS,* Pearson Education, 2003.

ADDITIONAL SUBJECTS

Code	Subject Name	Credit
IT346	IP Telephony	4:0:0
IT347	Storage Area Networks	4:0:0
IT348	Wireless Sensor Networks	4:0:0

IT346 IP TELEPHONY

Credits: 4:0:0

Unit I

Protocols for Voice over IP and Interactive Applications: IP Telephony Fundamentals – SGCP, MGCP and NCS overviews – H.323 An Overview of the ITU-T Approach for VOIP Telephony – SIP Summary of Features of the Session Initiation Protocol (Chapter 1).

Unit II

Media Transport in Packet Networks: RTP and RTCP Definition for Media Transport in IP Networks – RSVP The Resource Reservation Protocol – A Quick look at AAL2 for Voice Transport – Edge Bandwidth Management A look at AAL2 (Chapter 2)

Unit III

Basic Call Control for Voice Telephony: An overview of SS7 – The Services of SSCP and TCAP – Call Control in packet networks – Heterogeneous Call Setup – Mapping SS7 to IP based Call Control – Closing thoughts on mixed network voice Telephony (Chapter 3)

Unit IV

Metrics for Voice Quality: Voice Quality in Converging TDM and IP Networks – Auditory perception and Testing Methodologies – Perceptual Speech Quality Measurement – Voice Quality Test Instrumentation – Echo measurement and Control (Chapter 4)

Unit V

Voiceband Call considerations A detailed look at Fax: A look at a Real-time Trace of the T.30 Protocol – Fax over packet networks – Real time Internet Fax – Basics of V.34 Fax – Group 3 Fax error Correction mode(ECM) – Voiceband Data transport Revisited AAL2 (Chapter 6)

Text Book:

Bill Douskalis, *IP Telephony: The integration of Robust VoIP Services*, Pearson Education, 2002, ISBN: 81-7808-285-3

Reference Book:

Kevin Brown, *IP Telephony Unveiled*, CISCO Press, 2004, ISBN 1-58720-075-9.

IT347 STORAGE AREA NETWORKS

Credits: 4:0:0

Unit I

Introduction-Using the SNIA Shared Storage Model-Example- Carlson Companies-Storage and Networking Concepts: Networking in front of the Server- Serial Transport-Access Method-Addressing-Packetizing of Data-Routing of Packets-Upper-Layer -Protocol Support-The SCSI Architecture-The Parallel SCSI Bus-Network-Attached Storage-Networking behind the Server. (Chapters 1, 2)

Unit II

Fibre Channel Internals-Fibre Channel Layers-1Gbps and 2Gbps Transport-Physical layer Options-Data Encoding- Ordered Sets-Framing Protocol-Classes of Service- Flow Control - Naming and Addressing Conventions- Fibre Channel SAN Topologies: Point-to-Point - Arbitrated Loop-Loop Physical Topology-Loop Addressing-Loop Initialization- Port Login-Loop Port State Machine-Arbitration-The Nonbroadcast Nature of Arbitrated Loop-Design Considerations for Arbitrated Loop-Fabrics-Fabric Login - Simple Name Server-State Change Notification-Private Loop Support-Fabric Zoning – Building -Extended Fabrics-E_Port Standardization-Principal Switch Selection-Fabrics and Loops. (Chapters 3, 4)

Unit III

IP SAN Technology: Ethernet and TCP/IP-Gigabit Ethernet Transport-TCP/IP-Native IP Storage Protocols-Internet Fibre Channel Protocol-Internet SCSI (iSCSI)-Discovery in IP SANs-Service Locator Protocol (SLP)-Internet Storage Name Server (iSNS)-Quality of Service for IP SANs-Security for IP SANs-Wide Area Storage Networking. (Chapter 6)

Unit IV

Problem Isolation in SANs: Simple Problem-Isolation Techniques- Fibre Channel Analyzers - iSCSI Network Analyzers - Performance Tools.

Management of SANs: Storage Network Management- In-Band Management-Out-of-Band Management-SNMP-HTTP-Telnet-Storage Network Management Issues-Storage Resource Management-Storage Management-Integration of Storage, Systems, and Enterprise Management-Common Information Model (CIM) (Bluefin). (Chapters 9, 10)

Unit V

What Is Storage Virtualization-In-Band and Out-of-Band Virtualization-Host-Based storage Virtualization-SAN Interconnect-Based Storage Virtualization-Storage-Based Virtualization-Multivendor Storage Virtualization-File System and NAS Virtualization-Tape Virtualization-Virtualization and the Data Storage Utility. (Chapter 11).

Text Book:

Tom Clark, *Designing Storage Area Networks: A Practical Reference for Implementing Fibre Channel and IP SANs*, Addison Wesley, Second Edition, 2003, ISBN 978-0321136503.

Reference Book:

Robert Spadling, *Storage Networks- The Complete Reference*, Tata McGraw-Hill, 2003, ISBN 0-07-053292-3.

IT 348 WIRELESS SENSOR NETWORKS

Credits: 4:0:0

Unit I

Introduction and Overview of Wireless Sensor Networks: Background of Sensor Network Technology – Application of Sensor Networks-Basic overview of the technology- Basic Sensor Network Architectural Elements- Survey of Sensor Networks - Applications of Sensor Networks: Introduction- Background-Range of Applications-Examples of Category 2 WSN Applications- Examples of Category 1 WSN Applications-Taxonomy of WSN Technology. (Chapters 1, 2)

Unit II

Basic Wireless Sensor Technology: Introduction-Sensor Node Technology-Sensor Taxonomy-WN Operating Environment-WN Trends -Wireless Transmission Technology and Systems: Radio Technology Primer-Propagation and Propagation Impairments- Available Wireless Technologies-Campus Applications- MAN/WAN Applications. (Chapters 3, 4)

Unit III

Medium Access Control Protocols for Wireless Sensor Networks: Introduction-Background-Fundamentals of MAC Protocols-Performance Requirements-Common Protocols-MAC Protocols for WSNs-Sensor-MAC Case Study-IEEE 802.15.4 LR –WPANs Standard Case Study-PHY Layer-MAC Layer. (Chapter 5)

Unit IV

Routing Protocols for Wireless Sensor Networks: Data Dissemination and Gathering-Routing Challenges and Design Issues in Wireless Sensor Networks-Routing Strategies in Wireless Sensor Networks- Transport Control Protocols for Wireless Sensor Networks: Traditional Transport Control Protocols- Transport Protocol Design Issues- Examples of Existing Transport Control Protocols-Performance of Transport Control Protocols- Middleware for Wireless Sensor Networks :WSN Middleware Principles-Middleware Architecture-Existing Middleware. (Chapters 6, 7, 8)

Unit V

Network Management for Wireless Sensor Networks-Traditional Network Management Models-Network Management Design Issues-Example of Management Architecture: MANNA-Naming –Localization Operating Systems for Wireless Sensor Networks-Design Issues-Examples of Operating Systems Performance and Traffic Management – WSN Design Issues –Performance Modeling of WSNs-Case Study Simple Computation of the System Life Span. (Chapters 9, 10, 11)

Text Book:

Kazem Sohraby, Daniel Minoli and Taieb Znati, *Wireless Sensor Networks: Technology, Protocols, and Applications***,** John Wiley & Sons, 2007, 978-0471743002.

Reference Books:

1. Mohammad Ilyas and Imad MahGoub (Editors), *Handbook of Sensor Networks: Compact Wireless and Wire Sensing System*, CRC Press, 2005, ISBN 0-8493-1968-4.

Holger Karl and Andreas Willig, *Protocols and Architectures for Wireless Sensor Networks*, John Wiley & Sons, 2007, 978-0471718161.

ADDITIONAL SUBJECTS

Code	Subject Name	Credit
09IT201	Computer Architecture	3:0:0
09IT202	Cryptography and Network Security	3:0:0
09IT203	Data Structures and Algorithms	3:0:0
09IT204	Digital Principles and System Design	3:0:0
09IT205	Information Coding Techniques	3:0:0
09IT206	Microprocessors and Interfacing	3:0:0
09IT207	Signals and Systems	4:0:0
09IT208	Web Technology	3:0:0
09IT209	Multimedia Systems and Design	3:0:0
09IT210	Computer Graphics	3:0:0
09IT211	Fundamentals of Networking	3:0:0
09IT212	Mobile Computing	3:0:0
09IT213	High Speed Networks	3:0:0
09IT214	Computer Networks	3:0:0
09IT215	Fundamentals of Java Programming	3:0:0
09IT216	Object Oriented Programming Using C++ and Java	3:0:0
09IT217	Computer Animation	3:0:0
09IT218	Software Quality Management	3:0:0
09IT219	Multimedia Systems	3:0:0
09IT220	Software Testing	3:0:0
09IT221	User Interface Design	3:0:0
09IT222	Essentials of XML	3:0:0
09IT223	Operating System Fundamentals	3:0:0
09IT224	TCP/IP Protocols	3:0:0
09IT225	Data Compression Techniques	3:0:0
09IT226	E-Commerce	3:0:0
09IT227	Data Warehousing	3:0:0
09IT228	Software Radio	3:0:0
09IT229	IP TV and Internet Video	3:0:0
09IT230	Artificial Intelligence and Neural Networks	3:0:0
09IT231	Software Project Management	3:0:0
09IT232	Communication Engineering	3:0:0
09IT233	Service Oriented Architecture	3:0:0
09IT234	Satellite Communication	3:0:0
09IT235	Computer Hardware and Peripherals Lab	0:0:2
09IT236	Case Tools Lab	0:0:2
09IT237	Data Structures and Algorithms in C++ Lab	0:0:2
09IT238	Web Technology and Multimedia Lab	0:0:2
09IT239	Digital Design Lab	0:0:2
09IT240	Network Security Lab	0:0:2
09IT241	Microprocessors and Interfacing Lab	0:0:2

09IT242	Networking Lab	0:0:2
09IT301	Interactive Game Design	4:0:0
09IT302	Web Services	4:0:0
09IT303	Semantic Web	4:0:0
09IT304	Mobile Computing and Communication	4:0:0
09IT305	High Performance Communication Networks	4:0:0
09IT306	Grid Computing	4:0:0
09IT307	User Interface Design	4: 0:0
09IT308	Artificial Intelligence for Games	4:0:0
09IT309	Optical Networks	4:0:0
09IT310	Soft Computing	4:0:0
09IT311	Multimedia Database	4:0:0
09IT312	Internetworking Multimedia	4:0:0
09IT313	Computer Vision	4:0:0
09IT314	Multimedia Information Management	4:0:0
09IT315	Multimedia Systems Design	4:0:0
09IT316	Analysis, Architecture and Design of Networks	4:0:0
09IT317	Wireless Networks Lab	0:0:2
09IT318	Internetworking and Web Technology Lab	0:0:2
09IT319	Network Design and Management Lab	0:0:2
09IT320	Information Security Lab	0:0:2
09IT321	Digital Image Processing Lab	0:0:2
09IT322	Computer Graphics Lab	0:0:2

09IT201 COMPUTER ARCHITECTURE

Credits: 3: 0: 0

Course Objective:

1. To provide a thorough discussion of the fundamentals of computer architecture.
2. To discuss in detail the operation of the control unit and arithmetic operations.
3. To study in detail the different types of control and the concept of pipelining.

UNIT I

Computer organization & architecture, Function & Structure, Top level view of computer components, Computer function, Interrupts, Multiple interrupts Cache memory.

UNIT II

Computer memory systems overview, Semiconductor main memory, Error correction, Advanced DRAM organization, External devices and I/O modules, Programmed I/O, Interrupt driven I/O, Direct Memory

UNIT III

Computer Arithmetic - M/C instruction characteristics, Types of operands, Types of operation, Transfer of control, Pentium operations, PowerPC operations, Assembly language, Addressing, Pentium & PowerPC addressing modes

UNIT IV

Processor and Register organization, Instruction cycle, Instruction pipelining, Intel 80486 pipelining, Pentium & Power PC processors.

UNIT V

Micro operations, Control of the CPU, Intel 8085, Hardwired implementation, Micro programmed control basic concept, Microinstruction sequencing, Microinstruction execution.

Text Book:

1. William Stallings, *Computer Organization and Architecture,* Sixth Edition, Prentice Hall India, 2003. ISBN: 81-7808-792-8.

Reference Books:

1. John P.Hayes, *Computer Organization and Architecture,* McGraw Hill, Third Edition, 1998. ISBN: 0-07-115997-5.
2. John L.Hennessy, David A.Patterson, *Computer Architecture,* Third Edition. ISBN: 81-8147-205-5.

09IT202 CRYPTOGRAPHY AND NETWORK SECURITY

Credits: 3: 0: 0

Course Objective:

1. To provide a practical survey of both the principles and practice of cryptography and network security.

UNIT I

Security Attacks – Security Services – Security Mechanisms – Block cipher principles – The Data Encryption Standard – The Strength of DES – Evaluation Criteria for AES – The AES Cipher

UNIT II

Principles of Public-Key Cryptosystems – The RSA Algorithm – Key Management – Diffie-Hellman Key Exchange – Elliptic Curve Cryptography

UNIT III

Secure Hash Algorithms – Whirlpool – CMAC – HMAC – Digital Signature Standard – Kerberos – X.509 Authentication Service

UNIT IV

Pretty Good Privacy – S/MIME – IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Security Payload

UNIT V

Web Security Considerations – Secure Socket Layer and Transport Layer Security – Secure Electronic Transactions – Intruders – Intrusion Detection – Password Management – Firewall Design Principles – Trusted Systems

Text Book:

1. William Stallings, *Cryptography and Network Security*, Fourth Edition, Prentice Hall, 2006. ISBN: 81-203-3018-8.

Reference Books:

1. Bruce Schneier, *Applied Cryptography,* Second Edition, John Willey and Sons, 2002. ISBN: 9971-51-348-X
2. Wenbo Mao, *Modern Cryptography*, First Edition, Pearson Education,2004. ISBN: 81-297-0692-X
3. Roberta Bragg, Mark Rhodes, Keith Strassberg, *Network Security,* Tata Mcgraw Hill Edition,2004. ISBN-13: 978-0-07-058671-0
4. Charlie Kaufman, Radia Perlman, Mike Speciner, *Network Security,* Second Edition, Prentice Hall, 2002. ISBN: 81-203-2213-4.

09IT203 DATA STRUCTURES AND ALGORITHMS

Credits: 3: 0: 0

Course Objective:

1. To learn and to be able to judge the appropriateness of alternate implementations of elementary data structures such as Stacks, Queues, Trees, and Graphs in computer programming.

UNIT I

Introduction to Data Structures - Stacks – Introduction to Recursion – Principles of Recursion – Back Tracking: Postponing the work – Queues – Definitions – Implementation of Queues – Circular Queues – Application of Queues: Simulation – Linked Queues.

UNIT II

List Specification - Implementation of Lists – Linked list in Arrays - Searching: Introduction and Notation – Sequential Search – Binary Search – Comparison Trees.

UNIT III

Sorting: Introduction and Notation – Insertion Sort – Selection Sort – Shell Sort – Divide and Conquer Sorting, Merge sort for Linked Lists – Quick Sort for Contiguous Lists – Heap and Heap Sort – Table and Information Retrieval - Introduction - Rectangular Arrays – Tables of Various Shapes – Application: Radix Sort – Hashing.

UNIT IV

Binary Trees – Binary Search Trees – Building a Binary Search Trees – Height Balance: AVL Trees – Multi way Trees: B-Trees.

UNIT V

Graphs: Mathematical Background – Graph Traversal - Topological Sorting – A Greedy Algorithm – The Polish Notation: The Problem – The Idea – Evaluation of polish notation – Translation from infix to Polish form.

Text Book:

1. Robert L.Kruse, Bruce P Leung and Clovis L.Tondo, *Data Structures and Program Design*, Prentice Hall, Third Edition, 1999, ISBN -81-203-0884-0

Reference Books:

1. Mark Allen Weiss, *Data Structures and Algorithms Analysis in C++*, Second Edition, Pearson Education, 1999. ISBN: 81-7808-670-0.
2. Peter Smith, *Applied Data Structures with C++*, First Edition, Narosa Publishers, 2004. ISBN: 81-7319-617-6.
3. Sartaj Sahni, *Data Structures, Algorithms and Applications in C++*, Second Edition, Silicon Press, 2005. ISBN: 81-7371-522-X.

09IT204 DIGITAL PRINCIPLES AND SYSTEM DESIGN

Credits: 3: 0: 0

Course Objective:

1. To understand different methods used for the simplification of Boolean functions.
2. To design and implement combinational, synchronous, and asynchronous sequential circuits.
3. To study the fundamentals of HDL.

UNIT I

Boolean algebra And Logic Gates: Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map – Logic gates.

UNIT II

Combinational Logic: Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL).

UNIT III

Design With Msi Devices: Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits.

UNIT IV

Synchronous Sequential Logic: Sequential circuits – latches -Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters - HDL for registers and counters.

UNIT V

Asynchronous Sequential Logic: Analysis and design procedure of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards.

Text Book:

1. M.Morris Mano, Digital Design, Fourth edition, Pearson Education, PHI 2007. ISBN :0131989243

Reference Books:

1. Charles H.Roth, Jr. Fundamentals of Logic Design, Fifth Edition, Ontario-Thomson Publications, 2006. ISBN :0534378048.
2. Donald D.Givone, Digital Principles and Design, Tata McGraw-Hill, 2003. ISBN 0072525037

09IT205 INFORMATION CODING TECHNIQUES

Credits: 3: 0: 0

Course Objective:

1. To get started in practice of Information Engineering
2. To provide idea of Channels and channel capacity
3. To study the features the introduction of various Error control codes

UNIT I

Fundamental Limits in Information Theory: Introduction- Uncertainty, Information and Entropy- Source coding theorem- Data compaction- Discrete memoryless channels- Mutual Information- Channel capacity- channel coding theorem- differential entropy and mutual information for continuous ensembles- Information capacity theorem- Implication of the information capacity theorem- information capacity of colored noise channel-Rate distortion theory- Data compression.

UNIT II

Channel capacity and coding: Introduction- Channel models- Channel capacity- Channel coding- Information capacity Theorem- The Shannon limit- Random selection of codes-The discrete memoryless channel model-channel capacity and the binary symmetric channel- block coding and Shannon second theorem- markov processes and source with memory- markov chain and data processing- constrained channels- autocorrelation and power spectrum sequences- data translation codes.

UNIT III

Linear Block codes: Introduction- Definition- Matrix description-Equivalent codes- parity check codes- decoding- Syndrome decoding- Error probability after decoding- perfect codes- hamming codes- optimal linear codes- maximum distance separable codes

UNIT IV

Cyclic codes: Introduction to cyclic codes- Polynomials-The division algorithm for polynomials- method for generating cyclic codes-Matrix description of cyclic codes-Burst error correction-Fire Codes- Golay Codes- Cyclic Redundancy Check (CRC) Codes-Circuit Implementation of Cyclic Codes. **Bose Chaudhuri Hocquenghem (BCH) Codes:**Introduction to BCH codes-Primitive elements-Minimal polynomials-Generator Polynomials in terms of Minimal Polynomials-Some examples of BCH codes-Decoding of BCH codes-Reed Solomon Codes - Implementation of Reed Solomon encoders and decoders-Nested Codes.

UNIT V

Convolutional codes: Introduction -Tree codes and Trellis codes-Polynomial description (Analytical Representation)-Distance Notions-The Generating Function-Matrix description-Viterbi decoding -Distance Bounds-Performance Bounds-Known good convolutional codes-Turbo Codes-Turbo decoding. **Trellis Coded Modulation (TCM):** Introduction-The concept of Coded Modulation-Mapping by set partitioning-Ungerboeck's TCM Design Rules-TCM decoder Performance Evaluation for AWGN Channel-Computation of *dfree*- TCM for Fading Channels.

Text Books:

1. Simon Haykin, *Communication Systems*, Wiley and sons Limited, fifth edition, 2008, ISBN 9971513056
2. Ranjan Bose, *Information Theory, Coding and Cryptography*, Tata McGraw-Hill, 2003, ISBN 0070482977.

Reference Books:

1. Fred Halsall, *Multimedia Communications, Applications Networks Protocols & Standards*, Pearson education, Asia 2002, ISBN 0201398184.
2. Richard B.Wells, *Applied coding and Information Theory for Engineers*, Pearson Education, 2005, ISBN 8129704021.
3. R.E.Blahut, Algebraic *Codes for data Transmission*, Cambridge University Press Cambridge, UK.2003, ISBN 0521553741.
4. Todd K.Moon, *Error Correction Coding*, Wiley-Interscience, 2005, ISBN 0471739146.
5. Shu Lin and Daniel J. Costello, *Error Control Coding,* Second Edition, Prentice Hall , 2002, ISBN 0-13-042672-5.

09IT206 MICROPROCESSORS AND INTERFACING

Credits: 3: 0: 0

Course Objective:

1. The course deals with applications, organization, architecture and design of microprocessors systems
2. To implement interfacing from a microprocessors based system to peripheral devices

UNIT I

Introduction – 8088 & 8086 Microprocessors architecture – software model of 8088/8086Microprocessor – Memory address space & data organization – Data types Segment registers and memory segmentation – Dedicated reserved and general use Memory Instruction Pointer – Data Registers – Pointers and Index Registers – Status Registers Generating a Memory Address – The Stack – I/O Address space

UNIT II

Instruction set – Addressing Modes – Integer instructions and computations – Control flow instructions and Program structures.

UNIT III

Memory I/O Interfaces: Minimum-mode and Maximum-mode systems – Minimum-mode and Maximum-mode Interface signals – Electrical Characteristics – Bus cycle & Time states – Hardware organization of the memory address space – Address Bus status codes – Memory control signals – Read/Write Bus Cycles – Memory Interface Circuits – Types of I/O –Isolated I/O interface – I/O Data Transfer – I/O Instructions – I/O Bus Cycles

UNIT IV

I/O Interface circuits: core and special purpose I/O Interfaces – Byte wide I/O ports using Isolated I/O – I/O Handshake and parallel printer interface – 8255A Programmable Peripheral Interface – Memory Mapped I/O 8254A - Programmable Interval Timer- 8237A Programmable Direct Memory Access controller – Serial Communication Interface –Programmable Communication Interface Controllers – Keyboard & Display Interfaces – 8279 Programmable Keyboard/Display Controller.

UNIT V

Interrupt Interface of 8088 & 8086 Microprocessors: Interrupt mechanism – Types & Priority– Interrupt Vector Table – Interrupt Instructions – Enable/Disable of Interrupts – External Hardware – Interrupt sequence – 8259A Programmable Interrupt Controller– Interrupt Interface Circuits using 8259A – S/W Interrupts – NonMaskable Interrupt Reset – Internal Interrupt functions.

Text Book:

1. Walter A. Triebel, Avatar Singh, The 8088 & 8086 Microprocessor, program, Interfacing, Software, Hardware and Applications, Prentice Hall of India, Fourth Edition, 2002. ISBN 81-297-0298-3

Reference Book:

1. Badri .Ram Fundamentals of Microprocessors and Microcomputers, Prentice Hall of India, Fifth Edition, 2003. ISBN 0-07-043448-4
2. Douglas V. Hall, Microprocessors and Interfacing Programming and Hardware, Tata Mc Graw Hill, Second Edition, 1991, Reprint 2004. ISBN 0-07-025742-6

09IT207 SIGNALS AND SYSTEMS

Credits: 4: 0: 0

Course Objective:

1. To develop continuous-time and discrete-time concepts/methods in parallel, highlighting the similarities and differences
2. To Feature introductory treatments to applications in areas such as filtering, communication and sampling.

UNIT I

Signals and Systems: Introduction – Continuous Time and Discrete Time signals – Transformations of independent variable – Exponential and sinusoidal signals – Unit Impulse and Unit Step functions – Continuous Time and Discrete Time systems – Basic system properties.

UNIT II

Linear Time Invariant Systems: Introduction – Discrete Time LTI systems: Convolution sum – Continuous Time LTI systems: Convolution Integral – Properties of Linear Time-Invariant

systems – Causal LTI systems described by differential and difference equations – Singularity functions.

UNIT III

Filtering : Frequency shaping and selective filters – **Time and frequency characterization:** Introduction – Magnitude phase representation of Fourier transform – Magnitude phase representation of the frequency response of LTI system – Time Domain properties of ideal frequency selective filters – Time Domain and Frequency Domain aspects of non ideal filters – First order, Second order continuous time system - First order, Second order discrete time system – Example of time and frequency domain analysis of systems

UNIT IV

Sampling: Introduction – Representation of continuous time signal by its samples: Sampling Theorem – Reconstruction of signal from its samples using interpolation – Effect of under sampling: aliasing – Discrete time processing of continuous time signals – Sampling of discrete time signals – Analysis and Characterization of LTI system using the Laplace Transform, System function algebra and block diagram representation – Unilateral Laplace transform.

UNIT V

Representing signals by using Discrete-time complex Exponentials: The Z-transform: Introduction – Region of convergence of Z transform – The inverse Z transform – Geometric evolution of the fourier transform from the Pole-Zero plot – Properties of the Z transform – Some common Z transform pairs - Analysis and Characterization of LTI system using the Z Transform – System function algebra and block diagram representation – Unilateral Z transform.

Text Book:

1. Alan V Oppenhiem, Alan S Wilsky, and Hamid Nawab S, *"Signals and Systems"*, second edition, Prentice Hall, New Delhi, 2006, ISBN 0138097313.

Reference Books:

1. John G.Proakis and Dimitris G.Manolakis, *Digital Signal Processing, Principles, Algorithms and Applications*, Third Edition., PHI, 2007, ISBN 0133737624.
2. Rodger E. Ziemer, William H. Tranter, D. Ronald Fannin, "*Signals and Systems: Continuous and Discrete"*, Fourth Edition, Prentice Hall, 2001, ISBN 0024316504.
3. Simon Haykin and Barry Van Veen, *"Signals and Systems"*, Second Edition, John Wiley & Sons Inc., New York, 2003, ISBN 0471164747.
4. Steven T. Karris "Signals and Systems: With MATLAB Applications", Second Edition, Orchard Publications, 2003,ISBN 970951167.

09IT208 WEB TECHNOLOGY

Credits: 3: 0: 0

Course Objective:

1.To build web applications using ASP and client side script technologies use with Microsoft's IIS.

2.To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.

UNIT I

VBScript Language Elements: Constants - Variables and Data Types - Mathematical Operations - Logical Operators - Looping and Decision Structures.VBScript Functions and Objects: Data Conversion Functions - Mathematical Functions - Data Formatting Functions - Text Manipulation Functions - Data and Time Functions - Built-in Objects.

UNIT II

ASP fundamentals: Using Server – Side Includes- Learning the SSI Directives – Creating Modular ASP Code. Using the Request Object: Using Form Information - Using Query String Information – Using Server Variables. Using the Response Object: Create Output – Managing Output – Managing the Connection.

UNIT III

Using Cookies: Introduction to Cookies – Cookies and Your Browser – Creating a Cookie – Modifying and removing Cookies – Tracking Preferences with Cookies Using the Application, Session, and Server Objects: The application Object - The Session Object – The Server Object – Using the global .asa file - Active Data Objects Essentials: Microsoft's Universal Data Access Strategy – The Connection Object – The Record set and Field Objects – The Command and Parameter Objects – Using the Errors Collection.

UNIT IV

Introducing XML: What is XML - Why are Developers Excited About XML? – The Life of an XML documents - Related technologies- Your First XML Document: Hello XML – Exploring the Simple XML Document – Assigning Meaning to XML Tags – Writing a Style Sheet for an XML Document – Attaching a Style Sheet to an XML Document – Style Languages: CSS Style Sheets, CSS Layouts, CSS Text Styles.

UNIT V

Attributes, Empty tags & XSL: Attributes – Attributes versus Elements – Empty Elements and Empty Element Tags – XSL-DTDs and Validity: Document Type Definitions - Element Declarations – DTD Files – Document Type Declarations – Validating Against a DTD-Element Declaration - Entity Declarations: What Is an Entity – Internal General Entities – External General Entities – Internal Parameter Entities – External Parameter Entities – Building a Document from Places-Attribute Declaration: What is an Attribute – Declaring Attributes in DTDs - Declaring Multiple Attributes – Specifying Default Values for Attributes – Attribute Types – Predefined Attributes – A DTD for Attribute- Based Baseball Statistics.

Text Books:

1. Eric A. Smith, "ASP 3 Programming Bible", Wiley-Dreamtech India (P) Ltd, 2003, ISBN: 81- 265-0049-2.
2. Elliotte Rusty Harold, "*XML Bible"*, IDG Books India (P) Ltd, 2003,Second Edition , ISBN: 81- 265-0212-6.

Reference Books:

1. Dave Mercer, *ASP 3.0 Beginners Guide*, Tata McGraw-Hill Edition, Sixth reprint, 2004, ISBN: 0072127414.
2. Kenneth L. Spencer, Kenneth C. Miller & Lauran Lassesen, *Introducing VBScript &*
3. *ActiveX*, Comdex Computer Publication, 1997, ISBN: 9780764580109.

09IT209 MULTIMEDIA SYSTEMS AND DESIGN

Credits: 3: 0: 0

Courses Objective:

1.To present a step-by-step approach to multimedia systems design
2.To introduce multimedia standards and compression and decompression technologies.
3.To provide a detailed analysis of the various storage technologies

UNIT I

Multimedia Systems Design : An Introduction – Multimedia Elements – Multimedia applications – Multimedia Systems Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Need for Data compression - Multimedia Databases.

UNIT II

Compression and Decompression: Types of compression – Binary Image compression Schemes – Color, Gray scale and Still - video Image compression – Video Image Compression - Audio compression – Fractal Compression.

UNIT III

Multimedia Input/output Technologies: Key Technology Issues – Pen Input – Video and Image Display systems – Print output technologies – Image scanners - Digital Voice and Audio – Digital Camera - Video images and animation – Full-motion video.

UNIT IV

Storage and Retrieval Technologies: Magnetic Media Technology – Optical Media – Hierarchical Storage management – Cache management for storage systems.

UNIT V

Multimedia Application Design: Multimedia Application classes – Types of Multimedia systems – Virtual reality design – Components of Multimedia systems – Organizing Multimedia databases – Application workflow design issues – Distributed application design issues.

Text Book:

1.Prabhat K Andleigh and Kiran Thakrar, *Multimedia Systems and Design*, PHI, 2003. ISBN: 81-203-2177-4.

Reference Books:

1. Tay Vaughan, *Multimedia Making it work*,Fourth Edition, Tata McGraw-Hill. ISBN: 0-07-463953-6.

2. Ze-Nain Li, Mark S.Drew, *Fundamentals of Multimedia*, PHI. ISBN :81-203-2817-5.
3. John F. Koegel Buford, *Multimedia Systems*, Third Edition, 2000. ISBN: 8177588273.
4. Gaurav Bhatnager, Shikha Mehta, Sugata Mitra, *Introduction to Multimedia Systems*, First Edition, 2004. ISBN: 0125004524.

09IT210 COMPUTER GRAPHICS

Credits: 3:0:0

Course Objective:

The aim of this course is to give the fundamentals of graphics and animation. The concept of Principles of 2D Graphics, 3D Graphics, Visible Surface Determination**,** are studied in detail for a competitive computer professional

UNIT I

Basic principles of two dimension graphics : Raster versus vector graphics-The first java 2D program-Basic geometric objects-Geometric transformations-Homogenous coordinates-Applications of transformations-Geometric transformations in java 2D-Animation and movements based on transformations- Interpolators for continuous changes- implementations of interpolators in Java 2D-Single or double precision

UNIT II

Drawing lines and curves: Lines and pixel graphics-The midpoint algorithm for lines-Structural algorithms-Pixel densities and line styles-Lineclipping-Midpoint algorithm for circles-Drawing arbitrary curves-Antialiasing-Drawing thick lines-Filling areas-Buffered images in java 2D-Displaying text-Text in java 2D-Grey images and intensities-Colour Model-Colour Interpolation with java 2D.

UNIT III

Basic principles of three-dimensional graphics : Geometric transformations-The scenegraph-Elementary geometric objects in java 3D-The scenegraph in java 3D- Animations and moving objects- Projections in Java 3D-Modelling Three dimensional objects-Three Dimensional objects and their surfaces-Topological notions-Modelling techniques-Surface Modeling with polygons in java 3D-importing geometric objects in to java3D-Parametric curves and freedom surfaces-normal vectors for surfaces

UNIT IV

Visible surface determination: Clipping volumes-Algorithms for visible surface determination-Image precision techniques-Priority algorithms-Illumination and shading- Light sources-Light sources in java 3D-Reflection-Shading in java 3D-Shading-Shadows-Transparency-Textures-Textures in java 3D-The radiosity model-Ray tracing.

UNIT V

Special effects and virtual reality: Fog and particle systems- Fog in Java 3D- Dynamic surfaces- Interaction-Interaction in Java 3D-Collision detection-Collision detention in Java 3D-Sound effects-Sound effects in Java 3D- stereoscopic viewing

Text Book:

1. Frank Klawonn, *Introduction to Computer Graphics Using Java 2D and 3D*, Springer, 2008, ISBN: 978-1-84628-847-0

Reference Books:

1.Rick Parent, *Computer Animation Algorithms and Techniques*, Morgan Kaufmann publishers, 2002, ISBN 1558605797
2.James D.Foley, et al,*Computer Graphics Principles and Practices*, Addison Wesley, 1996,ISBN-31-2043-22-2,
3.F.S.Hill,jr ,*Computer graphics using Open GL,Prentice* Hall of India,2006,iSBN—81-203-2813-2
4.Peter Shirley, et al, *Fundaments of Computer Graphics*, AK Peters Ltd, 2005, ISBN: 978-1-56881-269-*4***.**
5. Issac Victor Kerlow, *The Art of 3D Computer Animation and Effects*, John Wiley,2004, ISBN:0471430366 .

09IT211 FUNDAMENTALS OF NETWORKING

Credit: 3:0:0

Course Objective:

The course describes the networking concepts, such as network topologies, network protocols and access methods, network architectures, OSI model and introduces students to different network components.

UNIT I

Introduction: What is a Network-Use of computer network-Network Hardware-Network Software-Reference Models-Examples of Network?

UNIT II

Physical &Data Link layer: Guided Transmission Media-Wireless Transmission-Data Link Layer design issues-Sliding Window protocols

UNIT III

MAC & Network Layer: Multiple Access Protocols-Ethernet-WLAN-Network layer design issues-Routing algorithms-congestion control algorithms.

UNIT IV

Transport Layer: Transport service-Elements of Transport Protocol-Internet Transport Protocol:TCP –UDP.

UNIT V

Application Layer: Domain Name Service-Electronic Mail-World Wide Web.

Textbook:

1.Andrew S Tanenbaum, *Computer Networks*, Fourth Edition-Prentice Hall India Publication, 2003, ISBN 81-203-2175-8.

Reference Books:

1. Tom Sheldon, *Encyclopedia of Networking and Telecommunication*, Tata Mc Graw Hill, 2005, **ISBN**-10: 0072120053.
2. Douglas E Comer, *Computer Networks and Internets*, Fourth Edition, Prentice Hall India Publication, ISBN-10- 0131433512.
3. William Stallings,*Data & Computer Communications*, Sixth Edition, Prentice Hall India Publication,2003,ISBN 81-203-2067-0.
4. Larry L Pererson, Bruce S Davie, *Computer Networks A System Approach*, Third Edition, 2003, ISBN 15-586-0832-8.

09IT212 MOBILE COMPUTING

Credits: 3: 0: 0

Course Objectives:

1.To introduce the fundamental principles of mobile computing.
2.To provide an in-depth knowledge on mobile communication and wireless networking.
3.To describe the various mobile services and applications.

UNIT I

Introduction and Devices: Pervasive Computing – Information Access Devices – Smart Identification – Embedded Controls – Entertainment Systems.

UNIT II

Software: Java – Operating Systems: Windows CE, Palm OS, Symbian OS, Java Card – Client Middleware – Security.

UNIT III

Connecting the World: Internet Protocols and Formats - Mobile Internet – Voice – Web Services – Connectivity - Service Discovery.

UNIT IV

Back – End Server Infrastructure: Gateways – Application Servers – Internet Portals – Device Management – Synchronization.

UNIT V

New Services: Home Services – Travel and Business Services – Consumer Services.

Text Book:

1.Uwe Hansmann, Lothar Merk, Martin S.Nicklous, Thomas Stober, *Principles of Mobile Computing*, second edition,Springer 2003, ISBN:81 – 8128 – 073 – 3.

Reference Book:

1.Raj Kamal, *Mobile Computing*, Oxford University Press, 2007, ISBN: 0-19–568677–2.

09IT213 - HIGH SPEED NETWORKS

Credits: 3: 0: 0

Course Objective:
The course covers fundamental principles to develop a comprehensive understanding of network architectures, protocols, control, performance, and economies, to a focus on the convergence of the telephone, computer networking, cable TV, and wireless networks that explains current and emerging networking technologies.
Prerequisites: Computer Networks.

UNIT I
Overview: History of Communication Networks – Networking Principles – Future Networks. Network Services and Layered Architectures: Applications – Traffic Characterization and Quality of Service – Network Services – High Performance Networks – Network Elements – Basic Network Mechanisms – Layered Architecture – Open Data Network Model – Network Architectures – Network Bottlenecks.

UNIT II
Packet - Switched Networks: OSI and IP models – Ethernet (IEEE 802.5) – Token Ring – FDDI - DQDB - Frame Delay – SMDS. Internet and TCP/IP Networks: The Internet – Overview of Internet Protocols - Internet Protocol – TCP and UDP – Internet Success and Limitation - Performance of TCP/IP Network.

UNIT III
Circuit Switched Networks: Performance of Circuit Switched Networks - SONET - Dense Wave Division Multiplexing (DWDM) - Fiber to the Home - Digital Subscriber Line (DSL) - Intelligent Networks – CATV. ATM: Main Features of ATM - Addressing Signaling and Routing - Header Structure - ATM Adaptation layer - Management control - BISDN - Internetworking with ATM.

UNIT IV
Wireless Networks: Introduction - The wireless channel - Link level design - Channel access - Network design - Wireless Networks Today - Future Systems and standards.

UNIT V
Optical Networks: Optical Links - DWDM Systems - Optical Cross Connects - Optical LANs- Optical paths and Networks. Global Multimedia Network: Attributes of the Global Network – Technology areas – Challenges.

Text Book:
1.Walrand. J. Varaiya, *High Performance Communication Network*, Morgan Kaufmann-Harcourt Asia Pvt., Ltd., Second Edition, 2000, ISBN 15-5860-574-6.

Reference Books:
1.William Stallings, *ISDN & Broadband ISDN with frame Relay & ATM*, Pearson Education, h Edition, 2000, ISBN 81-7808-422-8.

2.Rainer Handel, Manfred N. Huber, Steffen Schroeder, *ATM Networks, Concepts, Protocols Applications*, Pearson Education, 3rd Edition, 1999, ISBN 81-7808-338-8.
3.J.F.Kurose & K.W. Ross, *Computer Networking-A top-down approach featuring the internet*, Addison Wesley, Fourth Edition, 2007, ISBN 03-2149-770-8.

09IT214 COMPUTER NETWORKS

Credits: 3: 0: 0

Course Objective:
1. To introduce key trends on network principles and practices.
2. To provide a top down approach which focus on the internet and its accessible styles.

UNIT I
Introduction: Computer Networks and the Internet-The network edge-The Network Core-Access networks and physical media-ISPs and Internet backbones- Delay and loss in packet switched networks- Protocol layers and their service models

UNIT II
Application Layer: Principles of network applications- The web and the HTTP- File transfer: FTP- Electronic mail in the internet- DNS- The Internet's Directory Service- P2P file sharing-Socket Programming with TCP, Socket Programming with UDP

UNIT III
Transport Layer: Introduction to transport layer services- Multiplexing and De–Multiplexing-Connectionless transport: UDP- Principles of reliable data transfer-Connection-oriented transport: TCP-Principles of congestion control-TCP congestion control

UNIT IV
Network Layer: Introduction-Virtual circuit and datagram networks- What's inside a router?-The Internet protocol (IP): Forwarding and addressing in the internet- Routing algorithms-Routing in the Internet

UNIT V
Link layer: introduction and services- Error detection and correction techniques- multiple access protocols-Link layer addressing-Ethernet, Network Management**:** Introduction-The Infrastructure for Network Management- the Internet standard management framework-ASN 1

Text Book:
1.J. F. Kurose, K. W. Ross, *Computer Networking, A Top-Down Approach Featuring the Internet*, 4th Ed, Addison-Wesley,2007, ISBN 0321497708.

Reference Books
1.William Stallings, *Data and Computer Communications*, Prentice Hall, Eighth Edition, 2007,ISBN9780132433105

2.Andrew S.Tanenbaum, *Computer Networks*, Prentice Hall of India, fourth edition, 2002 ISBN 0130661023.
3.F.Halsai ,*Data Communications, Computer Networks and Open Systems*, Addison- Wesley Publications , Fourth Edition ,1996,ISBN 9780201422931
4.W. Richard Stevens , *TCP/IP Illustrated Volume – I " The Protocols* , Addison Wesley Longman, 1995,ISBN 9780201633542

09IT215 - FUNDAMENTALS OF JAVA PROGRAMMING

Credits: 3: 0 : 0

Course Objective:

1. To learn the Java programming language fundamentals: its syntax, idioms, patterns, and styles.
2. To learn object oriented programming concepts,
3. To learn the essentials of the Java class library

UNIT I

The History and evolution of Java: Java's Lineage, The creation of java, Why java is important to the Internet, The Bytecode, The java Buzzwords, The evolution of Java, The J2SE 5.0 Revolution - An Overview of Java: Object Oriented Programming, Simple programs, Control Statements, Blocks of Code, Lexical Issues, Data Types, Variables and Arrays: Strongly typed, The Primitive Types-Integers, Floating Point Types, Characters, Booleans, Literals, Variables, Type Conversion and Casting, Automatic type promotion in Expression, Arrays – Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The ? Operator, Operator Precedence, Using Parentheses - Control Statements: Java's Selection Statements, Iteration Statements, Jump Statements.

UNIT II

Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The finalize() Method – A Closer look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding Static, Introducing final, Arrays, Introducing Nested and Inner class, Using Command Line Arguments, Varargs – Inheritance: Basics, Using super(), Creating a Multilevel Hierarchy, When Constructors are called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, The Object Class.

UNIT III

Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces - Exceptions Handling: Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally – Multithreaded Programming: The Java Thread Model, The Main Thread, Creating a Thread, Creating Multiple Threads, Using isAlive() and join, Thread Priorities, Synchronization, InterThread Communication, Suspending, Resuming, and Stopping Threads, Using Multithreading.

UNIT IV

Enumerations, Autoboxing : Enumerations, Type Wrappers, Autoboxing - I/O : I/O Basics, Reading Console Input, Writing Console Output, The PrintWriter Class, Reading and Writing Files - String Handling – More Utility Classes : StringTokenizer, BitSet, Date, Calendar, GregorianCalendar, TimeZone, SimpleTimeZone, Locale, Random, Observable, Timer and TimerTask, Currency, Scanner.

UNIT V

Networking: Basics, Java and the Net, InetAddress, Inet4Address and Inet6Address, TCP/IP Client Sockets, URL, URLConnection, TCP/IP Server Sockets, A Caching Proxy HTTP Server, Datagrams, The URI Class, New Classes added by J2SE 5 - The Applet Class: Basics, Applet Architecture, An Applet Skeleton, Simple Applet Display Methods, Requesting Repainting, Using the Status Window, The HTML Applet Tag, Passing Parameters to Applets, getDocumentBase() and getCodeBase(), AppleContext and showDocument(), The AudioClip Interface, The AppletStub Interface, Outputting to the Console.

Text Book:

1.Herbert Schildt, *Java - The Complete Reference*, J2SE, Seventh Edition, Tata McGraw- Hill, 2008. ISBN 13:978-0-07-063677-4

Reference Books:

1. Kathy Sierra, Bert Bates, *Head First java*, Second Edition, Oreilly & Associates, 2005, ISBN-10:0596004656, ISBN-13: 9780596004651
2. Harvey M. Deitel, *Java How to Program*, Seventh Edition, Prentice Hall, 2007, ISBN-10: 0132222205, ISBN-13: 978-0132222204
3. Bruce Eckel, *Thinking in Java*, Fourth edition, Prentice Hall 2006, ISBN 9780131872486 Ivor Horton, *Beginning Java 2 JDK 5 Edition*, 2004, Wiley, ISBN: 978-0-7645-6874-9
4. Balagurusamy E, *Programming with Java: A primer*, Third edition, Tata McGraw- Hill, 2006
5. Ken Arnold, James Gosling, David Holmes, *The Java Programming Language*,FourthEdition, Prentice Hall Professional Technical Reference, ISBN-13: 9780321349804

09IT216 OBJECT ORIENTED PROGRAMMING USING C++ AND JAVA

Credits: 3:0:0

Course Objective:

1. To learn the Java programming language fundamentals: its syntax, idioms, patterns, and styles.
2. To learn object oriented programming concepts,
3. To learn the essentials of the Java class library

UNIT I

Object oriented programming - Introduction, Basic concepts, Object oriented Languages, Applications. Object oriented programming system – C++ - Key concepts, classes, features, Functions, operators, variables, C++ program, structures

UNIT II

Tokens, expressions, control structures – tokens, keywords, Identifiers and constants, Data types, Functions, classes and objects, Constructors and Destructors String manipulation – creating string objects, manipulation, relational operation, accessing character in strings.

UNIT III

Operator overloading – Defining unary and binary operators Inheritance – Defining derived class, single inheritance, Multiple inheritance, constructors in derived class .

Pointers – to objects, to derived classes, to virtual functions working with files – File stream operation, file pointers and their manipulation, file updation.

UNIT IV

Java features, Java program structures, constants, variables, & data types, classes &J Objects, Packages, Arrays, string and vectors.

UNIT V

Managing errors and exception handling, Java applets programming, Multithreading, I / O streams, Sample Java program in Bioinformatics

Text books:

1. E.Balaguruswamy, *Object oriented programming with C++*, Fourth edition, Tata Mc Graw Hill publications, 2008, ISBN: 978-0-07-066907-9
2. E.Balaguruswamy, *Programming with Java*, Third edition, Tata McGraw Hill publications, 2006, ISBN: 978-0-07-061713-1

Reference Books:

1. Herbert Schildt, *The Complete Reference C++*,Fourth edition, McGraw-Hill Osborne Media, 2002, ISBN 9780072226805.
2. Robert Lafore, *OOPS in C++*, Fourth edition,Sams Publication,2002, ISBN 0672323087
3. Stephen Prata, *C++ Primer Plus*, Fourth edition, Sams Publisher, ISBN-10: 0672322226
4. Herbert Schildt, *Java - The Complete Reference*, J2SE, Seventh Edition, Tata McGraw-Hill, 2008 , ISBN 13:978-0-07-063677-4
5. Harvey M. Deitel, *Java How to Program*, Seventh edition, Prentice Hall, 2007, ISBN-10: 0132222205, ISBN-13: 978-0132222204
6. Bruce Eckel, *Thinking in Java*, Fourth edition, Prentice Hall 2006, ISBN 9780131872486

09IT217 COMPUTER ANIMATION

Credits: 3:0:0

Course Objective:

1. To learn about modeling, rendering, animation basics to process 3D computer animation
2. To understand the principles of 3D computer animation to work with traditional animation techniques like compositing, Editing, Virtual Sculpting.

UNIT I

Preproduction and Modeling Basics :Introduction-Storyboarding-Character and Model Design-Sound Design-Technical Tests-Production Scheduling Modeling Basics :Introduction-Polygon Modeling-Splines and Patches-Coordinate Systems-Viewing windows-Geometric Primitives-Transformations-Common Modeling Techniques-Hierarchies-Booleans and Trims-Basic Deformations.

UNIT II

Rendering Basics Introduction-The Camera-Light Surface Characteristics-Shading Algorithms-Rendering Algorithms -Background Images-Surface Texture Mapping-Solid Texture Mapping-Final Rendering.

UNIT III

Animation Basics and Advanced Modeling :Animation Basics: Introduction- Key framing-Interpolations-Parameter-Curve Editing-Dope Sheet Editing-Forward Kinematics-Inverse Kinematics-Motion Paths-Shape Deformations-Camera Animation-Animating Light and Surface Properties-Pose-based Animation. Advanced Modeling: Introduction-Virtual Sculpting-Digitizing Techniques-Procedural Modeling-Stitched Patches-Subdivision Surfaces-Displacement Mapping-Hair and Fur-Paint-based Modeling-Higher-level Primitives.

UNIT IV

Advanced Rendering: Introduction- Atmospheric Effects-Fractals-Lighting Subtleties-Advanced Texturing-Texturing Polygons-Background Shaders-Non-Photorealistic Rendering-Reflection Maps and Environment Procedures-More Rendering Algorithms-Rendering for output.

UNIT V

Advanced Animation and Postproduction: Introduction-Animated Fillets-Limits and Constraints-Metaballs-Expressions and Driven Keys-Motion Dynamics: Principles, Rigid Bodies-Soft-Body Dynamics- Particle Systems-Cloth Dynamics-Motion Capture-Camera-Motion Matching-Character Rigging: Movement Controls, Deformation Controls-Facial Animation-Nonlinear Animation Postproduction: Introduction-Compositing-Editing.

Text Book:

1. Michael O'Rourke, *Principles of Three Dimensional Computer Animation*, W.W.Norton & Company Ltd.,Third Edition 2003, ISBN: 0-393-73083-2

Reference Books:

1. John Vince, *Essential Computer Animation,*, Springer-Verlag 2000,ISBN:1-85233-141-0
2. Marcia Kuperberg, *A Guide to Computer Animation*, Focal Press, 2002, ISBN:0-240-51671-0
3. Daniel Cunliffe, Geoff Elliott, *Multimedia Computing*, Crucial, 2003, ISBN: 1-903337-18-6

09IT218 SOFTWARE QUALITY MANAGEMENT

Credits: 3:0:0

Course Objective:

1.To learn about managerial, technological, statistical concepts for the major functions of an organization.
2.To know to face the urgent task of solving the quality problem of current products and proper planning for quality of future products.

UNIT I

Basic Concepts-Companywide Assessment of Quality-Quality Improvement and Cost Reduction - Quality Planning and Sales Income.

UNIT II

Control of Quality-Strategic Quality Management-Organization for Quality-Developing Quality Culture

UNIT III

Statistical Tools for analyzing data-Understanding Customer Needs-Designing for Quality-Designing for Quality Statistical Tools.

UNIT IV

Statistical Process Control-Inspection, Test and Measurement-Inspection and Test, Sampling plans.

UNIT V

Administrative and Support operations-Quality Information Systems-Quality Assurance

Text Book:

1.J.M.Juran Frank M.Gryna, "Quality planning and Analysis, Third Edition 2004, ISBN: 0-07-462179-3

Reference Books:

1. Alan C Gillies, *Software Quality Theory and Management*, Thomson, Second Edition, 2003,ISBN:981-243-859-9
2. Dr.K.C.Arora,*Total Quality Management*, Second Edition 2004,ISBN:81-8574 9-99-X

09IT219 MULTIMEDIA SYSTEMS

Credits: 3:0:0

Course Objective:

1.To examine the challenges of combining audio and video with text, image, graphics and animation for more dynamic presentation.
2.To probe today's development towards fully integrated multimedia working systems.

UNIT I

Introduction: Branch- overlapping Aspects of Multimedia- Global Structure-- Multimedia: Media and Data Streams: Medium- Main Properties of a Multimedia System- Multimedia- Traditional Data Stream Characteristics- Data Streams Characteristics for Continuous Media- Information Units - Sound/Audio: Basic Sound Concepts- Music- Speech - Image and Graphics: Basic Concepts- Computer Image Processing -Video and Animation- Basic Concepts- Television- Computer based Animation.

UNIT II

Data Compression: Storage Space- Coding Requirements- Source, Entropy, and Hybrid Coding- Some Basic Compression Techniques- JPEG- H-261 (px64)- MPEG- DVI-: Optical Storage media: History- Basic Technology- Video Disks and Other WORMs- Compact Disk Digital Audio- Compact Disk Read Only Memory- CD-ROM Extended Architecture- Further CDROM based Developments- Compact Disc Write Once- Compact Disk Magneto Optical- The Prospects of CD Technologies - Computer Technology: Communication Architecture- Multimedia Workstations.

UNIT III

Multimedia Operating Systems: Introduction- Real-Time- Resource Management- Process Management- File Systems- Additional Operating System Issues- System Architecture- Concluding Remarks - Networking Systems: Layers, Protocols, and Services- Networks- Local Area Networks (LANs)- Metropolitan Area Networks (MANs)- Wide Area Networks (WANs).

UNIT IV

Multimedia Communication Systems: Application Subsystem- Transport Subsystem- Quality of Service and Resource Management:-Data Base Systems: Multimedia Database Management System- Characteristics of an MDBMS- Data Analysis- Data Structure- Operations on Data- Integration in a Database Model - Documents, Hypertext and Hypermedia- Document Architecture SGMLDocument Architecture ODA- MHEG.

UNIT V

User Interface: General Design Issues- Current Work- Extension through Video and Audio- Video at the User Interface- Audio at the User Interface- User: friendliness as the Primary Goal- Synchronization: Introduction- Notion of Synchronization- Presentation Requirements- A Reference Model for Multimedia Synchronization - Synchronization- Specification.

Text Book:

1. Ralf Steinmetz and Klara Nahrstedt, “Multimedia: Computing, Communications and Applications”, Pearson Education (Singapore), Seventh Indian Reprint, 2004, ISBN: 81-7808- 319-1.

Reference Books:

1. Nigel Chapman and Jenny Chapman, *Digital Multimedia* , John Wiley and Sons Private Limited, 2001, ISBN: 0471983861.
2. Ze-Nian Li.Mark S.Drew,*Fundamentals of Multimedia*,First Edition 2004, ISBN:81-297-0-438-2

09IT220 SOFTWARE TESTING

Credits: 3: 0: 0

Course Objective:

1. To highlight the importance of the software testing during software development.
2. To provide an exposure to the development tools and languages for testing.

UNIT I

Assessing testing-capabilities and competencies-Creating an environment supportive of software testing-Building Software testing process-Tools available for software testing-selecting and using tools.

UNIT II

Seven step Testing process- Overview- Organizing for testing-Developing test plan-Verification Testing.

UNIT III

Validation testing-Analyzing and reporting test results-Acceptance and operational testing.

UNIT IV

Post-Implementation Analysis-Testing Client/Server Systems-RAD testing- Testing COTS and contracted software.

UNIT V

Testing software system security-Testing a data warehouse-Testing Web-based systems

Text Book:

1. William Perry, *Effective Methods for Software Testing*, Third Edition, John Wiley and Sons, 2006, ISBN 81-265-0893-0.

Reference Books:

1. Ron Patton, *Software Testing,* SAMS Publishers, 2001, ISBN 0672319837.
2. Ilene Burnstein, *Practical Software Testing,* Springer, 2003, ISBN NO: 81-8128- 089-X.
3. Glenford J.Myers, "The Art of Software Testing", Second Edition, John Wiley & Sons, 2004, ISBN 047167835X.
4. Boris Beizer, John Wiley & Sons, *Black-Box Testing: Techniques for Functional Testing of Software and Systems*, 1995, ISBN 0471120944.

09IT221 USER INTERFACE DESIGN

Credits: 3: 0: 0

Course Objective:

1.To understand the basics of User Interface Design.
2.To design the user interface, design, menu creation and windows creation

3.To understand the concept of menus, windows, interfaces, business functions, various problems in windows design with color, text, Nonanthropomorphic Design.
4.To study the importance of documentation.

UNIT I

Usability of Interactive Systems: Introduction - Usability Measures - Usability Motivations - Universal Usability - Goals for Our Profession - **Guidelines, Principles, and Theories:** Introduction – Guidelines – Principles - Theories - **Managing Design Processes:** Introduction - Organizational Design to Support Usability - The Four Pillars of Design - Development Methodologies - Ethnographic Observation - Participatory Design - Scenario Development - Social Impact Statement for Early Design Review - Legal Issues

UNIT II

Evaluating Interface Designs: Introduction - Expert Reviews - Usability Testing and Laboratories - Survey Instruments - Acceptance Tests - Evaluation During Active Use - Controlled Psychologically Oriented Experiments - **Direct Manipulation and Virtual Environments:** Introduction - Examples of Direct Manipulation - Discussion of Direct Manipulation - 3D Interfaces – Teleoperation - Virtual and Augmented Reality - **Menu Selection, Form Fill-in, and Dialog Boxes:** Introduction - Task-Related Menu Organization - Single Menus - Combinations of Multiple Menus - Content Organization - Fast Movement through Menus

UNIT III

Selection, Form Fill-in, and Dialog Boxes: Data Entry with Menus: Form Fill-in, Dialog Boxes and Alternatives - Audio Menus and Menus for Small Displays - **Command and Natural Languages:** Introduction - Command-Organization Functionality, Strategies, and Structure - Naming and Abbreviations - Natural Language in Computing - **Interaction Devices:** Introduction - Keyboards and Keypads - Pointing Devices - Speech and Auditory Interfaces - Displays – Small and Large

UNIT-IV

Collaboration and Social Media Participation – Introduction - Goals of Collaboration and Participation - Asynchronous Distributed Interfaces: Different Place, Different Time - Synchronous Distributed Interfaces: Different Place, Same Time - Face-to-Face Interfaces: Same Place, Same Time - **Quality of Service –** Introduction - Models of Response Time Impacts - Expectations and Attitudes - User Productivity - Variability in Response Time - Frustrating Experiences - **Balancing Function and Fashion**: Introduction - Error Messages - Nonanthropomorphic Design - Display Design - Web Page Design - Window Design - Color

UNIT-V

User Documentation and Online Help – Introduction - Online versus Paper Documentation - Reading from Paper versus from Displays - Shaping the Content of the Documentation - Accessing the Documentation - Online Tutorials and Animated Demonstrations - Online Communities for User Assistance - The Development Process - **Information Search:** Introduction - Searching in Textual Documents and Database Querying - Multimedia Document

Searches - Advanced Filtering and Search Interface - **Information Visualization:** Introduction - Data Type by Task Taxonomy - Challenges for Information Visualization

Text Book:

1. Ben Shneiderman, Maxine Cohen, *the user interface-Strategies for Effective Human-Computer Interaction,* Fifth Edition, Pearson Education, 2008. ISBN-13: 9780321537355

Reference Books:

1. Wilbert. O. Galitz , *The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques,*Second Edition, John Wiley and Sons, 2007. ISBN 81-265-0280-0
2. JoAnn T. Hackos, Janice C. Redish, *User and Task Analysis for Interface Design,*First Edition, Wiley, ISBN 978-0471178316
3. Alan J. Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, Janet E. Finley., *Human-Computer Interaction*, Second Edition, Prentice Hall, 1998. ISBN 978-0132398640
4. Helen Sharp, Yvonne Rogers, Jenny Preece, *Interaction Design: Beyond Human-Computer Interaction*, Second Edition, Wiley, 2007. ISBN-13: 978-0470018668

09IT222 ESSENTIALS OF XML

Credits: 3: 0: 0

Course Objective:

1. To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.

UNIT I

Introducing XML: An Eagle's Eye view of XML: What is XML?-Life of an XML document- -Your First XML document-XML Applications-Attributes, Empty tags, XSL-Well Formedness: Elements and Tags-Attributes-Entity References.

UNIT II

Document Type Definitions: DTDs and Validity:DTD--Element Declarations-Entity Declarations-Attribute Declarations :What is an Attribute?-Declaring Attributes in DTDs-Declaring Multiple Attributes-Specifying default values for attributes-Attribute types-Predefined attributes.

UNIT III

Style Languages: CSS Style Sheets: What are Cascading Style sheets-Selecting Elements-Different rules for different media-Importing Style sheets-CSS Layouts: CSS Units-The display property-Box properties-size-Positioning-Formatting pages-CSS Text Styles: Font Properties-The Color Property-Text Properties-Background Properties.

UNIT IV

XSL Transformations: What is XSL- Over view of XSL Transformations-XSL templates-XPath Expressions for selecting Nodes-XSL Formatting Objects: Fornatting objects and their properties -Page Layout-Content-Leaders and rules-Graphics-Links-Lists-Tables-Inlines-Footnotes-Floats-Formatting Properties?

UNIT V

Supplemental Technologies-XLinks:XLinks Versus HTML Links-Linking Elements-Link Behavior-Extended Links-Syntax-Arcs-Out of line Links -XPointers-The Resource Description Framework:What is RDF?-RDF statements-Basic RDF syntax-ContainersRDF Schemas

Text Book:

1. Elliotte Rusty Harold, *XML Bible*, Published by Wiley Dreamtech India Pvt.Ltd, Second Edition 2003,ISBN: 81-265-0212-6

Reference Books:

1. Don Box, Skonnard, Aron, Essential *XML*, Second Edition 2000, ISBN: 0201709147
2. Ann Navarro,Chuck White,Linda Burman,*Mastering XML*,First Edition 2000,ISBN:0-7821-2266-3

09IT223 – OPERATING SYSTEM FUNDAMENTALS

Credits: 3: 0: 0

Course Objective:

The objective of this course is to introduce the principles underlying the design and implementation of contemporary computer operating systems

UNIT I

Introduction – What Operating System Do – Computer System Organization Computer System Architecture Service – Process Management – Memory Management – Storage management- Protection and security- Distributed systems - Special purpose systems- Computing environments - Operating system services- User operating system interface – System calls – Types of system calls – System programs – Operating system structure

UNIT II

Process concept – Process scheduling – Inter process communication – Process scheduling – Basic concepts – Scheduling criteria – Scheduling algorithms - Algorithm evaluation - Synchronization – The critical section problem – Peterson's solution – Synchronization hardware – Semaphores – Classic problems of synchronization – Monitors - Atomic transactions

UNIT III

System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock - Memory management strategies – Swapping – Contiguous memory allocation – Paging – Structure of the page table – Segmentation - Virtual memory management – Demand paging – Copy-on-write – Page replacement – Allocation of frames – Thrashing

UNIT IV

File concepts – Access methods – Directory structures – File system mounting – File sharing – Protection - Implementing file systems – File system structure – File system implementation – Directory implementation – Allocation methods – Free space management – Efficiency and performance – Recovery – Log structured file systems – NFS

UNIT V

Secondary storage structure – Overview of mass storage structure – Disk structure – Disk attachment – Disk scheduling – Disk management – Swap space management – RAID structure – Stable storage implementation – Tertiary storage structure - I/O systems – I/O hardware – Application I/O interfaces – Kernel I/O subsystem – Transforming I/O request to hardware operations – Streams – Performance

Text Book:

1.Abraham Silberchatz, Peter Baer Galvin, Greg Gagne, *Operating System Principles*, John Wiley & Sons, Seventh Edition, 2006 ISBN 9812-53-176-9

Reference Book:

1.William Stallings, *Operating System: Internals and Design Principles* , Addison-Wesley Prentice Hall, Sixth Edition, ISBN-10: 0136006329

09IT224 – TCP/IP PROTOCOLS

Credits: 3: 0: 0

Course Objective:

1. To understand the structure and functions of TCP/IP from the link layer up through the network, transport, and application layers.
2. To learn about the protocols that belong to each of these layers and its operation.

UNIT I

Introduction – Layering,TCP/1P,Internet Address, DNS, Encapsulation,Demultiplexing,Client Server, Port numbers, Standardization, RFCs, Standard, Simple Services, Internet, Implementations, Application programming Interfaces ,Test Network - **Link Layer** – Ethernet and IEEE802,Trailer Encapsulation, SLIP, Compressed SLIP,PPP, Loopback Interface, MTU, Path MTU, Serial Line throughput calculations, **IP** – IP Header, Routing, Subnet Addressing,Mask,Special case IP address,ipconfig command,netstat command,IP futures- **ARP** – ARP Cache, Packet format, ARP examples, proxy ARP- Gratuitous ARP,ARP Command- **RARP** - packet format-RARP – RARP Examples, Server design – **ICMP-** Message types, Address mark request and reply- Timestamp request and reply ,ICMP port unreachable error-BSD, Summary

UNIT II

Ping Program – IP record Route option, IP timestamp option-**Traceroute Program –** Operation, LAN output - **IP Routing –** Routing Principles, ICMP Host- To forward or not to forward, ICMP Redirect Errors, ICMP ROUTER Discovery Messages - **Dynamic Routing Protocols** – Dynamic Routing, Unix Routing Daemons, RIP- RIP Version 2,OSPF,BGP,CIDR -

UDP – Header, Checksum, Example, IP fragmentation- ICMP, Traceroute, Path MTU discovery with UDP- Interaction between UDP and ARP, Maximum UDP Datagram Size, ICMP source quench error, UDP Server Design- **Broadcasting and Multicasting-** Broadcasting and Examples- Multicasting

UNIT III

IGMP – IGMP Message and Protocol with examples-DNS – DNS basics, message format, Example-Pointer Queries, Resource Records, Caching, UDP or TCP- **TFTP –** protocol and example **-BOOTP –** Packet format and example**-TCP –** Introduction-services-header**- TCP Connection Establishment and Termination –TCP Interactive Data Flow**

UNIT IV

Tcp Bulk Data Flow – Introduction- Sliding Windows-Push Flag- Slow Start- Urgent Mode - **Tcp Timeout And Retransmission** – Introduction- Congestion- Errors- **Tcp Persist Timer –** Introduction-Silly Window Syndrome **-Tcpkeepalive Timer –** Introduction And Examples **-Tcp Futures And Performance –**Introduction-Performance **– Snmp**-Protocols-Examples

Unit V

Telnet and Rlogin – Introduction-Protocols –Telnet protocol- **FTP –**Protocol- **SMTP – Introduction-protocols- NFS –** Introduction –protocols**-TCP Applications**-Finger protocol-Whois protocol-Arcie-WAIS-Gopher-X window system.

Text Books:

1.W. Richard Stevens, *TCP/IP Illustrated Volume – I, The Protocols*, Pearson Education, 2000 ISBN : 81-7808-101-6

Reference Books:

1.Douglas E. Comer, *Internetworking with TCP/IP – Principles, Protocols and Architecture*, Pearson Education, Fourth Edition, 2000. ***ISBN*** 0-13-233553-0
2.Buck Graham, *TCP/IP Addressing* ,Harcourt India Pvt Ltd, Second Edition,2001,ISBN:81-7867-035-6
3.Charles M.Kozierok, *The TCP/IP Guide*, No Start Press ,First Edition, 2005, ISBN:81-7366-464-1.
4.Craig Hunt,*TCP/IP Network Administration* , Shroff Publishers and Distributors pvt Ltd ,Third Edition,2002,ISBN:81-7366-467-6

09IT225 DATA COMPRESSION TECHNIQUES

Credits: 3 : 0 : 0

Course Objective:

1.To understand the data Compression Techniques.
2.To learn more about the Compression Algorithms
3 To study variety of data compression for binary, text, sound and Image data in Digital forms.

UNIT I

Introduction: Compression, decompression, Lossless and lossy compression, Deriving algorithmic solutions, Measure of compression quality, Limits on lossless compression, **coding symbolic data,** Information data and codes, Symbolic data, Variable length codes, Elementary information theory. Data compression in telecommunication, redundancy, Compression algorithms

UNIT II

Run-length algorithms and Huffman Coding: Run-length, Hardware data compression (HDC), Algorithm design, **Huffman coding:** Static Huffman coding, Shannon Fano approach, Optimal Huffman codes, Implementation efficiency, Extended Huffman coding, **Adaptive Huffman coding** Adaptive approach, Compressor, Decompressor, Disadvantages of Huffman coding

UNIT III

Arithmetic coding and Dictionary Based Compression: Probabilities and subintervals, Models and coders, Simple case, General case, **Dictionary-Based compression**: Pattern in string, LZW coding, LZ77 family, LZ78 family, Applications, Comparison

UNIT IV

Prediction transforms and audio compression: Predictive approach, Move to front coding, Burrows-Wheeler transform (BWT), Transform approach discrete cosine transform (DCT), Subband coding, Wavelet Transforms, **Audio compression**: Modeling sound, Sampling, Quantization, Compression Performance, Speech Compression Music compression

UNIT V

Image and Video Compression: Image data, Bitmap Images, Vector Graphics, Bitmap and vector graphics, Color Classifying images by color, Classifying images by appearances, Image compression **Video Compression,** Motion Compensation, Model-Based Coding, Asymmetric Applications , MPEG-1&2 Video Standard, ITU- T Recommendation H.263, ITU-T Recommendation H.264 ,Advanced Video Coding,MPEG-4,Packet Video, ATM Networks-Compression Algorithms for packet .

Text Books:

1. Ida Mengyi Pu, *Fundamental Data compression*, Butterworth- Heimenann, 2006 ISBN 0750663103
2. Khalid Sayood, Introduction to Data compression, Morgan Kaufmann, 2004 ISBN 8131206246

Reference Books:

1. Mark Nelson,*Data compression book*,BPB Publishers,New Delhi,1998 ISBN1558514341 ,9781558514348.
2. Richard B.Wells, "*Applied coding and Information Theory for Engineers*", pearson Education, 2005 ISBN 0139613277, 9780139613272.

09IT226 E-COMMERCE

Credits: 3 : 0 : 0

Course Objective:

1. To have an awareness about role of IT in business
2. To have knowledge of basic concepts of ecommerce
3. To have in depth knowledge in security and legal issues in ecommerce

UNIT I

Introduction – Electronic commerce and physical commerce-Digital phenomenon-ecommerce different perspective-types-examples-scenarios-changes brought by ecommerce-advantages-myths about ecommerce-system model-**Internet and World Wide Web –**Overview of internet-history of internet-web system architecture-URL-HTTP-Dynamic web page-cookies-**Client Side Programming-**Factors-web page design-HTML-Text formatting-Link-Images-Image MAP-Tables-Frames-Form-CSS-Javascript.

UNIT II

Server side Programming: Servlet Fundamentals – Three tier model-CGI-ASP-Java Servlet-Architecture-API-Building VBS-Compilation and execution of servlets-Interactive servlet program- **Database Connectivity –** Relational database systems-JDBC-JDBC program-Advanced book query-JDBC servlet-**Session Tracking-**Traditional session tracking techniques-Servlet session tracking API-VBS shopping cart

UNIT III

Basic Cryptography for enabling e-commerce – Security concerns-Encryption-Private key encryption-key distribution problem-Diffie Hellman-Public key encryption-RSA-Hybrid-Stream cipher and block cipher-Message digest-Authentication code-Digital Signature-Authentication-**Internet Security –** Ip sec protocol-Security associations-Authentication header-ESP service-Application-Firewalls-Types of firewall-SSL-**Advanced Technologies for e-commerce** -Mobile agents-WAP-XML-Data mining

UNIT IV

Internet Payment Systems –4C Payment system-SET Protocol-Ecash-Echeck-Micropayment-Smart card-Mondex- **Consumer oriented e-commerce –**Traditional retailing- Benefits-Key success factors- Model of eretailing-Features-Developing consumer oriented ecommerce-PASS model-**Business oriented ecommerce**-B2B-Business model-Integration.

UNIT V

Web Advertising and Web Publishing – Web advertising versus internet advertising-advertising techniques-business model-pricing model-web publishing-Website development-Logical design-Usability Testing-Web presence and visibility-**Building the Virtual Book Store-**VBS homepage design-Form validation-Search engine-Quick search-Category search-Advanced search-Access control –cart login.

Text Book:

1. Henry Chan, Raymond Lee, Tharam Dillon and Elizabeth Chang, *E-Commerce Fundamentals and Applications*, John Wiley and Sons Ltd., 2001. ISBN 9971-51-411-7

Reference Books:

1. R Kalokota, Andrew V.Winston, *Elecronic Commerce-a Managers Guide*, Fourth Edition, Pearson Education, 2006. ISBN:81-780-8158-X.
2. ErfanTurban,Dave King,Jae Kyu Lee,Dennis Viehland ,*Electronic Commerce-A Managerial Perspective*, Fourth Edition Pearson Education,2006:ISBN: 81-780-8362-0.

09IT227 – DATA WAREHOUSING

Credits: 3: 0 : 0

Course Objective:

1. To understand different methods for handling unstructured data in a data warehouse.
2. To store data across multiple storage media.
3. To examine Relational and Multidimensional Models.
4. To explore advanced topics, including data monitoring and testing.

UNIT I

Introduction – Evolution of Decision Support Systems - The Data Warehouse Environment - **The** Data Warehouse and Design

UNIT II

Granularity in the Data Warehouse - The Data Warehouse and Technology- The Distributed Data Warehouse.

UNIT III

Executive Information Systems and The Data Warehouse – External Data and The Data Warehouse – Migration to the architectural Environment.

UNIT IV

The Data Warehouse and the Web – Unstructured Data and The Data Warehouse – The Really Large Data Warehouse

UNIT V

The Relational and the Multidimensional Models as a Basis for Database and design – Advanced Topics in the Data Warehouse.

Text Books:

1. William H.Inmon, *Building the datawarehouse*, Wiley Dreamtech (P) Ltd, Fourth Edition, 2005,ISBN:81-265-0645-8.

Reference Books:

1. Sam Anahory, Dennis Murray, *Data Warehousing in the Real World*, Pearson Education (P)Ltd., First Edition 1997, Fifteenth Indian Reprint 2005, ISBN: 81-7808-387-6.

2. Claudia Imhoff ,Nicholas Galenno, Jonathan G.Geiger, *Mastering data warehouse design*, Wiley Publishing, First Edition, 2003,ISBN:81-265-0365-3.
3. Paulraj Ponniah, *Data Warehousing Fundamentals – A Comprehensive guide for IT Professionals,* John Wiley & Sons, First Edition, 2003, ISBN: 981-2-53-012-6.

09IT228 SOFTWARE RADIO

Credits: 3: 0: 0

Course Objective:

1. To introduce the key concepts of software radio design
2. To cover every issues and techniques that an engineer must understand to successfully utilize DSP in their radio systems and subsystems

UNIT I

Introduction: Need for Software Radio-Characteristics-Benefits-Design Principles-**RF Implementation issues:** Purpose of RF front end-Dynamic range-RF receiver front-Enhanced flexibility of the RF chain with software radios-Importance of components to overall performance-transmitter architecture and their issues-noise and distortion in RF chain-Flexible RF systems with micro electro mechanical systems.

UNIT II

Multi Rate Signal Processing: Introduction-sample rate conversion principles-poly phase filters-digital filter banks-time recovery in digital receivers.

UNIT III

Digital Generation of Signals: Direct digital synthesis-approaches to direct digital synthesis-analysis of spurious signals-spurious components due to periodic jitter-band pass signal generation-performance of direct digital synthesis systems-hybrid DDS PLL Systems-applications of direct signal synthesis-generation of random sequences-ROM compression techniques.

UNIT IV

Analog to Digital and Digital to analog conversion: Parameters of ideal data converters-parameters of practical data converters-common ADC and DAC architectures-

UNIT V

Smart antennas: vector channel modeling- benefits of smart antennas-structures of beam forming systems-smart antennas algorithms-diversity and space time adaptive signal processing-hardware implementation of smart antennas.

Digital Hardware Choices: Key hardware elements-DSP processors-field programmable gate arrays-trade off using DSPs FPGAs and ASICs-Networks-Object oriented programming-Object brokers-mobile application environments.

Text Books:

1. Jeffrey H. Reed,"*Software Radio: A Modern Approach to Radio Engineering*", Prentice Hall PTR, 2002. ISBN 0-13-081158-0

Reference Books:

1. Jouko Vankka, *"Digital Synthesizers and Transmitters for software Radio"*, Springer Verlag, 2005
2. Dillinger, Madani, Alonistioti.,*"Software defined radio : architectures, systems, and functions"* Wiley, 2003,ISBN-13: 9780470851647
3. Bruce Fette,*"Cognitive Radio Technology"*,Elsevier Science & Technology Books, 2006. ISBN-13: 9780750679527
4. Burns, *"Software Defined Radio for 3G"*, Artech House, 2002. ISBN 1-58053-347-7

09IT229 IP TV AND INTERNET VIDEO

Credits: 3: 0: 0

Course Objective:

1. To provide an overview of hardware, software, and Internet technologies.
2. To introduce key trends and drivers transforming the world of broadcast television and the Web

UNIT I

Introduction: Internet Protocol-Market for IP Video-Characteristics of IPTV-Internet video-IPTV versus internet video-constructing an IPTV network-constructing an internet video system

UNIT II

Internet Protocol & video compression: Packet – types of IP Networks-IP Addresses-key parts of an IP network-Transport protocols-Multicasting-video compression-groups of pictures-MPEG-Microsoft Windows Media and VC-1-Other compression techniques

UNIT III

Video Quality& servers: Maintaining video quality and security-video servers-video on demand servers-advertising servers-live streaming servers-encryption and right management.

UNIT IV

Bandwidth: DSL technologies-DSLAM-Home gateway-multiple televisions-Calculate bandwidth

UNIT V

Set top boxes & Internet video technologies: Basic functions-middleware-STB selection issues-internet video technologies-types of internet streaming-commercial players-content creation workflows

Text Book:

1. Wes &Howard Greenfield, *IPTV and Internet Video: New markets in television Broadcasting*, Focal Press,2007. ISBN: 0240809548

Reference Books:

1. Howard J. Gunn, *The Basics of IPTV, Intl. Engineering Consortium*, 2007, ISBN 9781931695589

2. Gerard O'Driscoll, *Next Generation IPTV Services and Technologies, Wiley-Interscience*, 2007.ISBN :0470163720
3. Gilbert Held, *Understanding IPTV*, CRC Press, 2006. ISBN: 0849374154

09IT230 – ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS

Credits: 3 : 0 : 0

Course Objective:

1. To introduce artificial intelligence concepts in searching, programmable logic.
2. To broaden the scope of the definition of ANS.
3. To develop the ability to choose from a variety of programming methods those that are best suited for particular programming tasks.

UNIT I

Introduction: Foundation of AI - History of AI - Intelligent agents - Agents and Environments - The Concept of Rationality -The nature of environments - Structure of agents - Problem solving agents - Example problems

UNIT II

Searching : Searching for Solutions - Uniformed search strategies – Avoiding repeated States - Searching with partial information – **Informed Search and Exploration:** Informed(Heuristic) Search Strategies - Heuristic Functions – Local Search Algorithms and Optimization Problems - Local Search in Continuous Spaces - **Adversial Search :** Games - Optimal Decisions Games - Alpha-Beta Pruning – Imperfect, Real Time Decisions – Games That include an Element of Chance.

UNIT III

Knowledge and Reasoning: Logical Agents: Knowledge – Based Agents -The Wumpus World – Logic- Propositional logic - Reasoning Patterns in Propositional Logic - **First order logic:** Representation Revisited - Syntax and semantics of First-Order Logic- Using First Order Logic- Inference in First Order Logic - Propositional vs. First-Order inference - Unification & Lifting - Forward Chaining-Backward Chaining- Resolution.

UNIT IV

Introduction to ANS Technology: Elementary Neurophysiology- from Neurons to ANS – ANS Simulation. **Backpropogation:** The Backpropogation Network – The Generalized Data Rule – Practical Consideration – BPN Applications – The Backpropogation Simulator.

UNIT V

The BAM and The Hopfield Memory: Associative Memory definitions – The BAM – The Hopfield Memory. **The Counterpropogation network:** CPN Building Blocks – CPN Data Processing – An Image Classification Example – The CPN Simulator

Text Books:

1. Stuart Russell, Peter Norvig, *Artificial Intelligence – A Modern Approach*, Second Edition, Pearson Education, 2004, ISBN 81-297-0041-7.
2. James A. Freeman, David M.Skapura, *Neural Networks Algorithms, Applications and Programming Techniques*, Pearson Education, Sixth Indian Reprint (2002), ISBN:10:0201513765

Reference Books:

1. Elaine Rich, Kevin Knight, *Artificial Intelligence*, Tata McGraw-Hill, 2003. ISBN: 0-07-460081-8
2. Dan W Patterson, *Introduction to AI and Expert Systems*, Prentice Hall of India, 2001. ISBN:81-203-0777-1
3. Patrick Henry Winston, *Artificial Intelligence*, Pearson Education, New Delhi, 1992. ISBN:10: 0201082799.
4. Stamatios V.Karatalopoulous, *Understanding Neural Networks and Fuzzy Logic- Basic Concepts & Applications*, Prentice Hall India, 2000. ISBN: 9780780311282.

09IT231 - SOFTWARE PROJECT MANAGEMENT

Credits: 3: 0: 0

Course Objective:

1. To provide a overview of the concepts, processes, and techniques associated with formal project management and to learn about the project management strategies.
2. To develop skills that will enable to construct software of high quality, software that is reliable, easy to understand, modify and maintain.
3. To foster an understanding on the importance of these skills.

UNIT I

Traditional Project Management: What is a Project - Traditional, Adaptive, Extreme: A Dynamic Project Management Landscape - Defining the Project – Building the Work Breakdown Structure.

UNIT II

Estimating Duration, Resource Requirements, and Cost - Constructing and Analyzing the Project Network Diagram - Finalizing the Schedule and Cost Based on Resource Availability - The Need to Plan: Conducting the Joint Project Planning Session.

UNIT III

Building and Managing an Effective Project Team - Monitoring and Reporting Project Progress - Closing out the Project - Critical Chain Project Management..

UNIT IV

Adaptive Project Framework: Introduction - Version Scope - Cycle Plan - Cycle Build - Client Checkpoint - Post-Version Review - Extreme Project Management and Other Variations to APF.

UNIT V

Organizational Considerations: Project Portfolio Management - Project Support Office.

Text Book

1. Robert K. Wyzocki, Rudd McGary, *Effective Project Management*, WILEY Dreamtech, 2006, Edition: 4, illustrated, revised ISBN 0470042613, 9780470042618.

Reference Books:

1. Walker Royce "*Software Project Management* – A Unified Framework ", Pearson Education, 2004. ISBN :0201309580, 9780201309584.
2. Bob huges, Mike cotterell, "*Software Project Management*", Tata McGraw Hill, New Delhi, 2002. ISBN: 1850321906, 9781850321903.

09IT232 COMMUNICATION ENGINEERING

Credits: 3 : 0 : 0

Course Objective:

1. To learn the functional blocks and circuitry used in modulators and transmitters
2. To understand the benefits and weaknesses of FM/PM compared with each other and with AM
3. To understand the relationship between analog signals and their digital representation in various digital formats
4. To learn the use of state transition diagrams to map out the possible states of the communication system
5. To understand the technical and operating requirements of RS-232 standard and to troubleshoot RS-232 interfaces.

UNIT 1

Fourier and spectrum analysis -Amplitude Modulation - Receivers for AM: RF stage - IF stage - Frequency and phase modulation

UNIT II

Wire and Cable Media: Parameters - Balanced and Unbalanced Lines - Drivers and Receivers--Propagation and Antennas-Digital information

UNIT III

Digital information -Digital Communication Fundamentals- Digital Communication Systems - Digital Modulation and Testing**.**

UNIT IV

TV/Video,facismile- RS 232 Interface Standard, Modems and High Speed POTS Links

UNIT V

Satellite Communication - Navigation, Global Positioning System - Cellular Telephone and advanced wireless systems

Text Book:

1. William Schweber, Electronic Communication Systems A complete course, Fourth edition, Prentice Hall International,2002 ISBN: 0130916218

Reference Books:

1. Simon Haykin, *Communication Systems*, Fourth Edition,2006.Wiley publications ISBN: 812650904X
2. Michael O. Kolawole, *Satellite Communication Engineering* ,Published by CRC Press, 2002. ISBN :082470777X, 97808247077
3. Anokh Singh, *Principles Of Communication Engineering*, Published by S Chand & Company Ltd, 2006.ISBN: 8121904765

09IT233 SERVICE ORIENTED ARCHITECTURE

Credits: 3:0:0

Course Objective:

1. To provide an introduction to the concepts of Service Oriented Architecture.
2. To explore some of the key issues faced by many organizations, especially dealing with integration among disparate systems.

UNIT I

Introduction to SOA with Web Services: The service-oriented enterprise – Service oriented development – Service abstraction – Service-oriented architecture – SOA and web services – Rapid integration – Multi-channel access – Occasionally connected computing – Business Process Management – Extended Web Services Specifications.

UNIT II

Service Oriented Architecture Concepts: Service governance, processes, guidelines, principles, methods and tools – Key Service characteristics – Technical benefits of a service-oriented architecture – Service-oriented architecture – Benefits.

UNIT III

SOA and Web Services: The web services platform – Service contracts – Service-level data model – Service discovery-registration and lookup – Service-level security – Service level interaction patterns – Atomic services and composite services – Generating proxies and skeletons and service contracts – Service-level communication and alternative transports – A Retrospective on Service-oriented architectures- Overview of integration – Integration and Interoperability using XML and web services- Business benefits of SOA and multi-channel access.

UNIT IV

SOA and Business Process Management: Basic Business process management concepts – Examples - Combining BPM, SOA, and web services – Orchestration and Choreography specification – Examples - Web services.- The simple approach to metadata management - Metadata specification - Impact of web services on transactions.

UNIT V

Services Security: Overarching concern – Core concepts – Summary of challenges, threats and remedies – Securing the communication layer – Overview of message-level security – Data-level security.

Text book:

1. Eric Newcomer and Greg Lomow, *Understanding SOA with Web Services,* Pearson Education India, New Delhi, 2005.ISBN:10:0321180860

Reference Books:

1. Chatterjee, Sandeep and James Webber, *Developing Enterprise Web Services: An Architect's Guide*, Prentice Hall of India, New Delhi, 2003.ISBN: 0131401602
2. Bernstein Philip A and Eric Newcomer, *Principles of Transaction Processing*." Morgan Kaufmann Publishers, USA, 1997,ISBN 1558604154
3. Barry Douglas K,*Web Services and Service oriented Architectures- The Savvy Manager's Guide*, Morgan Kaufmann Publishers, USA, 2003.ISBN:1558609067

09IT234 SATELLITE COMMUNICATION

Credits: 3:0:0

Course Objective:

1. To cover global wireless applications, antenna options, error coding, digital television, and internet access via satellite.
2. To introduce Global wireless services, launch systems, orbits, frequencies.
3. Upon completion trainees will be equipped with a solid understanding of how the satellite market is structured and the capabilities of the technology that makes it all possible.

UNIT I

Introduction - Orbits and Launching Methods: Kepler's Laws - Definitions of terms for Earth-Orbiting Satellites - Orbital Elements - Apogee and Perigee Heights - Orbital Perturbations - Inclined Orbits – Local Mean Solar Time and Sun Synchronous Orbits – Standard Time – The Geo Stationary Orbit - Antenna Look Angles – The Polar Mount Antenna – Earth Eclipse of Satellite - Sun Transit Outage - Launching Orbits.

UNIT II

Radio Wave Propagation: Atmospheric Losses- Ionospheric Effects – Rain Attenuation - Polarization - Antennas: Reciprocity Theorem for Antennas - The Isotropic Radiator and Antenna Gain - The Half-Wave Dipole - Aperture Antennas – Horn Antennas - The Parabolic Reflector - Double-Reflector Antennas – Shaped Reflector Systems- Arrays.

UNIT III

Space Segment: Power Supply - Attitude Control - Station Keeping - Thermal Control - TT&C subsystem - Transponders - Antenna Subsystem - Earth Segment – Error Control Coding: Linear Block Codes - Cyclic Codes- Convolution Codes – Interleaving – Concatenated Codes – LDPC Codes – ARQ - Space Link: Equivalent Isotropic Radiated Power - Transmission Losses - Link-Power Budget Equation - System Noise – Carrier-to-Noise Ratio - Uplink – Downlink – Intersatellite Links.

UNIT IV

Interference between Satellite Circuits (B1 and B2 Modes) - Energy Dispersal – Coordination-Satellite Access – Single Access – Preassigned FDMA – Demand Assigned FDMA – Spade System – Bandwidth-limited and Power-limited TWT Amplifier Operation - TDMA – Satellite-Switched TDMA – CDMA.

UNIT V

Satellites in Networks – Direct Broadcast Satellite(DBS) Television - Orbital Spacing - Power Rating and Number of Transponders - Frequencies and Polarization - Transponder Capacity - Bit Rates for Digital Television - MPEG Compression Standards – FEC - ODU - IDU - Downlink Analysis – Uplink - HDTV - Satellite Mobile and Specialized Services.

Text Book:

1. Dennis Roddy, *Satellite Communications*, Fourth edition,Tata McGraw Hill, 2006, ISBN 0-07-146298-8, ISBN-9780071462983.

Reference Book:

1. Dennis Roddy , *Satellite Communications*, Third edition ,Tata McGraw Hill, 2001, ISBN 0-07-137176-1.
2. Timothy Pratt, *Satellite Communicationss*, John Willey & Sons, 2000, ISBN-9780471878377.

09IT235 COMPUTER HARDWARE AND PERIPHERALS LAB

Credits: 0:0:2

1. Study of different types of cables and network topologies
2. Study of different types of network devices
3. Study and identification of Major parts of PC
4. Assembly and Disassembly of PC
5. Study and identification of Major parts of Laptop
6. Assembly and Disassembly of Laptop
7. Connecting a small LAN
8. IP configuration and Subnet masking.
9. Study and troubleshoot the boot process
10. Installation and configuration of Windows 2000
11. Router configuration

12. Implementation of Wireless Network
13. Study, Identification, Assembly and Disassembly of Keyboard and Mouse
14. Study, Identification, Assembly and Disassembly of Printer and Monitor

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT236 CASE TOOLS LAB

Credits: 0:0:2

1. Study of software engineering basics and UML
2. Study of UML diagrams with an example
3. Implementation of use case diagram with an example
4. Implementation of class diagram with an example
5. Implementation of sequence diagram with an example
6. Implementation of collaboration diagram with an example
7. Implementation of state chart diagram with an example
8. Implementation of Activity diagram with an example
9. Implementation of Component diagram with an example
10. Implementation of Deployment diagram with an example
11. Forward and Reverse Engineering

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT237 DATA STRUCTURES AND ALGORITHMS IN C++ LAB

Credits: 0:0:2

1. Implementation of Stack
2. Implementation of Queue
3. Implementation of towers of Hanoi
4. Implementation of Singly Linked List
5. Implementation of doubly Linked List
6. Implementation of linear and binary searching
7. Implementation of insertion and selection sort
8. Implementation of shell and quick sort
9. Implementation of merge sort
10. Implementation of Heap sort
11. Implementation of binary search tree

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT238 WEB TECHNOLOGY AND MULTIMEDIA LAB

Credits: 0:0:2

1. Working with HTML
2. Working with VB-Script
3. Form validation using VB-Script
4. Usage of Session Object
5. Online Ticket Reservation
6. Word game design using ASP
7. Working with Database
8. Working with XML and CSS
9. Working with XML and XSL
10. Adobe Photoshop
11. Macromedia Flash MX
12. Macromedia Flash MX- Calculator

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT239 DIGITAL DESIGN LAB

Credits: 0:0:2

1. Study of Logic Gates
2. Realization of Logic gates using universal gates
3. Half Adder and Full Adder
4. Design of Decoder and Encoder
5. Multiplexer and De-multiplexer
6. Code Converter
7. Parity generator and Checker
8. Study of Flip-Flops
9. Shift Register
10. Counters using Flip Flops

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT240 NETWORK SECURITY LAB

Credits: 0:0:2

1. Substitution and Transposition Cipher
2. Vignere cipher
3. RSA Implementation
4. One-time Pad

5. Simplified DES
6. Feistel Cipher
7. Diffie-Hellman Key Exchange
8. Frequency Analysis on Caesar Cipher
9. Digital Signature Algorithm
10. Hashed Message Authentication Code
11. Message Digest-5
12. Secure Electronic Transaction

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT241 MICROPROCESSORS AND INTERFACING LAB

Credits: 0:0:2

1. Study of 8086 /8088
2. Arithmetic Operations
3. String Operations
4. Operations on arrays
5. Code Conversion
6. 8255 Programmable peripheral Interface
7. 8253 Programmable Interval Timer
8. 8259 Programmable Interrupt Controller
9. 0809 Analog to Digital Converter
10. 0800 Digital to Analog Converter
11. 8279 Programmable Display Interface
12. Stepper Motor Interface

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT242 NETWORKING LAB

Credits: 0:0:2

1. TCP two way communication
2. UDP two way communication
3. File Transfer Protocol
4. Remote method Invocation
5. Shortest path Algorithm
6. Study of Wireless Network
7. Realization of wireless network using WAP and wireless adaptors
8. Router Management
9. Introduction of OPNET
10. Simulation of LAN and Ethernet

11. Simulation of WAN
12. Simulation of TCP
13. Network Design
14. Video Conferencing Application

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT301 – INTERACTIVE GAME DESIGN

Credits: 4: 0: 0

Course Objective:
To learn the concepts of designing a game and the role of a Game Designer.

UNIT I
Introduction – Game Design Basics: The role of the game Designer- Passion and Skills- A Play centric design process- Designing for innovation **–** The Structure of Games: Go fish versus Quake-Engaging the player- The sum of parts- Defining games.

UNIT II
Designing a Game I : Working with formal elements: Players-Objectives- procedures-rules-resources-conflicts-boundaries-outcome. Dramatic elements: Challenge-Play-Premise-character-story-world building. Working with system Dynamics: Games as Systems-System dynamics, interacting with systems-Tuning game systems.

UNIT III
Designing a Game II: Conceptualization: Ideas-Brain Storming skills-alternate methods-Editing and refining – turning idea into game. Prototyping: Methods of prototyping-Prototyping original game idea. Digital Prototyping: Types of digital prototype-designing control schemes-selecting view points – effective interface design-prototyping tools.

UNIT IV
Working as a Game Designer I: Play Testing: Play testing and interactive design – Play testing session-methods- the play matrix- usability techniques- test control situation – Functionality, Completeness & Balance, Fun & Accessibility

UNIT V
Working as a Game Designer II: Team Structure- Developers team – publishers team-contribution to the design- team communication. Stages of Development: Stages- project plan. The Design Document: Communication- contents-writing.

Text Book:
1.Tracy Fulerton, Christopher Swain, Steven Haffman, *Game Design Workshop: A PlayCentric Approach to Creating Innovative Games*, Second Edition, Elsevier, 2003, ISBN: 0240809748, 9780240809748.

09IT302 WEB SERVICES

Credits: 4: 0: 0

Course Objectives:

1.To discuss the evolving standards landscape for Web Services.
2.To have an in-depth knowledge of Web Service Architecture.
3.To build web services and applications that meet the enterprise requirements for security, mobility, transactions, QoS and workflow,
4.To provide secure private information within web service environments.

UNIT I

Evolution and Emergence of Web Services: Introduction to Web Services: What are web services? – Motivation and Characteristics – Use of Web Services – Operational model of web services – Core web service standards – Other industry Standards Supporting web services – Known Challenges – Software and Tools – Strategies from industry leaders, Building the Web Services Architecture: Architecture and its core building blocks – toolf of the trade – communication models – implementing web services – developing web service enabled applications.

UNIT II

Web Services Architecture and Technologies: Developing Web Services using SOAP: XMl Based protocols and SOAP – Anatomy of SOAP – SOAP encoding – SOAP Message Exchange Model – SOAP communication – SOAP messaging – SOAP Bindings for transport protocol – SOAP Security – building SOAP web services, Description and Discovery of Web Services: WSDL – UDDI, Creating .Net Interoperability: Means of ensuring interoperability – Overview of .NET framework – developing Microsoft .NET client - Challenges in creating web service interoperability – WS-I Initiative and its goals – public interoperability testing efforts .

UNIT III

Conversations and WorkFlow : Conversations: Conversation Overview - web Services Conversation language - WSCL Interface Components - The Bar Scenario conversation - relationship Between WSCL and WSDL – Workflow: Business process Management - Workflows and Workflow management Systems - Business process Execution language for Web Services (BPEL) - BPEL 1.1 and OASIS WSBPEL - BPEL and Its Relation to BPML - WSCI, WSFL, Xlang, and others.

UNIT IV

Transactions and Security: Transactions: ACID Transaction, Distributed Transactions and Two-Phase Commit - Dealing with Heuristic Outcomes - scaling transactions to Web Services - OASIS Business transaction Protocol - other Web Services Transaction Protocols, Security: Everyday Security Basics - Security Is An End-to-End Process - Web Service Security Issues - Types of Security Attacks and Threats - Web Services Security Roadmap - WS-security.

UNIT V

QoS, Portals and Service Management: Quality of Service: What Is QoS? - Why Is QoS Important for Web Services? - QoS Metrics for Web Services - Where Are the Holes? - Design Patterns and Best practices - Building QoS into Web Services and Applications - QoS-Enabled Web Services - QoS-Enabled Applications - Mobile and Wireless - Mobile Web Services - Challenges with Mobile - Proxy-Based Mobile Systems - Direct Mobile Web Service Access - J2ME Web Services, Portals and Services Management: Portals - Web Services management.

Text Book:

1. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, *Developing Java Web Services*, Wiley Publishing Inc., 2004.ISBN 81-265-0499-4.
2. Sandeep Chatterjee, James Webber, *Developing Enterprise Web Services*, Pearson Education, 2004.ISBN 81-297-0491-9.

Reference Book:

1. B. V. Kumar, S. V. Subrahmanya, *Web Services*, Tata McGraw Hill, 2004. ISBN 0-07-059378-7.

09IT303 SEMANTIC WEB

Credits: 4: 0: 0

Course Objective:

To improve the representation of machine processible semantics of information based on arising web standards.

1. To introduce Ontologies for representation of semantics in the formalisms
2. Incorporates semantic annotations which allow atomization in information access and task achievement and the applications of the above new techniques are presented.

UNIT I

Introduction – Need for semantic web – Provisions and Possibilities of semantic web – Languages and Ontologies – SHOE language – Implementation – DAML-ONT Ontology language – Language extension – Axiomatic semantics of DAML-ONT

UNIT II

Ontologies and Schemas – OIL Ontology language – XML schema – RDF schema –Application to online resources – Brokering reasoning components on the web – UPML –Ontologies – Simple ontologies and uses – Structured ontologies and uses – Structured ontologies and uses – Ontology acquisition – Ontology related implications and Needs

UNIT III

Sesame – RDF and RDF schema – Need for an RDF/S query language – Sesame's architecture – Sesame's Functional modules – Evolving Web – Web problem solving – Domains – Enabling infrastructure – Knowledge mobility – Need for knowledge mobility –New generation knowledge bases – Resilient hyper-knowledge bases – TRELLIS

UNIT IV

Complex relationships for semantic web – Knowledge modeling – Information scapes – Knowledge discovery – Visual Interfaces – Semantic portal: SEAL approach – Ontology and knowledge bases – Ontology engineering – SEAL Infrastructure and Core modules – Semantic ranking – Semantic personalization

UNIT V

Semantic gadgets – Representation – Semantic discovery – Contracting for the use of services – Composition of services – Static semantics – Dynamic semantics – Sources of dynamic semantics – Web agents – Information retrieval and theorem proving perspectives –Glue – Features – Comparison – Semantic Annotation – External annotation framework –Annotation based transcoding system – HTML Page splitting – Task achieving agents –Standards – Web based application

Text Book:

1. Diester Fensel, James Hendler, Henry Lieberman, Wolfgang Wahlster, *Spinning the Semantic Web*, The MIT Press, 2003, ISBN 0-262-06232-1

Reference Books:

1. Daconta, Obrst and Smith. *The Semantic Web: A Guide to the Future of XML, Web Services and Knowledge Management*, Wiley 2003, ISBN 0471432571.
2. Grigoris Antoniou,Frank van Harmelen, *A Semantic Web Primer*, The MIT Press,2004,ISBN-10:0-262-01210-3.
3. John Davies, Dieter Fensel, Frank van Harmelen, *Towards the Semantic Web: Ontology-driven Knowledge Management*, John Wiley & Sons, 2003, ISBN 0470858079.
4. Jorge Cardoso , *Semantic Web Services: Theory, Tools and Applications*, Idea Group Pub., 2007,ISBN 9781599040455

09IT304 MOBILE COMPUTING AND COMMUNICATION

Credits: 4: 0: 0

Course Objective:

1.To describe the technologies of Wireless, voice and data communications.
2.To have an in-depth knowledge of the principles of wireless LAN and its standards.
3.To provide an in-depth knowledge on mobile communication and wireless networking.
4.To describe the various mobile services and applications.

UNIT I

Introduction –Wireless transmission: Antennas - Spread Spectrum - Cellular systems -Medium access control: SDMA- FDMA- TDMA-CDMA– Comparison of S/T/F/CDMA - Telecommunication systems: GSM - DECT – TETRA - UMTS and IMT 2000 – Broadcast systems : Cyclic repetition of data - Digital audio broadcasting - Digital video broadcasting.

UNIT II

Wireless LAN: Infrared Vs Radio transmission - Infrastructure and adhoc networks – IEEE 802.11 – HIPERLAN– Bluetooth- Wireless ATM: WATM services - Reference model

functions- Radio access layer – Handover - Location Management – Addressing –Mobile quality of service - Access point control protocol

UNIT III

Mobile network layer: Mobile IP - Dynamic host configuration protocol - adhoc networks - Mobile transport layer : Traditional TCP-- Indirect TCP - Snooping TCP - Mobile TCP – Fast retransmit/ fast recovery - Transmission/ time-out freezing - Selective retransmission - Transaction oriented TCP - Support for mobility : File systems - World Wide Web – Wireless application protocol – i-mode – SyncML – WAP 2.0.

UNIT IV

Pervasive Computing – Information Access Devices - Smart Identification – Embedded Controls - Entertainment Systems.

UNIT V

Software – Java-Operating Systems-Client Middleware-Security-New services – Home Services - Travel and Business Services- Consumer Services

Text Books:

1.Jochen Schiller, *Mobile Communication*, Pearson Education, *Second* Edition 2003. ISBN 81-7758-263-1.

2. Uwe Hansmann, Lothar Merk, Martin S.Nicklous and Thomas Stober, *Principles of Mobile Computing*, Second Edition, Springer International Edition, 2003. ISBN 81-8120-073-3.

Reference Book:

1.Jochen Schiller, *Mobile Communication*, Pearson Education, 2000. ISBN 81-7808-170-9.

2.Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, JohnWiley and Sons Inc., 2001. ISBN 0-471-39492-0.

3.William Stallings, *Wireless Communications and Networks*, Pearson Education, 2002. ISBN 81-7758-355-7.

09IT305 - HIGH PERFORMANCE COMMUNICATION NETWORKS

Credits: 4: 0: 0

Course Objective:

The course covers fundamental principles to develop a comprehensive understanding of network architectures, protocols, control, performance, and economies, to a focus on the convergence of the telephone, computer networking, cable TV, and wireless networks that explains current and emerging networking technologies.

Prerequisites: Computer Networks

UNIT I

Packet - Switched Networks: OSI and IP models - Ethernet (IEEE 802.5) - Token Ring - FDDI - DQDB - Frame Delay – SMDS. **Internet and TCP/IP Networks:** The Internet -Overview of Internet Protocols - Internet Protocol - TCP and UDP - Internet Success and Limitation - Performance of TCP/IP Network.

UNIT II

Circuit Switched Networks: Performance of Circuit Switched Networks - SONET - Dense Wave Division Multiplexing (DWDM) - Fiber to the Home - Digital Subscriber Line (DSL) - Intelligent Networks – CATV. **ATM:** Main Features of ATM - Addressing Signaling & Routing - Header Structure - ATM Adaptation layer - Management control - BISDN - Internetworking with ATM.

UNIT III

Wireless Networks: Introduction - The wireless channel - Link level design - Channel access - Network design - Wireless Networks Today - Future Systems and standards. **Control of Networks:** Objectives and methods of control – Circuit Switched Networks –Datagram networks **–** ATM Networks

UNIT IV

Control of Networks – Mathematical Background: Markov Chains - Circuit Switched Networks –Datagram networks **–** ATM Networks. **Optical Networks:** Optical Links - DWDM Systems - Optical Cross Connects - Optical LANs-Optical paths and Networks.

UNIT V

Switching: Switch Performance Measure – Time and Space Division Switching – Modular Switch Designs – Packet Switching – Distributed Buffer – Shared Buffer – Output Buffer – Input Buffer. Global Multimedia Network: Attributes of the Global Network – Technology areas – Challenges.

Text Book:

1.Walrand. J. Varaiya, *High Performance Communication Network*, Morgan Kaufmann-Harcourt Asia Pvt., Ltd., 2nd Edition, 2000, ISBN 15-5860-574-6.

Reference Book:

1.J.F.Kurose & K.W. Ross, *Computer Networking-A top-down approach featuring the internet*, Addison Wesley, 4th Edition, 2007, ISBN 03-2149-770-8.

2.William Stallings, *ISDN & Broadband ISDN with frame Relay & ATM*, Pearson Education, 4th Edition, 2000, ISBN 81-7808-422-8.

3.Rainer Handel, Manfred N. Huber, Steffen Schroeder, *ATM Networks, Concepts, Protocols Applications*, Pearson Education, 3rd Edition, 1999, ISBN 81-7808-338-8.

4.Fred Halsall, *Data Communications, Computer Networks and Open Systems*, 4th Edition, Addison-Wesley, 1996, ISBN 81-7808-098-2.

09IT306– GRID COMPUTING

Credits: 4: 0: 0

Course Objective:

1.To understand the basic concepts of Grid Computing and the emerging technology standards on Grid infrastructure

2.To expose on the prominent toolkits and middleware solutions that impact the Grid adoption.

UNIT I

Early grid activities – Current grid activities – An overview of grid business areas – Grid applications – Grid infrastructure – Organizations developing Grid standards and best practice guidelines – Global grid forum – Organizations developing grid computing tool kits and the framework – Organizations building and using grid based solutions to solve computing, data and network requirements – Commercial organizations building and using grid based solutions. The Grid problem – Autonomic computing – Business on demand and infrastructure virtualisation – Service oriented architecture and Grid – Semantic Grids

UNIT II

Service Oriented Architecture – Web service architecture XML, Related technologies and their relevance to web services – XML messages and enveloping – Service message description mechanisms – Relationship between web service and grid service – Web service interoperability and the role of the WS-I organization. OGSA architecture and goal – Commercial data center – National fusion collaboratory – Online media and entertainment – Native platform services and transport mechanisms – OGSA hosting environment – Core networking services transport and security – OGSA infrastructure – OGSA basic services

UNIT III

Grid services – A high level introduction to OGSI – Technical details of OGSI specification – Introduction to service data concepts – Grid service: Naming and change management recommendations – Common management model – Service domains – Policy architecture – Security architecture – Metering and accounting – Common distributed logging – Distributed data access and replication.

UNIT IV

GT3 software architecture model – Service-programming model

UNIT V

Acme search service implementation in a top down approach – Resource discovery and monitoring – Resource allocation – Data management – Information services – Index services – Resource information provider service – Resource management services – Data management services – OGSI.NET framework implementation

Text Book:

1.Joshy Joseph and Craig Fellenstein, *Grid Computing*, Pearson Education, 2004. ISBN 81-297-0527-3

Reference Books:

1. Ian Foster and Carl Kesselman, *The Grid: Blueprint for a New Computing Infrastructure*, Second Edition, Morgan Kaufmann, 2004. ISBN:1558609334

09IT307 USER INTERFACE DESIGN

Credits: 4: 0: 0

Course Objective:

1.To provide an introduction to the human computer interface.
2.To address the interface and screen design from the user's perspective.
3.To gain an understanding of the reasoning behind the guidelines and use of the design methods.
4.To study and understand the testing methods.

UNIT I

Importance of the user interface: Defining the User Interface-The Importance of Good Design-A Brief History of Human Computer Interface- **Characteristics of graphical and web user interface:** The Graphical User Interface-The Web User Interface-The Merging of Graphical Business Systems and the Web**- The User interface design process:** Obstacles and pitfalls in development path-Usability.

UNIT II

Know your User or Client: Important Human Characteristics in Design-Human considerations in the design of business systems - Human interaction speed-**Understand the Business Function:** Determining Basic business Functions- Design standards and style guides-Documentation-**Understand the principles of good Screen Design:** Human Considerations in screen design.

UNIT III

Develop system menus and navigation schemes: Structures of menus – Functions of menus – Content of menus –Formatting of Menus-Phrasing the Menus-Selecting Menu choices-Navigating Menus-**Select the Proper Kinds of Windows:** Characteristics-Components-Presentation styles-Types-Managements-organizations- Web systems.

UNIT IV

Select the proper device-based controls: Characteristics-selecting proper device-based controls-**Chose the proper Screen -based controls:** Operable control – Text Entry/Read-only controls-Selection controls-Combination control-Custom control-Presentation control –**Write clear text and messages:** Text for Web pages – **Provide effective feedback, guidance & assistance :** Providing proper feedback-Guidance and Assistance-**Provide Effective Internationalization and Accessibility:** Internationalization-Accessibility-**Create Meaningful graphics, Icons and Images:** Icons- Multimedia.

UNIT V

Choose the proper Colors: Color-uses-Problems with Color –Choosing Colors for Textual Graphic screens – Choosing Colors for Statistical Graphics Screens – **Organize and Layout Windows and Pages:** Organizing and Laying Out Screens – **Test and Retest:** Prototypes - Kinds of tests – Developing and conducting a test.

Text book:

1. Wilbert. O. Galitz , *The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques*, John Wiley and Sons, 2007. ISBN 81-265-0280-0.

Reference Books:

1. Ben Shneiderman, Maxine Cohen, *Designing the user interface-Strategies forEeffective Human-Computer Interaction,* Fifth Edition, Pearson Education, 2008. ISBN:13: 9780321537355
2. JoAnn T. Hackos, Janice C. Redish, *User and Task Analysis for Interface Design,* First Edition, Wiley, ISBN :978-0471178316
3. Alan J. Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, Janet E. Finley., *Human-Computer Interaction,* Second Edition, Prentice Hall, 1998. ISBN: 978-0132398640
4. Helen Sharp, Yvonne Rogers, Jenny Preece, *Interaction Design: Beyond Human-Computer Interaction,* Second Edition, Wiley, 2007. ISBN-13: 978-0470018668

09IT308– ARTIFICIAL INTELLIGENCE FOR GAMES

Credits: 4 : 0 : 0

Course Objective:

1. To impart knowledge about the fundamentals of intelligent behavior and decision making by machines in games
2. To cover a wide range of techniques for Game AI and design its applications.

UNIT I

Introduction: What is AI? – My Model of Game AI – Algorithms, Data Structures and Representations- Game **AI:** The Complexity Fallacy - The Kind of AI in Games – Speed and Memory – The AI Engine- **Movement: The Basics of Movement Algorithms - Kinematic Movement Algorithms.**

UNIT II

Steering Behaviors: Steering Basics - Variable matching- Arrive – Seek and Flace – Arrive - Align – Velocity matching – Delegated Behaviors – Pursue and Evade- Face – Looking where you're going-Wander- Path following-Separation -Collision avoidance – Obstacle and Wall Avoidance - **Combining Steering Behaviors:** Blending & arbitration – Weighted Blending – Priorities –Cooperative Arbitration- Steering pipeline – **Predicting Physics.**

UNIT III

Jumping: Jump Points – Landing Pads – Holes Fillers **-Coordinated Movements**: Fixed Formations – Scalable formations – Emergent Formations – Two level formation steering – Implementation - Extending to more than two levels – Slot rules and Better Assignment – Slot Assignment – Dynamic slots and Plays - Tactical Movement – **Motor Control – Movement in the Third Dimension.**

UNIT IV

Path finding: The Pathfinding Graph – Dijkstra – A* - Improving A* – Hierarchical Pathfinding – Other ideas in Pathfinding – Continuous Time Pathfinding - Movement Planning – **Decision making:** Overview of Decision making – Decision trees

UNIT V

Board Games: Game Theory – Minmaxing – Transposition Tables and Memory – Turn Base Strategy Games- Memory-Enhanced Test Algorithms- Opening Books and Other set Plays – Further Optimizations - **Designing Game AI:** The Design – Shooters – Driving – Real Time strategy – sports – Turn Based strategy Games- **AI Based Game Genres**: Teaching Characters – Flocking and Herding Games

Text Book:

1. Ian Millington, *Artificial intelligence for Games*, Morgan Kaufmann Publishers, 2006. ISBN:13.978-0-12-497782-2

Reference Books:

1. Stuart Russell, Peter Norvig,, *Artificial Intelligence – A Modern Approach*, Second Edition, Pearson Education, 2004.ISBN: 81-297-0041-7.
2. Elaine Rich, Kevin Knight, *Artificial Intelligence*, Tata McGraw-Hill, 2003. ISBN:0-07-460081-8
3. Dan W Patterson, *Introduction to AI and Expert Systems*, Prentice Hall of India, 2001. ISBN:81-203-0777-1

09IT309 OPTICAL NETWORKS

Credit: 4:0:0

Course Objective:

1. To develop an in-depth understanding, in terms of architecture, protocols and applications in major optical networking technologies.
2. To solve analytical networking problems pertaining to the optical networking technologies.
3. To provide adequate exposure for successfully implement projects on optical network technologies.

UNIT I

Introduction – Telecommunication network architecture – Services – Circuit switching – Optical Networks – Optical layer – Optical packet switching – Transmission basics – Network evolution – Client layers – SONET/SDH – ATM – IP – Storage Area Networks – Gigabit Ethernet.

UNIT II

WDM network elements – Optical line terminals – Optical line amplifiers – Optical Add/Drop multiplexers – Optical cross connects – WDM Network design – Cost Trade-offs – LTD and RWA problems – Dimensioning wavelength – Routing networks – Statistical dimensioning models – Maximum load dimensioning models.

UNIT III

Control and Management – Network Management function - Optical layer services and - Layers with in optical layer - Performance and fault management configuration management - optical safety. Network suitability - Basic concepts - protection in SONET / SDH IP networks - Optical layer protection schemes - Interworking layers.

UNIT IV

Access Networks – Network architecture overview – Enhanced HFC – Fiber to the curb (FTTC) photonic packet switch – Optical TDM – Synchronization – Header processing – Buffering – Burst switching – test beds.

UNIT V

Deployment considerations – evolving telecommunication network – Designing the transmission layer – Using SDM, TDM, WDM - Long haul network metro networks.

Text book:

1. Rajiv Ramaswami, Kumar N Sivarajan, *Optical Networks* ***– A Practical Perspective***, Morgan Kaufmann Publishers, 2004. ISBN 1-55860-445-6.

Reference Books:

1. G.P. Agrawal, *Fiber optic communication systems*, Third Edition, John Wiley & Sons, New York, 2004. ISBN: 7302087490, 9787302087496**.**
2. H. Franz & V.K.Jain, "*Optical Communication Systems*", Narosa Publications, New Delhi, 1996.ISBN: 8173190615, 9788173190612

09IT310 SOFT COMPUTING

Credits: 4: 0: 0

Course Objective:

1. To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
2. To have good knowledge about neural networks and to form appropriate rules for inferencing systems
3. To familiarize genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations

UNIT I

Introduction to Artificial intelligence Systems - Fundamentals of Neural Networks - Basic concepts of Neural networks - Human Brain - Model of an Artificial Neuron - Neural Network

Architectures - Characteristics of Neural Networks - Learning Methods - Back Propagation Networks - Architecture of a back Propagation Network - Single Layer Artificial Neural Network - Back propagation Learning – Applications

UNIT II

Associative Memory – Autocorrelators – HeteroCorrelators - Exponential BAM –Applications - Adaptive Resonance Theory – Introduction - ART1 - ART2 - Applications

UNIT III

Fuzzy Logic - Fuzzy Set Theory - Fuzzy versus Crisp - Crisp Sets - Fuzzy Sets - Crisp Relations - Fuzzy Relations - Fuzzy Systems - Crisp Logic - Predicate Logic - Fuzzy Logic - Fuzzy Rule Based System - Defuzzification Methods – Applications - Fuzzy Back propagation Networks - LR-type Fuzzy numbers - Fuzzy Neuron - Fuzzy BP Architecture - Learning in Fuzzy BP - Inference by Fuzzy BP - Applications.

UNIT IV

Genetic Algorithms - Fundamentals of Genetic Algorithms - Genetic Algorithm History - Basic Concepts - Creation of Offsprings - Working Principle – Encoding - Fitness Function – Reproduction - Genetic Modeling - Inheritance operators – Crossover - Inversion and Deletion - Mutation operator - Bitwise Operators - Generational Cycle - Convergence of Genetic Algorithm – Applications - Multilevel Optimization - Real life problem - Differences and similarities between GA and other traditional methods - Advances in GA - Genetic algorithm based BPN - GA Based Weight Determination - Applications

UNIT V

Hybrid Systems - Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms – Simplified fuzzy ART map-Working of Simplified fuzzy ART map-Application-Recent trends-Fuzzy Associative Memories - FAM, An introduction - Single Association FAM - Fuzzy Hebb FAMs - FAM involving a Rule Base - FAM Rules with Multiple Antecedents/Consequents – Applications

Text Book:

1. S.Rajasekaran and G.A. Vijayalakshmi Pai, *Neural Networks, Fuzzy Logic, And Genetic Algorithms Synthesis and Applications,* Prentice Hall India, 2003.ISBN-81-203-2186-3.

Reference books:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, *Neuro-Fuzzy and Soft Computing,* PHI, 2004. ISBN 9789861540443.
2. Timothy J.Ross, *Fuzzy Logic with Engineering Applications,* Wiley publications,2005.ISBN:9780470860748.
3. Frank Hoffmann, Mario Köppen, Frank Klawonn, Rajkumar Roy, *Soft Computing: Methodologies and Applications,* Published by Birkhäuser, 2005. ISBN: 3540257268.
4. Andrea Bonarini, Francesco Masulli, Gabriella Pasi, *Soft Computing Applications Published by Springer*, 2003. ISBN :3790815446.
5. Vojislav Kecman, *Learning and Soft Computing: Support Vector Machines, Neural Networks, and Fuzzy Logic Models*, Published by MIT Press, 2001. ISBN: 0262112558.

09IT311 MULTIMEDIA DATABASE

Credits 4:0:0

Course Objective:

1. To study the design, indexing and retrieval of centralized and distributed Multimedia Database.
2. To introduce trends in Multimedia Data Management and Mining used for Electronic Enterprise.

UNIT 1

Introduction - Multimedia Data Types and Formats - Multimedia Database Design Issues.

UNIT II

Text Document Indexing and Retrieval - Indexing and Retrieval of Audio - Image Indexing and Retrieval

UNIT III

Video Indexing and Retrieval - Integrated Multimedia Indexing and Retrieval -. Techniques and Data Structures for Efficient Multimedia Similarity Search.

UNIT IV

System Support for Distributed Multimedia Databases: Introduction - QoS Management - Design Goals of Multimedia Systems - Multimedia Data Storage Devices and Management - Multimedia Computer Architectures - Multimedia Operating Systems - Multimedia Networks - Multimedia Transport Protocols - Achieving Overall Synchronous Presentation.

UNIT V

Measurement of Multimedia Information Retrieval Effectiveness - Products, Applications and New Developments - Multimedia for Web and E-Commerce - Multimedia for Collaboration, Knowledge Management and Training for the Web - Security and Privacy Considerations for Managing and Mining Multimedia Databases - Standards, Prototypes and Products for Multimedia Data Management and Mining.

Text Books:

1. Guojun Lu, *Multimedia Database Management Systems*, First Edition, Artech House Publishers, 1999. ISBN: 0890063427, 9780890063422.
2. Bhavani M. Thuraisingham, *Managing and Mining Multimedia Databases*, First Edition, CRC Press, 2001. ISBN: 0849300371, 9780849300370

Reference Books:

1. Lynne Dunckley, *Multimedia Databases*, First Edition, Addison-Wesley, 2003. ISBN :0201788993, 9780201788990.
2. Kingsley C. Nwosu, Bhavani M. Thuraisingham, P. Bruce Berra, *Multimedia Database Systems*, First Edition, Springer, 1996. ISBN: 0792397126, 9780792397120.

09IT312 INTERNETWORKING MULTIMEDIA

Credits: 4:0:0

Course Objective:

1. To identify and analyze the requirements that a distributed multimedia application may enforce on the communication network.
2. To include all the important aspects that has significant impact on the enhancements to the basic Internet architecture and its associated protocols.

UNIT I

Introduction: A brief history of Real time : Content and delivery-From letters and numbers to sound and vision-Analogue and digital-Protocols-Internet Service models-Multicast in the internet-Transport Protocols-Multimedia Sessions-Conference Membership and Reception feedback-Security-Application other than Audio and Video-**Network service models:** Sharing and caring-Service schedules and Queues-Evolution of the internet service models-Resource reservation protocol (RSVP), Service classes and assurance-Detailed analysis of the integrated services-Host functions- Resource reservation protocol (RSVP)revisited-QoS routing-Futures-IP and ATM-Recent simplified approaches to service differentiation.

UNIT II

Multicast - Coding and compression: Host Functions -Routing and addressing-Multicast routing-Multicast scoping-Reliable multicast transport- Calling down traffic on a Site-**Coding and compression:** System Components-Nature of the signal-lossless data compression-Audio-Still image-Moving image-Multiplexing and synchronizing-performance-Processing requirements for video Compression.

UNIT III

Transport Protocols: Introduction-TCP adoption algorithms-MPEG systems-Transport and program streams-RTP-Synchronization-Reliable multicast transport-**Session Directories, Advertisement and Invitation protocols:** Session Description protocol **(**SDP)-Session announcement protocol (SAP)-Section initiation protocol (SIP)-**Conference Controls:**ITU model H.320/TGCC-MMCC a Centralized Internet model-CCCP distributed Internet model-Using ISDN to do IP access to the Mbone.

UNIT IV

Applications: Introduction-**Shared applications in the Mbone**: Design-Limitations of the data model-Usability Issues-Asynchronous events-Generalizing the models-**Distributed virtual reality:** General idea and problems-Virtual reality operations, user views and network considerations-application model-Distributed virtual reality multicast protocol (DVRMP).

UNIT V

Media - On – Demand: Recording and playing back Mbone sessions- Recording -Remote control of playback-**Security and Policy in Multicast Multimedia:** Introduction-Roadmap-A brief introduction to cryptographic technology-Network-level solutions-media encryption-key distribution.

Text Book:

1. Jon Crowcroft, Mark Handley, Ian Wakeman, *Internetworking Multimedia*, Publisher: Morgan Kaufmann; Illustrated Edition, 1999, ISBN: 1558605843.

Reference Books:

1. B.O. Szuprowicz, *Multimedia Networking*, McGraw Hill, NewYork. 1995. ISBN-13: 978-0070631083
2. Tay Vaughan, *Multimedia Making it work*, Sixth Edition, Tata McGraw-Hill, 2003. ISBN-13: 978-0072230000.

09IT313 COMPUTER VISION

Credits: 4:0:0

Course objective:

1. To understand the concepts in computer Vision
2. To provide Knowledge on basic geometry, physics of imaging and probabilistic techniques.

UNIT I

Image Formation and Image Model: Cameras: Pinhole Cameras-Cameras with Lenses, The Human Eye, Geometric Camera Models: Elements of Analytical Euclidean Geometry-Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations, Geometric Camera Calibration: Least Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account.

UNIT II

Radiometry Measuring Light: Light in space, Light at Surfaces ,Important Special Cases, Sources, Shadows and Shading: Qualitative Radiometry Sources and their effects, Local Shading Models, Color: The Physics of Color, Human Color Perception, Representing Color, A Model For Image Color, Surface Color from Image Color.

UNIT III

Linear Filters: Linear Filters and Convolution, Shift Invariant Linear System, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, Technique Normalizes Co-relation and Finding Pattern, Edge Detection: Noise, Estimating Derivatives, Detecting Edges, Texture: Representing Texture, Analysis Using Oriented Pyramids, Application: Synthesizing Textures for Rendering, Shape From Texture.

UNIT IV

The Geometry of Multiple Views: Two Views, Three Views, More Views, Stereopsis: Reconstruction, Human Stereopsis, Binocular Fusion, sing More Camera, Affine Structure from Motion: Elements of Affine Geometry, Affine Structure and Motion from Two Images, Affine Structure and Motion from Multiple Images, From Affine to Euclidean Images, Affine Motion Segmentation, Projective Structure from Motion: Elements Of Projective Geometry, Projective Structure and Motion from Binocular Correspondences, Projective Motion Estimation from Multi-linear Constraints.

UNIT V

Segmentation By Clustering: Human Vision: Grouping and Gestalt, Applications: short Boundary detection and Background subtraction, Image Segmentation by Clustering Pixels, Segmentation By Graph-Theoretic Clustering, Segmentation By Fitting a Model: The Hough Transform, Fitting Lines, fitting Curves, Segmentation and Fitting Using Probabilistic Methods: Missing Data Problems, Fitting and Segmentation

Text Book:

1. David A.Forsyth, Jean Ponce, *Computer Vision A Modern Approach,* Prentice Hall, 2003. ISBN-81-203-2372-6

Reference Book:

1. Linda G. Shapiro, George C. Stockman ,*Computer Vision*, Published by Prentice Hall,2001. ISBN 0130307963, 9780130307965
2. Dana H. Ballard, Christopher M. Brown, *Computer Vision,2003*. Prentice Hall, ISBN:13:9780131653160 ISBN: 0131653164

09IT314 MULTIMEDIA INFORMATION MANAGEMENT

Credits: 4 : 0 : 0

Course Objective:

1. To introduce the fundamental concepts of content based information retrieval of images, Audio and video.
2. To learn the multimedia content description standard, which provides a standardized metadata System.
3. To Analyze and examine their use in Multimedia Application.

UNIT I

Fundamentals of content-based image retrieval: Introduction, Image Content Descriptors, Similarity Measures and Indexing Schemes, User Interaction, Performance Evaluation. **Content-based video analysis, retrieval and browsing:** Introduction, Video Structure Analysis, Video Content Representation, Video Abstraction and Summarization, Content-based Video retrieval and Browsing. **Relevance feedback in content-based image retrieval:** Introduction, Relevance Feedback Algorithms, An Integrated Relevance Feedback Framework.

UNIT II

Video analysis and summarization at structural and semantic levels: Introduction, Scene analysis, Event analysis, Video Summarization. **Content-based retrieval for digital audio and music:** Introduction, Audio Feature Extraction, Generic Audio Classification and retrieval ,Music Content Analysis, Content-based Music Retrieval, Case Study. **MPEG-7 Multimedia Content Description Standard:** Introduction, Context and Applications, MPEG-7 Constructs, MPEG-7 Conceptual Model, MPEG-7 Description Definition Language, MPEG-7 Multimedia Description Schemes, MPEG-7 Audio Description Tools, MPEG-7 Visual Description Tools, Beyond MPEG-7.

UNIT III

Multimedia authentication and watermarking: Introduction, The Multimedia authentication paradigm, Multimedia authentication schemes. **Indexing and retrieving high dimensional visual features**: Introduction, The R-Tree Family, The CSS+-Tree, Handling Varying Distance Metrics, Dimension Reduction. **A semantic data modelling mechanism for a Multimedia database:** Introduction, Semantic and Multimedia Data Modelling Techniques, MediaView: A Semantic Modelling Mechanism, Applications of MediaView.

UNIT IV

Feature-based retrieval in visual database systems: Introduction, Visual Database System Design, Metadata Hierarchy, Querying on Heterogeneous Features. **Digital library:** Digital Library Defined, Digital Library Initiative (Phase I), DLI Projects, DLI-Phase2. **Scalable storage for digital libraries:** Introduction, Motivation, Subject Areas, Local File Systems, Workload Studies, Local File System Performance Issues, Disk Arrays, Networked Storage.

UNIT V

Object repositories for digital libraries: Introduction, Digital Objects vs. Files, Naming and Location, Redundant Encoding for Reliability, Metadata, Digital Object Repositories. **Information discovery on the world-wide-web:** Introduction, Web-structure Mining, Web-log mining. **Cooperative Multimedia Information systems:** Introduction, Review of Cooperative Multimedia Information Systems, Architectural examples, Management Issues.

Text Book:

1. David Dagan Feng, Wan-Chi Siu, Hong-Jiang Zhang (Eds.), *Multimedia Information Retrieval and Management Technological Fundamentals and Applications*, Springer, 2003. ISBN: 978-3-540-00244-4

Reference Books:

1. Soon M. Chung, *Multimedia Information Storage and Management*, Edition: illustrated, Springer, 1996. ISBN: 0792397649, 9780792397649
2. William I. Grosky, Ramesh Jain, Rajiv Mehrotra, *The Handbook of Multimedia Information Management*, Prentice Hall PTR, 1997. ISBN: 0132073250, 9780132073257

09IT315 MULTIMEDIA SYSTEMS DESIGN

Credits: 4: 0: 0

Course Objective:

1. To provide a more dynamic fully integrated multimedia working systems by combining audio and video with text, image, graphics and animation.
2. To present step-by-step approach to multimedia system design.
3. To introduce multimedia standards, compression and decompression technologies as well as various storage technologies.

UNIT 1: INTRODUCTION

Multimedia Elements-Applications - System architecture – Evolving Technologies - Objects - Multimedia Data Interface Standards - The Need For Data Compression- Multimedia Databases - Types of Compression – Binary Image compression Schemes – Color, Gray Scale And Still-video Image Compression - Video image compression – Audio Compression.

UNIT II: FILE FORMATS AND INPUT/OUTPUT TECHNOLOGIES

RTF - TIFF - RIFF - MIDI - Key Technology Issues - Pen Input - Video And Image Display Systems – Print Output Technologies – Image Scanners - Digital Voice And Audio – Digital Camera.

UNIT III: STORAGE AND RETRIEVAL

Magnetic Media Technology - Optical media – Hierarchical Storage Management - Cache management - Architectural and Telecommunication Considerations - Specialized Computational Processors- Memory Systems-Multimedia Board Solutions-LAN/WAN Connectivity-Distributed Object Models.

UNIT IV: APPLICATION DESIGN

Application classes - Virtual reality design – Organizing Databases – Application Workflow Design Issues – Distributed Application Design Issues - Authoring Systems - Hypermedia - UID - Information Access - Hypermedia Messaging- Mobile Message – Components - Linking and Embedding – Creating Hypermedia Messages – Message Standards – Integrated Document Management.

UNIT V: DISTRIBUTED MULTIMEDIA SYSTEMS AND SYSTEM DESIGN

Components - Client-Server Operation – Object Servers – Multiserver Network Topologies - Databases - Managing Objects - System Design Methodology And Considerations-Multimedia Systems Design Example - IFC.

Text Book:

1. Prabhat K. Andleigh and Kiran Thakrar , *Multimedia Systems Design*, Prentice Hall, 2008, ISBN -978- 81-203-2177-9.

Reference Book:

1. Nigel Chapman and Jenny Chapman, *Digital Multimedia* , John Wiley and Sons Private Limited, 2001, ISBN: 0471983861.
2. Ze-Nian Li. Mark S. Drew, *Fundamentals of Multimedia*,First Edition 2004, ISBN: 81-297-0-438-2.
3. Tay Vaughan, *Multimedia Making it work*, Sixth Edition, Tata McGraw-Hill, 2003. ISBN-13: 978-0072230000.
4. John F. Koegel Buford, *Multimedia Systems*, Third Edition, 2000, ISBN: 8177588273.
5. Gaurav Bhatnager, Shikha Mehta, Sugata Mitra, *Introduction to Multimedia Systems*, 1st Edition, 2004, ISBN: 0125004524.

09IT316 ANALYSIS, ARCHITECTURE AND DESIGN OF NETWORKS

Credits: 4: 0: 0

Course Objective:

This course covers the principles of network analysis, architecture, and design. These principles help in identifying and applying the services and performance levels that a network must satisfy. Principles of network analysis include network service characteristics, performance characteristics, network requirements analysis, and network flow analysis. Principles of network architecture and design include addressing and routing, network management architecture, performance architecture and design, security and privacy architecture, and quality of service design.

Prerequisites: Computer Networks

UNIT I

Introduction – Overview of Analysis, Architecture and Design Processes – A Systems Methodology – System Description – Service Description – Service Characteristics – Performance Characteristics – Network Supportability. **Requirements Analysis: Concepts** – User Requirements – Application Requirements – Device Requirements – Network Requirements – Other Requirements – The Requirements Specification and Map.

UNIT II

Requirements Analysis: Process – Gathering and Listing Requirements – Developing Service Metrics – Characterizing Behavior – Developing RMA Requirements – Developing Delay Requirements – Developing Capacity Requirements – Developing Supplemental Performance Requirements – Environment-Specific Thresholds and Limits – Requirements for Predictable and Guaranteed Performance – Requirements Mapping – Developing the Requirements Specification – **Flow Analysis:** Flows – Identifying and Developing Flows – Data Sources and Sinks – Flow Models – Flow Prioritization – Flow Specification – Example Application of Flow Analysis.

UNIT III

Network Architecture: Component Architectures – Reference Architecture – Architectural Models – Systems and Network Architectures – **Addressing and Routing Architecture:** Addressing Mechanisms – Routing Mechanisms – Addressing Strategies – Routing Strategies – Architectural Considerations.

UNIT IV

Network Management Architecture: Defining Network Management – Network Management Mechanisms – Architectural Considerations – **Performance Architecture:** Developing Goals for Performance – Performance Mechanisms – Architectural Considerations – **Security and**

Privacy Architecture: Developing a Security and Privacy Plan – Security and Privacy Administration – Security and Privacy Mechanisms – Architectural Considerations.

UNIT V

Network Design: Design Concepts – Design Process – Vendor, Equipment, and Service-Provider Evaluations – Network Layout – Design Traceability – Design Metrics - **Selecting Technologies for Network Design**: Developing Goals for Network Design – Developing Criteria for Technology Evaluation – Guidelines and Constraints on technology Evaluations – Making Technology Choices for the Network Design – **Interconnecting Technologies within the Network Design:** Shared medium (No Interconnection) – Switching – Routing – Hybrid Mechanisms – Applying Interconnection Mechanisms to the Design.

Text Book:

1.James D. McCabe, *Network Analysis, Architecture and Design*, Third Edition, Elsevier, 2007. ISBN: 978-0-12-370480-1.

Reference Books:

1. James D. McCabe, *Network Analysis, Architecture and Design*, Second Edition, Elsevier, 2003. ISBN: 1-55860-887-7.
2. Andrew S. Tanenbaum, *Computer Networks*, Fourth Edition, Prentice Hall, Upper Saddle River, New Jersey, 2003. ISBN: 0-13-066102-3

09IT317 WIRELESS NETWORKS LAB

Credits: 0:0:2

1. Study of Wireless Network
2. Simulation of Ad hoc Network
3. Throughput Calculation using ns-2
4. Performance Evaluation of TCP over Wireless Network
5. Evaluation of Routing Protocol in Wireless Network using ns-2
6. Performance Analysis of MANET Routing
7. Evaluation of Multicast Protocols
8. Simulation of WLAN using OPNET
9. Realization of MIDlet Life-Cycle
10. Mobile Tips Calculator
11. WLAN Troubleshooting and Monitoring
12. Realization of WLAN using WAP and Wireless-B, G Adaptors and Throughput Calculation

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT318 INTERNETWORKING AND WEB TECHNOLOGY LAB

Credits: 0:0:2

1. Client - Server chat using TCP
2. Client - Server chat using UDP

3. File Transfer using FTP
4. Data Dictionary
5. IP Addressing and Subnet Masking
6. Online shopping using Request and Response Object
7. Online Quiz using Cookies
8. Changing background Color using Session Objects
9. Active Data Objects
10. Creating menu Using CSS and Ajax
11. Changing webpage style using DHTML and Ajax

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT319 NETWORK DESIGN AND MANAGEMENT LAB

Credits: 0:0:2

1. Introduction to NS-2 and Installation Guide
2. Throughput Calculation using AWK Scripts and Band width Calculation using Loss Monitor
3. Simulation of TCP using NS-2
4. Performance evaluation of Routing Protocols
5. Performance evaluation of Different Queues and effect of Queues and buffer
6. Ping implementation using NS2
7. Introduction of OPNET and theory about OPNET
8. Simulation of LAN and Ethernet
9. Simulation of Switched LAN
10. Network Design
11. Simulation of TCP
12. Simulation of UDP

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT320 INFORMATION SECURITY LAB

Credits: 0:0:2

1. Substitution Cipher and Transposition Cipher
2. One time Pad
3. Simplified DES
4. Vignere Cipher
5. RSA
6. Diffie-Hellman Key Exchange
7. Frequency Analysis on Caesar Cipher
8. Feistel Cipher
9. Digital Signature algorithm
10. HMAC

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT321 DIGITAL IMAGE PROCESSING LAB

Credits: 0:0:2

1. Image Enhancement using point operations - contrast Stretching, Clipping, Histogram Equalization
2. Image Transforms - DFT, DCT, Wavelet
3. Image Compression - DCT
4. Image Compression - Wavelet
5. Image Restoration - Inverse, Pseudo-Inverse, Wiener
6. Edge Detection - Sobel, Canny, Isotropic
7. Edge Detection - Laplacian of Gaussian, Zero Crossing
8. Image Filters - Spatial and Frequency Domain filters, Average, Weighted Average, Median
9. Image Quantization - Uniform Quantizer
10. Arithmetic & Logic operations - Zooming ,Shrinking
11. Color Image Processing - Color Model conversion, Pseudo Coloring
12. Image Morphology

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

09IT322 COMPUTER GRAPHICS LAB

Credits: 0:0:2

1. To implement Bresenham's algorithms for line,circle and ellipse drawing.
2. To perform 2D Transformations such as translation,rotation,scaling,reflection and sharing.
3. To implement Cohen-Sutherland 2D clipping and window-viewpoint mapping.
4. To perform 3D Transformations such as translation,rotation and scaling.
5. To visualize projections of 3D images.
6. To convert between color models.
7. To implement text compression algorithm
8. To implement image compression algoithm
9. To perform animation using any Animation Software
10. To perform basic operations on image using any image editing software

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

INFORMATION TECHNOLOGY

ADDITIONAL SUBJECTS

S.No.	Subject Code	Subject Name	Total Credits
1	10IT201	Principles of Mobile Communication	3:0:0
2	10IT202	Essentials of Information Technology	3:0:0
3	10IT203	Essentials of Information Technology	3:0:0

10IT201 PRINCIPLES OF MOBILE COMMUNICATION

Credits: 3:0:0

Course Objectives:

- To impart the fundamentals concepts of mobile communication systems.
- To introduce various technologies and protocols involved in mobile communication.

UNIT I

History of Mobile Communication, Simplified Reference Model, Wireless Transmission- Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular Systems, Medium Access Control- SDMA, FDMA, TDMA, and CDMA ; Comparison of S/F/T/CDMA.

UNIT II

Telecommunication Systems- GSM, DECT, TETRA, UMTS and IMT- 2000; Satellite Systems- Basics - Routing - Localization – Handover.

UNIT III

Wireless LAN- Infrared Vs radio transmission, Infrastructure and ad hoc networks, IEEE802.11, HYPERLAN, and Bluetooth.

UNIT IV

Wireless ATM-Motivation, Working group, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Quality of service, Access point control protocol; Mobile network layer- Mobile IP, Dynamic host configuration protocol, Ad-hoc networks.

UNIT V

Mobile transport layer- Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmission/ fast recovery, Selective retransmission, Transaction oriented TCP; Support for mobility-Wireless application protocol, mode, SyncML, WAP2.0.

Text Book:

1. Jochen Schiller, *Mobile Communications*, Pearson Education, Second Edition, 2004. ISBN-10: 0321123816, ISBN-13: 9780321123817.

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, John Wiley and Sons, Second Edition, 2001. ISBN: 0-471-39492-0.
2. Jochen Schiller, *Mobile Communications*, Pearson Education, First Edition, 2000.

10IT202 ESSENTIALS OF INFORMATION TECHNOLOGY

Credits: 3:0:0

Course Objectives:

- To provide extensive knowledge on IT Essentials including client-server modeling, designing data store, and working with Internet.
- To document artifacts using common quality standards.

UNIT I

Fundamentals of Computer architecture-introduction-organization of a small computer-Central Processing Unit - Execution cycle – Instruction categories – measure of CPU performance Memory – Input/output devices - BUS-addressing modes. System Software –Assemblers – Loaders and linkers – Compilers and interpreters. Operating system – introduction – memory management schemes Process management Scheduling – threads.

UNIT II

Problem solving with algorithms- Programming styles – Coding Standards and Best practices - Introduction to C Programming Testing and Debugging. Code reviews System Development Methodologies – Software development Models User interface Design – introduction – The process – Elements of UI design and reports.

UNIT III

RDBMS- data processing – the database technology – data models. ER modeling concept – notations – Extended ER features. Logical database design – normalization SQL – DDL statements – DML statements – DCL statements. Writing Simple queries – SQL Tuning techniques – Embedded SQL – OLTP.

UNIT IV

Objected oriented concepts – object oriented programming. UML Class Diagrams– relationship – Inheritance – Abstract classes – polymorphism Object Oriented Design methodology - Common Base class Alice Tool – Application of OOC using Alice tool.

UNIT V

Client server computing - Internetworking – Computer Networks – Working with TCP/IP – IP address – Sub netting – DNS – VPN – proxy servers World Wide Web – Components of web application - browsers and Web Servers URL – HTML – HTTP protocol – Web Applications - Application servers – Web Security.

Text Books:

1. Andrew S. Tanenbaum, *Structured Computer Organization*, PHI, Fifth edition, 2005. ISBN-10: 0131485210, ISBN-13: 978-0131485211.
2. Andrew Tanenbaum, *Modern Operating Systems*, Pearson Education, Third Edition, 2007. ISBN-10: 0136006639, ISBN-13: 9780136006633.
3. Alfred V.Aho, Ullman, Hopcroft, *Data Structures and Algorithms*, Addison-Wesley. ISBN: 0-201-00023-7.
4. Yashwant Kanitker, *Let Us C*, Second Edition. **ISBN**-10: 8176566217, **ISBN**-13: 978-8176566216.
5. Tharp Alan L, *File Organization and Processing*, John Willey and Sons. ISBN: 978-0-471-60521-8.
6. Elmasri, Navathe, *Fundamentals of Database Systems*, Addison Wesley, Fifth Edition, 2006. ISBN-10: 0321369572, ISBN-13: 978-0321369574.

Reference Books:

1. Andrew S. Tanenbaum, *Structured Computer Organization*, PHI, Fourth edition, 1998. ISBN-10: 0130959901, ISBN-13: 978-0130959904.
2. Dromey, R.G., *How to solve it by computer*, Prentice Hall, 2004.
3. Jon Bentley, *Programming Pearls*, Pearson Education, Second Edition, 2006. ISBN: 8177588583.
4. Aho, Alfred V, *Compiler Principles, Techniques and Tools*, Pearson Education, 2007. ISBN-10: 0321491696, ISBN-13: 978-0321491695.

10IT203 ESSENTIALS OF INFORMATION TECHNOLOGY

Credits: 3:0:0

Course Objectives:

- To provide extensive knowledge on IT Essentials including client-server modeling, designing data store, and working with Internet.
- To document artifacts using common quality standards.

UNIT I

Fundamentals of Computer architecture-introduction-organization of a small computer-Central Processing Unit - Execution cycle – Instruction categories – measure of CPU performance Memory – Input/output devices - BUS-addressing modes. System Software –Assemblers – Loaders and linkers – Compilers and interpreters. Operating system – introduction – memory management schemes Process management Scheduling – threads.

UNIT II

Problem solving with algorithms- Programming styles – Coding Standards and Best practices - Introduction to C Programming Testing and Debugging. Code reviews System Development Methodologies – Software development Models User interface Design – introduction – The process – Elements of UI design and reports.

UNIT III

RDBMS- data processing – the database technology – data models. ER modeling concept – notations – Extended ER features. Logical database design – normalization SQL – DDL statements – DML statements – DCL statements. Writing Simple queries – SQL Tuning techniques – Embedded SQL – OLTP.

UNIT IV

Objected oriented concepts – object oriented programming. UML Class Diagrams– relationship – Inheritance – Abstract classes – polymorphism Object Oriented Design methodology - Common Base class Alice Tool – Application of OOC using Alice tool.

UNIT V

Client server computing - Internetworking – Computer Networks – Working with TCP/IP – IP address – Sub netting – DNS – VPN – proxy servers World Wide Web – Components of web application - browsers and Web Servers URL – HTML – HTTP protocol – Web Applications - Application servers – Web Security.

Text Books:

1. Andrew Tanenbaum, Modern Operating Systems, Pearson Education, Third Edition, 2007. ISBN-10: 0136006639, ISBN-13: 9780136006633.
2. Elmasri, Navathe, Fundamentals of Database Systems, Addison Wesley, Fifth Edition, 2006. ISBN-10: 0321369572, ISBN-13: 978-0321369574.

Reference Books:

1. Sivasubramanyam Y, Deepak Ranjan Shenoy, Foundation Program - Computer Hardware & System Software Concepts, version 1.0 Vol-1, Infosys: Campus Connect 2008.
2. Hanumesh V.J.,Seema Acharya, Foundation Program - Relational Database Management System, Client Server Concepts, Introduction to Web technologies version 1.0 Vol-2, Infosys: Campus Connect 2008.
3. Sundar K.S., Foundation Program - Analysis of Algorithms, Object Oriented Concepts, System Development Methodology, User Interface Design version 1.0 Vol-3, Infosys: Campus Connect 2008.

DEPARTMENT OF INFORMATION TECHNOLOGY

REVISED AND NEW SUBJECTS

Subject Code	Subject Name	Credits
10IT301	Advanced Communication Engineering	3:0:0
10IT302	Principles of Digital Multimedia	4:0:0
10IT303	Computer Graphics	3:0:0
10IT304	Web Design	4:0:0
10IT305	Multimedia Communication	4:0:0
10IT306	Computer Animation	3:0:0
10IT307	3D Modelling and Rendering	4:0:0
10IT308	Web Design Lab	0:0:2
10IT309	Animation Lab	0:0:2
10IT310	Software Project Management	3:0:0
10IT311	Internetworking	4:0:0
10IT312	Network Management	3:0:0
10IT313	Virtual Reality Technology	4:0:0
10IT314	Artificial Intelligence	4:0:0
10IT315	Pattern Recognition	4:0:0
10IT316	Wireless Security	4:0:0
10IT317	Soft Computing	4:0:0
10IT318	Soft Computing Lab	0:0:2
10IT319	Computer Vision Lab	0:0:2
10IT320	Web Technology	4:0:0
10IT321	Cloud Computing	3:1:0
10IT322	Mathematical Foundation for Image and Video Processing	4:0:0

10IT301 ADVANCED COMMUNICATION ENGINEERING

Credits: 3:0:0

Course Objectives:

- To impart in-depth knowledge on the basic concepts of Modern Digital and Data Communications Systems and Networks
- To provide better understanding of Optical fiber Transmission, Satellite and Microwave Radio Communication

Unit I

Digital Modulation and Transmission: Introduction-Information capacity-Amplitude Shift Keying-Frequency Shift Keying-Phase Shift Keying-Quadrature Amplitude Modulation-Bandwidth Efficiency-Carrier recovery-Clock Recovery-Differential Phase Shift Keying-Trellis Code Modulation-Pulse Modulation-PCM sampling-Signal to Quantization Noise Ratio-PCM codes-Coding Methods-Companding-Vocoders-Delta Modulation PCM-Differential PCM-Pulse Transmission.

Unit II

Data Communications: History of DataCommunications-NetworkArchitecture-Protocols-Standards-Organizations -Layered Network Architecture-Open System Interconnection-Circuits-Serial and Parallel Data Transmission-Circuit Arrangements-Networks-Codes-

Error control, detection and correction-Character Synchronization-Data communication hardware-Line control Unit- Modems.

Unit III

Data Link Protocols and Networks: Protocol Functions-Character and Bit Oriented Data link protocols-Asynchronous and Synchronous Data link protocol-Synchronous and High level Data link control-Public Switched Data Networks-CCITT X.25 User to Network Interface Protocol-Integrated Services Digital Network-Asynchronous Transfer Mode-Local Area Networks-Ethernet.

Unit IV

Digital Multiplexing and Optical Fiber Transmission: Time Division Multiplexing-T1 Digital Carrier-Line Encoding-T Carrier Systems-Digital Carrier Frame Synchronization-Bit versus Word Interleaving-Statistical Time Division Multiplexing-Codecs and Combo chips-Frequency Division Multiplexing-Wavelength Division Multiplexing-History of Optical Fiber Communications-Optical Fibers versus Metallic Cable Facilities-Electromagnetic spectrum-Optical fiber communications system –Fiber types-Light Propagation-Optical Fiber Configurations and Classifications-Losses in Optical Fiber Cables-Light Sources-Optical Sources-Light Detectors-Lasers.

Unit V

Microwave Radio Communications and Satellite Communications: Introduction-Advantages and Disadvantages of Microwave Radio-Analog versus Digital Microwave-FM Microwave Radio System-Radio Repeaters- Radio Stations- Diversity-Protection Switching Arrangements-Microwave Repeater Station-History of satellites-Keplers Laws-Satellite orbits-Geosynchronous satellites-Antenna Look angles-Satellite classifications-Spacing and Frequency Allocation-Radiation Patterns-Satellite System Link Models.

Text Book:

1. Wayne Tomasi, *Advanced Electronic Communication Systems*, Sixth Edition, Prentice Hall of India, 2005. ISBN: 81-203-2497-8.

Reference Books:

1. George Kennady, Bernard Davis, *Electronic communication systems*, Fourth Edition, Tata McGraw Hill. ISBN: 978-0-07-463682-4.
2. Hebert Taub, Donald L Schilling, *Principles of Communication Systems*, Third Edition, Tata McGraw Hill, 2008. ISBN: 978-0-07-064811-1.
3. Simon Haykins, *Communication Systems*, Fifth Edition, Wiley Publications, 2009. ISBN: 978-0471697909.
4. Timothy Pratt, *Satellite Communications*, Second Edition, John Wiley & Sons, 2003. ISBN: 9814-12-684-5.
5. Ray Horak, *Communication Systems and Networks*, Third Edition, Wiley Publications, 2002. ISBN: 978-0764548994.

10IT302 PRINCIPLES OF DIGITAL MULTIMEDIA

Credits: 4:0:0

Course Objectives:

- To describe the tools and taxonomy of multimedia authoring.

- To have an in-depth knowledge of data compression, multimedia, multimedia networks, and multimedia data representations.

Unit I

Multimedia Authoring and Data Representations: Introduction to Multimedia – Multimedia and Hypermedia – World Wide Web – Overview of Multimedia Software Tools – Multimedia Authoring – Some useful editing and authoring tools – VRML – Graphics/Image Data Types – Popular file formats – Color science – Color models in images – Color models in video.

Unit II

Types of video signals – Analog video – Digital video -Digitization of sound – MIDI – Quantization and transmission of audio – Multimedia data Compression: lossless compression algorithms – Lossy compression algorithms.

Unit III

Image compression standards- Basic video compression techniques – Introduction to video compression – Video compression based on motion compensation – Search for motion vectors – H.261 – H.263 –MPEG video coding – MPEG 1 – MPEG 2 – Overview of MPEG 4 – Object based visual coding in MPEG 4 – Synthetic object coding in MPEG 4 – MPEG 4 Object types – Profiles and Levels – MPEG 4 part 10/H.264 –MPEG 7 – MPEG 21.

Unit IV

Basic audio compression techniques – ADPCM in speech coding – G.726 ADPCM vocoders. MPEG Audio compression: Psychoacoustics – MPEG audio – Other commercial audio codecs – The future of MPEG 7 and MPEG 21.Computer and multimedia networks: Basics of computer and multimedia networks –Multiplexing technologies – LAN and WAN – Access networks – Common peripheral interfaces. Multimedia network communication and applications: Quality of multimedia data transmission – Multimedia over IP – Multimedia over ATM networks – Transport of MPEG 4 – Media on Demand.

Unit V

Wireless Networks: Radio propagation models – Multimedia over wireless networks – Content based retrieval in digital libraries – Image retrieval – C- BIRD – Case study – Synopsis of current image search systems – Relevance feedback – Quantifying results – Querying over videos – Querying on other formats – Outlook for content based retrievals. Computer Based Animation.

Text Book:

1. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, Pearson Education, 2004. ISBN 81-297-0438-2.

Reference Books:

1. Ralf Steinmetz, Klara Nahrstedt, *Multimedia Fundamentals*, Pearson Education, Second Edition, 2004. ISBN: 978-81-317-0976-4.
2. J-R Ohm, *Multimedia Communication Technology*, Springer-Verlag, 2004. ISBN: 3-540-01249-4.
3. Daniel Cunliffe, Geoff Elliott, *Multimedia Computing*, Crucial, 2003. ISBN: 1-903337-18-6.

10IT303 COMPUTER GRAPHICS

Credits: 3:0:0

Course Objectives:

- To understand the foundations of computer graphics: hardware systems, math basis, light and colour.
- To implement key components of the rendering pipeline, especially visibility, rasterization, viewing, and shading.
- To appreciate the complexities of modelling realistic objects through modelling complex scenes using a high-level scene description language.
- To acquaint with few advanced topics in computer graphics.

Unit I

Video Display Devices – Raster Scan Systems **–** Line Drawing Algorithms – Parallel Line Algorithms – Setting Frame Buffer Values – Circle Generating Algorithms – Ellipse Generating Algorithms – other Curves – Parallel curve Algorithms – Pixel addressing and object Geometry – Fill area Primitives – Polygon Fill Areas – Attributes of Graphics Primitives: Line Attributes – Curve attributes – Fill area Attributes – General Scan Line Polygon Fill Algorithms – Scan Line Fill of Convex Polygons – Scan Line Fill for Regions with Curved Boundaries.

Unit II

Geometric Transformations: Basic Two Dimensional Geometric Transformations – Matrix Representations and Homogeneous Coordinates – Inverse transformations – Two dimensional Composite Transformations – Other Two Dimensional Transformations – Raster Methods for Geometric Transformations – Raster Transformations – Transformations Between Two Dimensional Coordinate Systems – Geometric Transformations in Three Dimensional space – Three dimensional Translations – Three Dimensional Rotation – Three Dimensional Scaling – Composite Three Dimensional Transformations – Other Three Dimensional Transformations – Transformations Between Three Dimensional Coordinate Systems – Affine Transformations – Geometric Transformation Functions – The Two Dimensional Viewing Pipeline – The Clipping Window – Normalization and Viewport – Clipping Algorithms – Two Dimensional Point Clipping – Two dimensional Line Clipping – Polygon Fill Area Clipping – Curve Clipping – Text Clipping.

Unit III

Three Dimensional Viewing: Overview of Three Dimensional Viewing Concepts – The Three Dimensional Viewing Pipeline – Three Dimensional Viewing Coordinate Parameters – Transformation from World to viewing Coordinates – Projection Transformations – Orthogonal Transformations – Oblique Parallel Projections – Perspective Projections – The Viewport Transformation and Three dimensional Screen coordinates – Three Dimensional Viewing Functions – Three Dimensional Clipping Algorithms – Optional Clipping Planes – Polyhedra – Polyhedron Functions – Curved surfaces – Quadric Surfaces – Blobby Objects – Spline Transformations – Cubic-Spline Interpolation Methods – Beizer Spline Curves – Beizer Surfaces – B-Spline Curves – B-Spline surfaces –Beta lines – Rational Splines – Displaying Spline Curves and Surfaces.

Unit IV

Light Sources - Surface Lighting Effects - Basic Illumination Models – Transparent Surfaces – Atmospheric Effects – Shadows – Camera Parameters – Displaying Light

Intensities – Halftone Patterns and Dithering Techniques – Polygon Rendering Methods – Ray Tracing Methods – Modeling Surface Detail with polygons – Texture mapping – Illumination and Surface Rendering Functions – Texture Functions.

Unit V

Interactive Picture Construction Techniques – Virtual Reality Environments –Interactive Input Device Functions - Color Models and Color Applications: Properties of Light – Color Models – Standard Primaries and the Chromaticity Diagram – The RGB Color Models – The YIQ and Related Color Models – The CMY and CMYK Color Models – The HSV Color Model – The HLS Color Model – Color section and applications – Computer Animations: Raster Methods for Computer Animation – Design of Animation sequence – Traditional Animation Techniques – General Computer animation Functions – Computer animation Languages – Key Frame Systems – Motion Specifications – Articulated Figure animation – Periodic Motions – Animation Procedures – Hierarchical Modeling - Graphics File Formats: Image File Configurations – Color Reduction Methods – File Compression Techniques – Composition of the Major File formats.

Text Book:

1. Donald Hearn, M.Pauline Baker, *Computer Graphics with OpenGL*, Pearson Education, Third Edition, 2009. ISBN: 978-81-317-2738-6.

Reference Books:

1. F.S.Hill JR, *Computer graphics using Open GL*, Second Edition, Prentice Hall, 2001. ISBN: 81-203-2813-2.
2. Edward Angel, *Interactive Computer Graphics - A Top Down approach with OpenGL*, Addison Wesley, 2000. ISBN: 0-201-38597-X.
3. Donald Hearn, M.Pauline Baker, *Computer Graphics*, Prentice Hall, Second Edition, 1999. ISBN: 81-203-0944-8.

10IT304 WEB DESIGN

Credits: 4:0:0

Course Objectives:

- To know how to create basic web pages using HTML, DHTML and CSS.
- To use Adobe Dreamweaver, JavaScript program as an aid for web design.
- To gain an understanding of the unique design problems involved in web design.

Unit I

Introduction to Computers and the Internet – Introduction - What is a Computer - Programming language types - Other high level languages-structured programming - History of Internet and world wide web - Hardware trends - Key Software Trend: Object Technology – JavaScript -Browser portability - C & C++ - Java – Microsoft .NET – Dynamic HTML - Internet &World Wide Web How to program - Microsoft Internet Explorer 6 – Introduction to the Internet Explorer 6 Web Browser - Connecting to Internet - Internet Explorer 6 Features - Searching the Internet - Online Help & tutorials - Keeping track of your favorite sites – File Transfer Protocol (FTP) - Customizing Browser Settings - Electronic mail - Instant messaging - Other web browsers - Adobe Photoshop elements: Creating web graphics – Introduction - Image Basics -Vector and raster graphics – Toolbox – Layers - screen capture - file formats.

Unit II

Introduction to XHTML: Part 1 - Introduction-Editing XHTML-First XHTML Example - W3C XHTML validation service – Headers – Linking – Images - Special Characters and More Line Breaks - Unordered lists - Nested and ordered lists - Introduction to XHTML: Part 2 - Introduction-Basic XHTML Tables - Intermediate XHTML tables and formatting – Basic XHTML forms - Internal linking - Creating and using image maps - meta elements - frameset elements - Nested framesets - Cascading style sheets-Introduction - Inline styles – Embedded style sheets - conflicting styles - Linking external style sheets - W3C CSS validation service - Positioning elements – Backgrounds - Element dimensions - Text flow and the box model -User style sheets.

Unit III

JavaScript: Introduction to Scripting - Simple program - Obtaining user input with prompt dialogs Memory concepts – Arithmetic - Decision making - JavaScript Control statements - Algorithms pseudocode - Control structures - If selection statement - if…else selection statement – while Repetition statement - Formulating algorithms - Counter controlled repetition - Sentinel controlled repetition - Nested control structures - Assignment operators - Data types - JavaScript control statements II - Essentials of Computer Controlled Repetition - for Repetition Statement- examples Using the for statement – switch Multiple Selection Statement - do..While Repetition Statement -break and continue statements - Labeled break and continue statements - Logical operators - Javascript: functions - Program modules in JavaScript – Programmer-Defined functions - Function Definitions – Random-Number Generation – Example: Game of Chance - Random Image Generator-Scope rules – JavaScript Global Functions-Recursion - Recursion vs Iteration.

Unit IV

JavaScript: Arrays - Declaring and Allocating Arrays – Examples using Arrays - Random Image Generator Using Arrays - References and Referenced Parameters - Passing arrays to Functions -Sorting Arrays - Searching arrays: Linear Search and Binary Search - Multidimensional Arrays( ) -Building Online Quiz - JavaScript: Objects - Thinking about objects - Math object - String object -Date object - Boolean and number objects - document object - window object - Using Cookies - Final JavaScript example - DHTML: Object Model and Collections - Object Referencing - Collections all and children - Dynamic Styles - Dynamic Positioning - Using frames collections - navigator object- DHTML: Event Model – Event onclick - Event onload - Error handling with one error - Tracking the mouse with Event onmousemove – Rollover with onmouseover and onmouseout – More Form Processing with onsubmit and onreset - Event bubbling - More DHTML Events.

Unit V

Dynamic HTML: Filters and Transitions - Flip Filters: Flipv and Fliph –Transparency with chroma filter - Creating Image masks - Miscellaneous Image filters : invert, gray and xray - Adding shadows to Text - Creating Gradients with alpha - Making Text glow - Creating Motion with blur - Using the wave filter - Advance Filters: dropShadow and light – blendTrans Transition - revealtrans Transition – DHTML: Data Binding with Tabular Data Control – Simple Data Binding - Moving within a Recordset - Binding to an img, table - Sorting table Data - Advanced Sorting and Filtering - Data Binding Elements – Macromedia Dreamweaver MX 2004 – Text styles – Images and Links- Symbols and Lines – Tables – Forms – Scripting in Dreamweaver – Site Management – Macromedia Cold Fusion MX – Simple ColdFusion Example – Using Variables and Expressions –

Variable Scoping – Form Processing – Creating a Data Source Name – Bookstore Case study: Interface , and Database - Bookstore Case study: Shopping Mart - Advanced Topics for Cold fusion Developers.

Text Book:

1. H.M. Deital,P.J. Deitel,A.B.Goldberg, *Internet and World Wide Web: How to Program*, Pearson Education, Third edition, 2005. ISBN: 81-297-0408-0.

Reference Books:

1. Thomas A. Powell, *Web Design: The Complete Reference*, Tata McGraw Hill, 2000. ISBN: 0-07-041180-7.
2. Robin Nixon, *Learning PHP, MySQL and Javascript*, O'Reilly Media, Inc., 2009. ISBN: 978-0-596-15713-5.
3. David Crowder, Rhonda Crowder, *Web Design With Html/flash/javascript & E-commerce Bible*, Wiley India, First Edition, 2003. ISBN: 8126502177.

10IT305 MULTIMEDIA COMMUNICATION

Credits: 4:0:0

Course Objective:

- To introduce the concepts of Audio-Visual Integration.
- To learn the multimedia communication standards and multimedia processing.

Unit I

Multimedia Communications –Audio-Visual Integration: Media interaction –Bimodality of human speech- Lip reading –Speech Driven Talking Heads– Lip synchronization – Lip tracking-Audio to visual mapping. Multimedia processing in communications: Digital media – Signal processing elements – Challenges of Multimedia information processing – Perceptual coding of digital audio signals– Transform audio coders –Audio Subband coders – Image coding – Video coding – Watermarking – Organization storage and retrieval issues – Signal processing for networked multimedia(NN) – NN for multimedia processing – Multimedia processors.

Unit II

Distributed multimedia systems: Introduction- Main Features of a DMS – Resource Management of DMS- Networking –Multimedia operating systems – Distributed multimedia servers – Distributed multimedia Applications. Multimedia Communication Standards: Introduction- MPEG 1 – MPEG 2.

Unit III

MPEG4: Overview of MPEG-4 - MPEG-4 Systems –DMIF-MPEG-4 Video- MPEG-4 Audio –profile & levels in MPEG-4-MPEG-4 Visual Texture Coding. MPEG-7 Standardization Process of Multimedia Content Description– MPEG-21Multimedia Framework.

Unit IV

ITU-T Standardization of Audiovisual communication systems: ITU-T Standardization process-AudioVisual Systems-Video-coding Standards-ITU-T Speech-Coding Standards-Multimedia Multiplex and Synchronization Standards. IETF and Internet Standards: IETF Standardization process-Internet Network architecture-Internet protocols-Real-Time

Mulitmedia Transmission across the Internet-MPEG-4 Video Transport across the Internet.

Unit V

Multimedia Communications Across Networks: Packet Audio/Video in the network environment – Video transport across generic networks-Multimedia transport across ATM networks – Multimedia across IP networks – Multimedia across DSLs – Internet access Networks – Multimedia across wireless - Mobiles Networks – Broadcasting Networks – Digital Television infrastructure for interactive multimedia services.

Text Book:

1. K.R. Rao, Zaron S. Bojkovic, Dragorad A. Milocanovic, *Multimedia Communication Systems*, Prentice Hall India, 2002. ISBN: 81-203-2145-6.

Reference Books:

1. Fred Halsall, *Multimedia Communications*, Pearson, 2001. ISBN: 81-7808-532-1.
2. Steve Heath, *Multimedia and Communication Technology*, Second Edition, Focal Press, 2003. ISBN: 81-8147-145-8.

10IT306 COMPUTER ANIMATION

Credits: 3:0:0

Course Objective:

- To provide knowledge about the techniques of 3D computer animation.

Unit I

Preproduction and Modeling Basics: Preproduction: Introduction – Storyboarding - Character and Model Design - Sound Design –Technical Tests - Production Scheduling. Modeling Basics: Introduction - Polygonal Modeling -Splines and Patches - Coordinate Systems - Viewing Windows - Geometric Primitives –Transformations - Common Modeling Techniques – Hierarchies - Booleans and Trims - Basic Deformations.

Unit II

Rendering Basics: Introduction - The Camera – Lights - Surface Characteristics - Shading Algorithms - Rendering Algorithms - Background Images - Surface Texture Mapping - Solid Texture Mapping – Final Rendering.

Unit III

Animation Basics and Advanced Modeling: Animation Basics: Introduction - Key framing – Interpolations – Parameter - curve Editing – Dope Sheet Editing - Forward Kinematics - Inverse Kinematics - Motion Paths - Shape Deformations - Camera Animation - Animating Lights and Surface Properties - Pose-based Animation. Advanced Modeling: Introduction - Virtual Sculpting - Digitizing Techniques –Procedural Modeling - Stitched Patches - Subdivision Surfaces - Displacement Mapping - Hair and Fur-Paint based Modeling - Higher-level Primitives.

Unit IV

Advanced Rendering: Introduction - Atmospheric Effects – Fractals - Lighting Subtleties - Advanced Texturing - Texturing Polygons - Background Shaders - Non-Photorealistic

Rendering - Reflection Maps and Environment Procedures - More Rendering Algorithms - Rendering for Output.

Unit V

Advanced Animation and Postproduction: Introduction - Animated Fillets - Limits and Constraints – Metaballs - Expressions and Driven Keys - Motion Dynamics: Principles, Rigid Bodies - Soft-Body Dynamics - Particle Systems - Cloth Dynamics - Motion Capture - Camera-Motion Matching - Character Rigging: Movement Controls, Deformation Controls - Facial Animation - Nonlinear Animation Postproduction: Introduction-Compositing-Editing.

Text Book:

1. Michael O'Rourke, *Principles of Three-Dimensional Computer Animation*, Third Edition, W.W.Norton & Company Ltd., 2003. ISBN: 0-393-73083-2.

Reference Books:

1. John Vince, *Essential Computer Animation*, Springer-Verlag, 2000. ISBN: 1-85233-141-0.
2. Marcia Kuperberg, *A Guide to Computer Animation*, Focal Press, 2002. ISBN: 0-240-51671-0.
3. Daniel Cunliffe, Geoff Elliott, *Multimedia Computing*, Crucial, 2003. ISBN: 1-903337-18-6.

10IT307 3D MODELLING AND RENDERING

Credits: 4:0:0

Course Objectives:

- To learn 3D modelling and various approaches for visualizing models.
- To learn the fundamentals of texture mapping, methods for rendering the graphics scene and techniques used to composite images.
- To learn various lighting techniques for rendering the 3D scene.

Unit I

Geometry Representation and Modeling: Polygonal representation- decomposition and tessellation –shading normals-triangle stripping-vertices and vertex arrays-modeling Vs rendering revisited. 3D Transformations: Data representation-over view of the transformation pipeline-normal transformation-texture coordinate generation and transformation-modeling transforms-visualizing transform sequences-projection transforms-the Z coordinate and perspective projection-vertex programs.

Unit II

Color, Shading and Lighting: Representing color-shading-lighting-fixed point and floating point arithmetic. Texture Mapping: Loading texture images-texture coordinates-Loading texture images from the frame buffer-environmental mapping-3D texture-Filtering-Additional control of texture level of detail-texture objects-multi-texture-texture environment. Window System and Platform Integration: Renderer and window state-address space and threads-anatomy of a window-off screen rendering-rendering to texture maps-direct and indirect rendering.

Unit III

Multiple Rendering Passes: Invariance-multipass overview-the multipass toolbox-multipass limitations-multipass Vs micro pass-deferred shading. Antialiasing: Full scene ant aliasing-super sampling-area sampling-line and point antialiasing-antialiasing with textures-polygon ant aliasing-temporal ant aliasing.

Unit IV

Composting, Blending and Transparency: Combining two images-other compositing operators-keying and matting-blending artifacts-composting image with depth-other blending operations-dissolves-transparency-alpha-blended transparency-screen door transparency-Image based depth of field-high dynamic range imaging. Basic Transform Techniques: Computing inverse transforms efficiently-stereo viewing-depth of field-image tilling-billboarding geometry-texture coordinate Vs Geometric transformation-interpolating vertex components through a perspective transformation-3D textures-texture projection-2D image warping mipmap generation.

Unit V

Lighting Techniques: Limitations in vertex lighting-fragment lighting using texture mapping-spot light effects using projection textures-specular lighting using environment maps-lightmaps-BRDF-based Lighting-reflectance maps-pre fragment lighting computations-other lighting models Bump Mapping with textures-normal maps-Bump mapped reflections-high dynamic range lighting-global illumination.

Text Book:

1. Tom McReynolds, David Blythe, *Advanced Graphics Programming Using OpenGL*, Elseveir Publications. ISBN-13: 978-1-55860-659-3.

Reference Books:

1. F.S.Hill, JR, *Computer graphics using Open GL*, Second Edition, Prentice Hall, 2001. ISBN: 81-203-2813-2.
2. Donald Hearn, M. Pauline Baker, *Computer Graphics using OpenGL*, Prentice-Hall, Third Edition. ISBN-10: 0130153907.

10IT308 WEB DESIGN LAB

Credits: 0:0:2

1. To create a web portal for online shopping using the software like Dreamweaver, Photoshop, Macromedia Flash.
2. To write a program for form validation using JavaScript.
3. To design a webpage using XHTML and CSS (Cascading Style Sheet).
4. To write a program in JavaScript for conducting Online Quiz.
5. To design a webpage for E-banking Applications using ASP and MS-Access.
6. To design a Tic-tac-toe game using Java Script.
7. To write a program for random image generator using Java Script.
8. To design an interactive greeting card using Photoshop and Flash.
9. To design an animation using motion Tween operation in Flash.
10. To write a program for implementing a calculator using JavaScript.
11. To write a program for Background Setting using Event Handling Function in DHTML.

12. To write a program for Changing Cursor Symbols using Mouse Event Handling Functions in DHTML.

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

10IT309 ANIMATION LAB

Credits: 0:0:2

1. To perform shape tweening using Flash.
2. To implement motion tweening using Flash.
3. To frame by frame tweening using Flash.
4. To add a motion guide by Flash.
5. To create web pages and buttons using Flash.
6. To create multiple scenes using Flash.
7. To create an advertisement within a banner using Flash.
8. To implement an interactive player using Flash.
9. To create primitive and text animation using Maya.
10. To implement texture mapping using Maya.
11. To implement interactive animation using Maya.
12. To implement rendered animation like video using Maya.

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

10IT310 SOFTWARE PROJECT MANAGEMENT

Credits: 3:0:0

Course Objectives:

- To understand Traditional Project Management, Resource Requirements and Cost.
- To create project Management Life Cycles and Strategies.
- To build an effective Project Management Infrastructure.

Unit I

Defining Project –A program-Understanding the scope triangle-Envisioning scope triangle as system in balance-Managing Creeps- Understanding project Management Process Groups- Using Tools, templates, and processes to scope a project-Managing Client Expectations-Wants versus Needs-Conducting conditions of satisfaction-Planning and Conducting the Project Scoping Meeting-gathering requirements-Building the requirement breakdown structure-Using the RBS to choose a Best –Fit PMLC Model-Diagramming Business Processes- .Prototyping your solution-Use Cases-validating the Business Case-Outsourcing to vendors and contractors-procurement Management Life cycle-Vendor Evaluation-Vendor Selection-Vendor Contracting-Contract Management-Vendor management-Writing an effective Project Overview Statement-Gaining approval to plan project.

Unit II

Tools, templates, and processes used to plan a project-the importance of planning-using application software packages to plan a project-Planning and conducting joint project planning sessions-building the work breakdown structure-Approaches to building the

WBS-Estimating-Estimation life cycles-Estimating resource requirement-Resource planning –Estimating Cost-Constructing the project network diagram-Planning for project risk: The Risk Management Life Cycle-Writing an effective project proposal- Tools, templates, and processes used to launch a project-recruiting the project team-Establishing Team Operating rules-Managing Scope changes-Managing team communication-Assigning resources-Resource leveling strategies- Tools, templates, and processes used to monitor and control a project-establishing your progress reporting system-Applying Graphical Reporting Tools-Managing the scope bank-Building and maintaining the issues log-managing project status meetings-defining a problem escalation strategy-Gaining approval to close the project.

Unit III

Tools, templates, processes used to close a project-writing & maintain client acceptance procedures-closing a project-getting client acceptance-installing project deliverables-documenting the project-Conducting post implementation audit-writing final report-Project management landscape-Traditional Project Management-Using Critical Chain Project management.

Unit IV

Agile Project Management-Extreme Project Management-Establishing & Maturing a Project Support Office.

Unit V

Establishing and Managing a Project Portfolio- Establishing and Managing a Continuous process Improvement Program-Managing Distressed Projects-Managing Multiple Team Projects.

Text Book:

1. Robert K. Wyzocki, Rudd McGary, *Effective Project Management*, Fifth Edition, WILEY-Dreamtech India Pvt. Ltd., 2009. ISBN: 978-81-265-2156-2.

Reference Books:

1. Roger S Pressman, Pressman Roger, *Software Engineering: A Practitioner's Approach*, Seventh Edition, McGraw-Hill Higher Education, 2009. ISBN: 0073375977, 9780073375977.
2. Pankaj Jalote, *Software project management in practice*, Addison-Wesley, 2002. ISBN: 0201737213, 9780201737219.
3. Walker Royce, *Software project management: a unified framework*, Addison-Wesley, 1998. ISBN: 0201309580, 9780201309584.

10IT311 INTERNETWORKING

Credits: 4:0:0

Course Objectives:

- To understand network layers and how all protocols in the TCP/IP suite fit into the five-layer model.
- To understand how it is possible to interconnect multiple physical networks into a coordinated system, how internet protocols operate in that environment, how application programs use the resulting system.

- To learn the details of the global TCP/IP internet including the architecture of its router system and the application protocols it supports.
- To learn the working principles of Multiprotocol Label Switching.

Prerequisites: Fundamentals of Computer Networks is advantageous.

Unit I

Layering – TCP/IP Layering – Internet Addresses – The Domain Name System – Encapsulation – Demultiplexing – Port Numbers - Ethernet and IEEE 802 Encapsulation - Trailer Encapsulation – SLIP – Compressed SLIP – PPP – Loopback Interface - MTU – Path MTU - IP Header – IP Routing – Subnet Addressing – Subnet Mask – Special Case IP Addresses – IPv6 Addressing – IPv6 Protocol - ARP Packet Format – Proxy ARP – Gratuitous ARP – RARP Packet Format – ICMP Message Types.

Unit II

IP Routing Principles – ICMP Host and Network Unreachable Errors – ICMP Redirect Errors – ICMP Router Discovery Messages - Dynamic Routing – RIP – RIP Version 2 – OSPF – BGP – CIDR - User Datagram Protocol – DNS Basics – DNS Message Format – Resource Records – TFTP Protocol – BOOTP Packet Format – TCP Services – TCP Header – TCP Connection Establishment and Termination – SNMP Protocol – Rlogin Protocol – Telnet Protocol – FTP Protocol – SMTP Protocol – NFS Protocol.

Unit III

MPLS Introduction - Label Switching Basics – Switching and Forwarding Operations – MPLS Key Concepts.

Unit IV

Label Distribution Operations - MPLS and ATM and Frame Relay Networks - Traffic Engineering.

Unit V

OSPF in MPLS Networks - Constraint-Based Routing with CR-LDP – MPLS, Optical Networks, and GMPLS – VPNs with L2TP, BGP, OSPF, and MPLS – MPLS and DiffServ.

Text Books:

1. W. Richard Stevens, *TCP/IP Illustrated Volume – I, The Protocols,* Pearson Education, 2000. ISBN: 81-7808-101-6.
2. Behrouz A. Forouzan, *TCP/IP Protocol Suite*, Tata McGraw Hill, Fourth Edition, 2006. ISBN: 0-07-060004-Xs.
3. Uyless Black, *MPLS and Label Switching Networks*, Pearson Education, Second Edition, 2002. ISBN: 81-7808-650-6.

Reference Book:

1. Douglas E. Comer, *Internetworking with TCP/IP – Principles, Protocols and Architecture*, Pearson Education, Fifth Edition, 2007. ISBN: 978-81-203-2998-0.

10IT312 NETWORK MANAGEMENT

Credits: 3:0:0

Course Objectives:

- To present the foundations of models which are needed to build various network management architectures and protocols.
- To provides exposure to SNMP-based protocols that manage TCP/IP networks with real-world examples.

Unit I

Introduction-Analogy of telephone network management -Data and Telecommunication network- Distributed Computing Environments-TCP/IP Based Networks – Communication Protocols and standards-Network Management: Goals, Organization and Functions-Network Management System Platform.

Unit II

SNMPV Network Management – History – Internet or Organizations and standards – SNMP Models – Organization Model – Information Model – Communication Model-Functional Model.

Unit III

SNMP V2 – System Architecture – Structure Of Management Information – MIB – Protocol –Compatibility with SNMPV1 – SNMPV3 – Documentation – Architecture-Applications – MIB security – User band security model access control.

Unit IV

Remote Monitoring – RMON SMI and MIB – RMON1 – RMON2 – ATM Remote Monitoring –Case Study of Internet Traffic Using RMON-Network Management Tools – Network Statistics Measurement Systems – History of Enterprise Management – Network Management Systems –Commercial Network Management Systems – system Management – Enterprise Management Solution.

Unit V

Web based Management – Web Interface – Desktop Management Interface – Enterprise Management – WBEM –Java Management Extension.

Text Book:

1. Mani Subramanian, *Network Management Principles and Practice*, Addison Wesley, 2000. ISBN: 0201357429.

Reference Books:

1. Stephen B. Morris, *Network Management, MIBs and MPLS: Principles Design and Implementation*, Pearson, 2003. ISBN-10: 0131011138, ISBN-13: 9780131011137.
2. Alexander clemm, *Network Management Fundamentals*, CISCO Press, 2006. ISBN: 1587201372.
3. Sebastian Abeck, Adrian Farrel, *Network Management Know it all*, Elsevier Morgan Caufmann, 2008. ISBN: 9780123745989.

10IT313 VIRTUAL REALITY TECHNOLOGY

Credits: 4:0:0

Course Objectives:

- To learn the fundamental principles of virtual reality, virtual reality hardware and software.
- To design and construct a simple virtual environment

Unit I

Introduction - Input devices - Three dimensional position trackers - Navigation and Manipulation, Interfaces-Gesture Interfaces.

Unit II

Output Devices-Graphic displays- Sound displays-Hap tic Feedback.

Unit III

Computing Architecture of VR-The Rendering Pipeline-PC Graphic Architecture-Workstation based Architectures-Distributed VR Architectures.

Unit IV

Modelling – Geometric modelling- Kinematics Modelling- Physical Modelling-Behavior Modelling-Model management-VR Programming-Toolkits and Scene Graphs-World Toolkit-Java 3D-General Hap tics open Software Toolkit-People shop.

Unit V

Human Factors in VR-Methodology and Terminology-User Performance Studies-VR health and safety Issues-VR and Society.

Text Book:

1. Grigore C.Burdea and Philippe Coiffet, *Virtual Reality Technology,* Second Edition, Wiley Interscience, 2003. ISBN: 0-471-36089-9.

Reference Book:

1. John Vince, *Virtual Reality Systems*, Pearson Education. ISBN: 81-7808-504-6.

10IT314 ARTIFICIAL INTELLIGENCE

Credits: 4:0:0

Course Objectives:

- To provide both theoretical foundations of Artificial intelligence and ways in which current techniques can be used in application programs.
- To introduce new approaches to solve a wide variety of research-oriented problem.

Unit I

What is Artificial Intelligence? – Problems, Problem Spaces, and Search – Heuristic Search Techniques - Knowledge Representation Issues.

Unit II
Using Predicate Logic- Representing Knowledge Using Rules – Symbolic Reasoning under Uncertainty - Statistical Reasoning - Weak Slot-and–Filler Structures – Strong Slot-and-Filler Structures.

Unit III
Planning – Natural Language Processing - Parallel and distributed AI- Learning.

Unit IV
Connectionist Models - Common Sense- Expert Systems- Perception and Action- Fuzzy Logic.

Unit V
Genetic Algorithms: Copying Natures approach –Artificial Immune Systems- Prolog-The Natural Language of Artificial Intelligence.

Text Book:
1. Elaine Rich, Kevin Knight, Shivashankar B. Nair, *Artificial Intelligence*, Third Edition, McGraw-Hill, 2009. ISBN -13: 973-0-07-008770-5, 10: 0-07-008770-9.

Reference Books:
1. Stuart Russell, Peter Norvig, *Artificial Intelligence a modern Approach*, Second Edition, Pearson Education, 2003. ISBN: 81-297-0041-7.
2. Nils J. Nilsson, *Artificial Intelligence: A New Synthesis*, Harcourt Asia PTE Ltd., 2000. ISBN: 981 4033 464.
3. Dan W. Patterson, *Introduction to Artificial Intelligence and Expert Systems*, Prentice-Hall India, 2001. ISBN: 81-203-0777-1.

10IT315 PATTERN RECOGNITION

Credits: 4:0:0

Course Objectives:
- To understand the basics of Patterns recognition systems, Parameter and Non-parameter estimation techniques.
- To know about Discrimination functions, Stochastic and Non-metric methods.
- To have knowledge on Algorithm independent Machine learning, Unsupervised learning and clustering in pattern recognition.

Unit I (Pattern Recognition and Parameter Estimation)
Pattern Recognition Systems – The Design Cycle – Learning and Adaptation – Bayesian Decision Theory – Continuous Features – Minimum Error-Rate Classification - Classifiers, Discrimination Functions, and Decision Surfaces – The Normal Density – Discriminant Functions for the Normal Density – Discrete Features. Maximum-Likelihood Estimation – Bayesian Parameter Estimation: Gaussian Case, General Theory – Problems of Dimensionality - Component Analysis and Discriminations - Expectation Maximization (EM) – Hidden Markov Model.

Unit II (Nonparametric Techniques and Linear Discriminant Functions)

Density Estimation – Parzen Windows – K-Nearest Neighbor Estimation – The Nearest–Neighbor Rule –Metrics and Nearest-Neighbor Classification - Linear Discriminant Functions and Decision Surfaces – Generalized Linear Discrimination functions - The Two-Category Linearly Separable Case – Minimizing the perceptron Criterion Function – Relaxation Procedures – Non-separable Behavior - Minimum Squared-Error Procedures – The Ho-Kashyap Procedures - Support Vector Machines – Multi-category Generalizations.

Unit III (Stochastic Methods and Nonmetric Methods)
Stochastic Search – Boltzmann Learning - Boltzmann Networks and Graphical Models – Evolutionary Methods – Genetic Programming - Decision Trees – CART – Other Tree methods – Recognition with Strings – Grammatical Methods, Interference – Rule-Based Methods.

Unit IV (Algorithm Independent Machine Learning)
Lack of Inherent Superiority of Any Classifier – Bias and Variance – Resampling for Estimating Statistics – Resampling for Classifier Design – Estimating and Comparing Classifiers – Combining Classifiers.

Unit V (Unsupervised Learning and Clustering)
Mixture Densities and Identifiability – Maximum–Likelihood Estimates – Application to Normal Mixtures – Unsupervised Bayesian Learning – Data Description and Clustering – Criterion Functions for Clustering – Iterative Optimization – Hierarchical Clustering – On-line Clustering - Graph-Theoretic Methods – Component Analysis – Low-Dimensional Representations and Multidimensional Scaling (MDS).

Text Book:

1. R.O.Duda, P.E.Hart and D.G.Stork, *Pattern Classification*, John Wiley, 2001. ISBN: 9814-12-602-0.

Reference Books:

1. S.Theodoridis and K.Koutroumbas, *Pattern Recognition*, Academic Press, Fourth Edition, 2008. ISBN-10: 1597492728.
2. C.M.Bishop, *Pattern Recognition and Machine Learning*, Springer, First Edition, 2006. ISBN-10: 0387310738.
3. E. Gose, R. Johnsonbaugh, S. Jost, *Pattern Recognition and Image Analysis*, PHI, 1997.

10IT316 WIRELESS SECURITY

Credits: 4:0:0

Course Objectives:

- To provide exposure to various threats in wireless networks and security solutions.
- To understand the technologies and protocols that support security in wireless networks.

Unit I
Introduction- Security Principles - Wi-Fi Vulnerabilities – Different Types of Attack – Wireless Information warfare.

Unit II

IEEE 802.11 Protocol Primer- IEEE 802.11 WEP Working - WPA, RSN and IEEE 802.11i-Access Control: IEEE 802.1X, EAP, and RADIUS.

Unit III
Upper- Layer Authentication - WPA and RSN Key Hierarchy- TKIP.

Unit IV
AES- CCMP-Wi-Fi LAN Coordination: ESS and IBSS- Public Wireless Hotspots.

Unit V
Known Attacks: A Technical Review – Actual Attack Tools – Open Source Implementation Example – Security in Wireless Application Protocol – Bluetooth Security – VoIP Security.

Text Book:

1. Jon Edney, William A.Arbaugh, *Real 802.11 Security Wi-Fi Protected Access and 802.11i*, Pearson Edition, 2004. ISBN: 81-297-0312-2.

Reference Books:

1. Randall K.Nichols, Panos C. Lekkas, *Wireless Security: Models, Threats and Solutions*, Tata McGraw Hill, 2006. ISBN: 0-07-061884-4.
2. Merrit Maxim, David Pollino, *Wireless Security*, McGraw-Hill. ISBN: 0-07-222286-7.

10IT317 SOFT COMPUTING

Credits: 4:0:0

Course Objectives:

- To familiarize with soft computing concepts.
- To introduce the ideas of Neural networks, fuzzy logic and use of heuristics based on human experience.
- To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications.

Unit I (Artificial Neural Network)
Introduction – Fundamental concept – Evolution of Neural Networks – Basic Models of Artificial Neural Networks – Important Terminologies of ANNs – McCulloch-Pitts Neuron – Linear Separability – Hebb Network. Supervised Learning Network: Perceptron Networks – Adaline – Multiple Adaptive Linear Neurons – Back-Propagation Network – Radial Basis Function Network.

Unit II (Artificial Neural Network)
Associative Memory Networks: Training Algorithms for Pattern Association – Autoassociative Memory Network – Heteroassociative Memory Network – Bidirectional Associative Memory – Hopfield Networks – Iterative Autoassociative Memory Networks – Temporal Associative Memory Network. Unsupervised Learning Networks: Fixed weight Competitive Nets – Kohonen Self-Organizing Feature Maps – Learning Vector Quantization – Counter propagation Networks – Adaptive Resonance Theory Networks – Special Networks.

Unit III (Fuzzy Set Theory)
Introduction to Classical Sets and Fuzzy sets – Classical Relations and Fuzzy Relations – Tolerance and Equivalence Relations – Noninteractive Fuzzy sets – Membership Functions: Fuzzification – Methods of Membership Value Assignments – Defuzzification – Lambda-Cuts for Fuzzy sets and Fuzzy Relations – Defuzzification Methods.

Unit IV (Fuzzy Set Theory)
Fuzzy Arithmetic and Fuzzy Measures: Fuzzy Rule Base and Approximate Reasoning: Truth values and Tables in Fuzzy logic – Fuzzy Propositions – Formation of Rules – Decomposition and Aggregation of rules – Fuzzy Reasoning – Fuzzy Inference Systems (FIS) – Fuzzy Decision Making – Fuzzy Logic Control Systems.

Unit V (Genetic Algorithm)
Introduction – Basic Operators and Terminologies in GAs – Traditional Algorithm vs. Genetic Algorithm – Simple GA – General Genetic Algorithm – The Scheme Theorem – Classification of Genetic Algorithm – Holland Classifier Systems – Genetic Programming. Applications of Soft Computing: A Fusion Approach of Multispectral Images with SAR Image for Flood Area Analysis – Optimization of Travelling Salesman Problem using Genetic Algorithm Approach – Genetic Algorithm based Internet Search Technique – Soft Computing based Hybrid Fuzzy Controllers – Soft Computing based Rocket Engine – Control.

Text Book:

1. S.N. Sivanandan and S.N. Deepa, *Principles of Soft Computing*, Wiley India, 2007. ISBN: 10: 81-265-1075-7.

Reference Books:

1. S. Rajasekaran and G.A.V.Pai, *Neural Networks, Fuzzy Logic and Genetic Algorithms*, PHI, 2003.
2. Timothy J.Ross, *Fuzzy Logic with Engineering Applications*, McGraw-Hill, 1997.
3. J.S.R.Jang, C.T.Sun and E.Mizutani, *Neuro-Fuzzy and Soft Computing*, PHI, 2004, Pearson Education.

10IT318 SOFT COMPUTING LAB

Credits: 0:0:2

Artificial Neural Networks:

1. Perceptron Learning Rule
2. Principal Component Extraction via Various Hebbian-Type Rules
3. Clustering via Simple Competitive Learning
4. SOM: Self-Organizing Maps
5. Traveling Salesman Problem (TSP) via SOM
6. Backpropagation Trained Multilayer Perceptron for Function Approximation
7. Image Compression Using Back-propagation
8. Support Vector Machine (SVM) for Pattern Recognition

Fuzzy logic:

1. Fuzzy inference system (FIS) using jFuzzyLogic tool – jFuzzyLogic is a Java package can be downloadable freely.
2. Fuzzy Control Language (FCL) program

3. Optimize fuzzy sets' parameters and fuzzy rule's weights
4. Fuzzy C-means Clustering

Genetic Algorithm (Using JGAP – Java Genetic Algorithm Package):

1. Creating Custom Genes
2. Solving problems using Genetic Programming with JGAP
3. Handling problems related to the Travelling Salesman Problem (TSP)

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

10IT319 COMPUTER VISION LAB

Credits: 0:0:2

1. Creating panoramic images from series of images.
2. Video segmentation.
3. Homographic Estimation.
4. Hough Transform based line/circle detection.
5. Stereo Geometry.
6. Multiple View Geometry.
7. Projective Transformation.
8. Camera Calibration.
9. Structure from Motion.
10. Finding Depth map.

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

10IT320 WEB TECHNOLOGY

Credits: 4:0:0

Course Objectives:

- To enable the student to design, develop, build and manage real web applications using current software development technologies and methodologies.
- To highlight the features of different Scripting Languages and Open source web development.

Prerequisites: Knowledge in Programming, Operating Systems and Networks, www is advantageous.

Unit I

HTML Essentials: Document Structure Elements - Text Formatting - Positioning tags - List Tags - Table Formatting Tags - Other Tags. Exploring Javascript: Javascript and HTML Text-Variables-Operators-Global Variables-Expressions – Operators – Conditionals –Looping - Javascript Functions – Objects – Arrays.

Unit II

ASP fundamentals: Using Server – Side Includes- Learning the SSI Directives – Creating Modular ASP Code. Using the Request Object: Using Form Information - Using Query

String Information – Using Server Variables. Using the Response Object: Create Output – Managing Output – Managing the Connection.

Unit III

Using Cookies: Introduction to Cookies – Cookies and Your Browser – Creating a Cookie Modifying and removing Cookies – Tracking Preferences with Cookies. Using the Application, Session, and Server Objects: The application Object - The Session Object – The Server Object – Using the global .asa file. Active Data Objects Essentials: Microsoft's Universal Data Access Strategy – The Connection Object – The Record set and Field Objects – The Command and Parameter Objects – Using the Errors Collection.

Unit IV

Creating Ajax Applications: Writing Ajax-Interacting with Server-Side Code-Passing Data to Server- Side Scripts. XML and Ajax: Creating XML-Handling XML with JavaScript-Retrieving Data from an XML Document-Handling White Space in the Mozilla, Netscape, and Firefox Web Browsers-Handling White Space in a Cross-Browser Way-Accessing XML Data Directly-Accessing XML Attributes Values-Validating Your XML. Cascading Style Sheets and Ajax: Ajax-Enabled Menus-Getting Text Noticed in Ajax Applications-Scrolling Text- Styling Text Using CSS- Styling Colors and Backgrounds Using CSS-Styling Locations in Web Pages. Dynamic HTML and Ajax: Creating Mouseovers - Using Dynamic Styles - Using document.write - Using Dynamic HTML Methods to Update Part of a Page - Using Dynamic HTML Properties to Update Part of a Page-Using Text Ranges to Update Part of a Page-Using createElement to Create New Elements on the Fly Creating Dynamic Tables- Catching the User's Attention with Animation.

Unit V

PHP: The Structure of PHP- Expressions – Operators – Conditionals – Looping - Implicit and Explicit casting - PHP Functions - Including and Requiring Files – Objects – PHP Arrays: Basic Access – foreach - Multidimensional Arrays - Using Array Functions. MySQL: Basics-Summary of Database Terms-Querying a MySQL Database with PHP-practical example-Practical MySQL.

Text Books:

1. Eric A. Smith, *ASP 3 Programming Bible*, Wiley-Dreamtech, 2002. ISBN: 81-265-0049-2.
2. Robin Nixon, *Learning PHP, MySQL and Javascript*, O'Reilly Media, Inc., 2009. ISBN: 978-0-596-15713-5.
3. Steve Holzner, *Ajax Bible*, Wiley India Pvt. Ltd, 2007. ISBN: 81-265-1217-2.

Reference Books:

1. Deitel & Deitel, *Internet and world wide web – How to Program*, Pearson Prentice Hall, Fourth Edition, 2007. ISBN: 0131752421.
2. Keyton Weissinger, *ASP in a Nutshell - A Desktop Reference*, Second Edition, O'Reilly & Associates, 2000. ISBN: 1-56592-843-1.
3. Janet Valade, *PHP and MySQL for Dummies*, Wiley Publishing, Inc., Fourth Edition, 2010. ISBN: 978-0-470-52758-0.

10IT321 CLOUD COMPUTING

Credits: 3:1:0

Course Objectives:

- To provide an insight into the evolution of Cloud Computing.
- To introduce the challenges in Cloud Computing.
- To impart basic knowledge on Architecture of Cloud Computing.
- To introduce various cloud application and developmental tools.

Unit I (The Evolution of Cloud Computing)

The Emergence of Cloud Computing, Cloud based service offerings, Grid Computing Vs Cloud Computing, Key characteristics of Cloud Computing, Challenges for the cloud, Various Technological revolution that contributes to the evolution of Cloud - Hardware Evolution, Internet software Evolution, Server Virtualization; Services delivered over Cloud – Infrastructure as a Service, Platform as a service, Software as a service.

Unit II (Cloud Architectures)

Cloud computing infrastructure models- public, private and hybrid clouds, Architectural layers of Cloud computing, Cloud application programming interfaces; Architectural considerations for IaaS – CPU virtualization(hypervisors), storage virtualization (SAN, ISCSI), Network virtualization(VLAN);Case Study- Amazon EC2, S3, DB, Queues, Cloud Front.

Unit III (Security issues in Cloud Computing)

Cloud Security Challenges, security management, security governance, risk management, risk assessment, security monitoring and incident response, Security architecture design, Vulnerability Assessment, password assurance testing, security images, data privacy, data security, application security, virtual machine security, Identity Access management, physical security, Business continuity and disaster recovery, Is security as a service the New MSSP?

Unit IV (Common Standards and Backbone Technologies for the Emergence of Cloud Computing)

Distributed Management Task Force, Standards for Application Developers- Ajax, XML, JSON, LAMP, LAPP, Standards for Messaging – SMTP, POP,IMAP, Atom, APP, RSS, HTTP, SIMPLE, XMPP, Standards for Security- SAML OAuth, SSL/TLS, OpenID; SOA as a step towards Cloud; Role of Virtualization in the Cloud.

Unit V (Cloud Computing Applications and Tools for development)

YouTube-YouTube API overview, Widgets, YouTube player APIs, The You Tube Custom Player, YouTube data API, Zimbra- Zimbra Collobration Suite (ZCS), Facebook – Facebook development, Zoho – Zoho cloud SQL, Introduction to MapReduce-Discussion of Google paper, Big Tables, GFS, HDFS, Hadoop Framework, Hadoop Framework examples

Text Book:

1. Cloud Computing - Implementation, Management & Security, John W. Rittinghouse, James F. Ransome, CRC Press, 2010.

Reference Books:

1. Judith Hurich, Robin Bloor, Marcia Kaufman, Fern Halper, *Cloud Computing for Dummies,* Wiley Publication Inc., 2010.
2. Tom White, *Hadoop the Definite Guide*, O'REILLY, 2009.

3. George Reese, *Cloud Application Architectures*, O'REILLY, 2009.
4. Tim Mather, Subra Kumarasamy, Shahed Latif, *Cloud Security and Privacy*, O'REILLY, 2009.
5. *Introduction to Cloud Computing Architecture*, White paper, SUN, Microsystems, 1st edition, June 2009.
6. Cloud Computing Specialist Certification kit.

10IT322 MATHEMATICAL FOUNDATION FOR IMAGE AND VIDEO PROCESSING

Credits: 4:0:0

Course Objective:

- To understand basic mathematical concepts and signal processing involved in image processing and provide basic idea behind image segmentation.

Unit I (Linear Algebra)

Rank of a matrix – Consistency of linear system of equations – Eigen value problem – Eigen values and eigenvectors of a real matrix – Characteristic equation – Properties of eigen values and eigenvectors – Cayley –Hamilton theorem (without proof) –Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation. Transforms: Fourier transforms pairs, Properties, Cosine transforms, Wavelet transforms.

Unit II (Differentiation Techniques)

Derivatives of elementary function from first principle – Derivatives of inverse functions –Logarithmic differentiation – Differentiation of parametric functions – Second order derivatives.

Unit III (Integration Techniques)

Integrals of functions – Methods of integration – Decomposition method – Method of substitution – Integration by parts.

Unit IV (Filters)

Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters: Smoothing – Sharpening filters – Homomorphic filtering.

Unit V (Segmentation)

Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors.

Text Books:

1. Grewal, B.S., *Higher Engineering Mathematics*, Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
2. S Salivahanan, *Digital Signal Processing*, Tata McGraw-Hill, 2000.
3. Gonzalez and Woods, *Digital Image Processing*, Third Edition, 2008.

ADDITIONAL SUBJECTS

S.No.	Subject Code	Subject Name	Credits
1.	11IT201	Data Structures and Algorithms	3:0:0
2.	10IT323	Multimedia Design, Storage and Analysis	4:0:0
3.	11IT301	Internetworking	4:0:0
4.	11IT302	Information Storage and Management	4:0:0
5.	11IT303	Analysis of Algorithms	4:0:0
6.	11IT304	Elements of Multimedia Systems	4:0:0
7.	11IT305	Multimedia Communication	4:0:0
8.	11IT306	Wireless Sensor Networks	4:0:0
9.	11IT307	IP Telephony	4:0:0

11IT201 DATA STRUCTURES AND ALGORITHMS

Credits: 3:0:0

Course Objective:

- To learn and to be able to judge the appropriateness of alternate implementations of elementary data structures such as Stacks, Queues, Trees, and Graphs in computer programming.
- To learn different sorting methods and applications

Unit I

Introduction to Data Structures - Stacks – Introduction to Recursion – Principles of Recursion – Back Tracking: Postponing the work – Queues – Definitions – Implementation of Queues – Circular Queues – Application of Queues: Simulation – Linked Queues.

Unit II

List Specification - Implementation of Lists – Linked list in Arrays - Searching: Introduction and Notation – Sequential Search – Binary Search – Comparison Trees.

Unit III

Sorting: Introduction and Notation – Insertion Sort – Selection Sort – Shell Sort – Divide and Conquer Sorting, Merge sort for Linked Lists – Quick Sort for Contiguous Lists – Heap and Heap Sort – Table and Information Retrieval - Introduction - Rectangular Arrays – Tables of Various Shapes – Application: Radix Sort – Hashing.

Unit IV

Binary Trees – Binary Search Trees – Building a Binary Search Trees – Height Balance: AVL Trees – Multi way Trees: B-Trees.

Unit V

Graphs: Mathematical Background – Graph Traversal - Topological Sorting – A Greedy Algorithm – The Polish Notation: The Problem – The Idea – Evaluation of polish notation – Translation from infix to Polish form.

Text Book:

1. Robert L.Kruse, Bruce P Leung and Clovis L.Tondo, Data Structures and Program Design, Prentice Hall, Second Edition, 1997, ISBN -81-203-2097-2

Reference Books:

1. Mark Allen Weiss, Data Structures and Algorithms Analysis in C++, Second Edition, Pearson Education, 1999. ISBN: 81-7808-670-0.
2. Peter Smith, Applied Data Structures with C++, First Edition, Narosa Publishers, 2004. ISBN: 81-7319-617-6.
3. Sartaj Sahni, Data Structures, Algorithms and Applications in C++, Second Edition, Silicon Press, 2005. ISBN: 81-7371-522-X.

10IT323 MULTIMEDIA DESIGN, STORAGE AND ANALYSIS

Credits: 4:0:0

Course Objective:

- To provide a more dynamic fully integrated multimedia working systems by combining audio and video with text, image, graphics and animation.
- To present step-by-step approach to multimedia system design.
- To introduce multimedia standards, compression and decompression technologies as well as various storage technologies.
- To introduce the fundamental concepts of content based information retrieval of images, Audio and video.

UNIT 1

Multimedia Compression: Multimedia Elements, Applications, System architecture, Evolving Technologies, Objects, Multimedia Data Interface Standards, The Need For Data Compression, Multimedia Databases, Types of Compression, Binary Image compression Schemes, Color, Gray Scale And Still, video Image Compression, Video image compression, Audio Compression.

UNIT II

Storage and Retrieval: Magnetic Media Technology, Optical media, Hierarchical Storage Management, Cache management, Architectural and Telecommunication Considerations, Specialized Computational Processors, Memory Systems-Multimedia Board Solutions, LAN/WAN Connectivity, Distributed Object Models.

UNIT III

Application Design: Application classes, Virtual reality design, Organizing Databases, Application Workflow Design Issues , Distributed Application Design Issues, Authoring Systems, Hypermedia , UID, Information Access, Hypermedia Messaging, Mobile Message, Components , Linking and Embedding, Creating Hypermedia Messages, Message Standards, Integrated Document Management.

UNIT IV

Video analysis and summarization at structural and semantic levels: Introduction, Scene analysis, Event analysis, Video Summarization. Content-based retrieval for digital audio and music: Introduction, Audio Feature Extraction, Generic Audio Classification and retrieval, Music Content Analysis, Content-based Music Retrieval, Case Study. MPEG-7 Multimedia Content Description Standard: Introduction, Context and Applications, MPEG-7 Constructs, MPEG-7 Conceptual Model, MPEG-7 Description Definition Language, MPEG-7 Multimedia Description Schemes, MPEG-7 Audio Description Tools, MPEG-7 Visual Description Tools, Beyond MPEG-7.

UNIT V

Object repositories for digital libraries: Introduction, Digital Objects vs. Files, Naming and Location, Redundant Encoding for Reliability, Metadata, Digital Object Repositories. Information discovery on the world-wide-web: Introduction, Web-structure Mining, Web-log mining. Cooperative Multimedia Information systems: Introduction, Review of Cooperative Multimedia Information Systems, Architectural examples, Management Issues.

Text Books:

1. Prabhat K. Andleigh and Kiran Thakrar , Multimedia Systems Design, Prentice Hall, 2008, ISBN -978- 81-203-2177-9.
2. David Dagan Feng, Wan-Chi Siu, Hong-Jiang Zhang (Eds.), Multimedia Information Retrieval and Management Technological Fundamentals and Applications, Springer, 2003. ISBN: 978-3-540-00244-4.

Reference Books:

1. Nigel Chapman and Jenny Chapman, Digital Multimedia , John Wiley and Sons Private Limited, 2001, ISBN: 0471983861.
2. William I. Grosky, Ramesh Jain, Rajiv Mehrotra, The Handbook of Multimedia Information Management, Prentice Hall PTR, 1997. ISBN: 0132073250, 9780132073257
3. Ze-Nian Li. Mark S. Drew, Fundamentals of Multimedia, First Edition 2004, ISBN: 81-297-0-438-2.
4. Tay Vaughan, Multimedia Making it work, Sixth Edition, Tata McGraw-Hill, 2003. ISBN-13: 978-0072230000.
5. John F. Koegel Buford, Multimedia Systems, Third Edition, 2000, ISBN: 8177588273.

11IT301 INTERNETWORKING

Credits: 4:0:0

Course Objective:

- To understand the layers of TCP/IP and how all protocols in the TCP/IP suite fit into the five-layer model.
- To understand the possibilities of interconnecting multiple physical networks into a coordinated system.
- To learn the details of the global TCP/IP internet including the architecture of its router system and the application protocols it supports.
- To learn the working principles of Multiprotocol Label Switching.

Pre-requisites: Fundamentals of Computer Networks.

Unit I

Layering – TCP/IP Layering – Internet Addresses – The Domain Name System –Encapsulation – Demultiplexing – Port Numbers - Ethernet and IEEE 802 Encapsulation -Trailer Encapsulation – SLIP – Compressed SLIP – PPP – Loopback Interface - MTU –Path MTU - IP Header – IP Routing – Subnet Addressing – Subnet Mask – Special Case IP Addresses – IPv6 Addressing – IPv6 Protocol - ARP Packet Format – Proxy ARP –Gratuitous ARP – RARP Packet Format – ICMP Message Types.

Unit II

IP Routing Principles – ICMP Host and Network Unreachable Errors – ICMP Redirect Errors – ICMP Router Discovery Messages - Dynamic Routing – RIP – RIP Version 2 –OSPF – BGP – CIDR - User Datagram Protocol –Broadcasting and Multicasting-IGMP-DNS Basics – DNS Message Format –Resource Records – TFTP Protocol – BOOTP Packet Format.

Unit III

TCP Services – TCP Header – TCP Connection Establishment and Termination –TCP Interactive Data Flow-TCP Timeout and Retransmission- TCP Persist Timer-TCP Keepalive Timer-SNMP Protocol –Telnet and Rlogin – FTP Protocol – SMTP Protocol – NFS Protocol.

Unit IV

MPLS Introduction - Label Switching Basics – Switching and Forwarding Operations – MPLS Key Concepts.

Unit V

Label Distribution Operations - MPLS and ATM and Frame Relay Networks - Traffic Engineering-OSPF in MPLS Networks.

Text Books:

1. W. Richard Stevens, TCP/IP Illustrated Volume – I, The Protocols, Pearson Education, 2000. ISBN: 81-7808-101-6.
2. Uyless Black, MPLS and Label Switching Networks, Pearson Education, Second Edition, 2002. ISBN: 81-7808-650-6.
3. Behrouz A. Forouzan, TCP/IP Protocol Suite, Tata McGraw Hill, Fourth Edition, 2006. ISBN: 0-07-060004-Xs.

Reference Book:

1. Douglas E. Comer, Internetworking with TCP/IP – Principles, Protocols and Architecture, Pearson Education, Fifth Edition, 2007. ISBN: 978-81-203-2998-0.

11IT302 INFORMATION STORAGE AND MANAGEMENT

Credits: 4:0:0

Course Objective:

- Evaluate storage architecture; understand logical and physical components of a storage infrastructure including storage subsystems
- Describe storage networking technologies such as FC-SAN, NAS, IP-SAN and data archival solution – CAS
- Identify different storage virtualization technologies and their benefits
- Understand and articulate business continuity solutions including, backup and recovery technologies, and local and remote replication solutions
- Define information security, and storage security domains
- Identify parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions

Unit I

Introduction to Information Storage: Information Storage – Evolution of Storage Technology and Architecture – Data Centre Infrastructure – Key Challenges in Managing Information – Information Lifecycle , Storage System Environment: Components of a Storage System Environment – Disk Drive Components – Disk Drive Performance – Fundamental Laws Governing Disk Performance – Logical Components of the Host – Application Requirements and Disk Performance, Data Protection: RAID: Implementation of RAID – RAID Array Components – RAID Levels – RAID Comparison – RAID Impact on Disk Performance – Hot Spares

Unit II

Intelligent Storage System: Components of an Intelligent Storage System – Intelligent Storage Array - Direct Attached Storage and Introduction to SCSI: Types of DAS – DAS Benefits and

Limitations – Disk Drive Interfaces – Introduction to Parallel SCSI – SCSI Command Model, Storage Area Networks: Fibre Channel Overview – The SAN and its Evolution – Components of SAN – FC Connectivity – Fibre Channel Ports – Fibre Channel Architecture – Zoning – Fibre Channel Login Types – FC Topologies

Unit III

Network Attached Storage : General Purpose Servers vs NAS Devices – Benefits of NAS – NAS File I/O – Components of NAS – NAS Implementations – NAS File Sharing Protocols – NAS I/O Operations – Factors affecting NAS Performance and Availability, IP SAN: iSCSI – FCIP, Content Addressed Storage : Fixed Content and Archives – Types of Archives – Features and Benefits of CAS – CAS Architecture – Object Storage and Retrieval in CAS – CAS Examples, Storage Virtualization: Forms of Virtualization – SNIA Storage Virtualization Taxonomy – Storage Virtualization Configurations – Storage Virtualization Challenges – Types of Storage Virtualization

Unit IV

Introduction to Business Continuity: Information Availability – BC Terminology – BC Planning Life Cycle – Failure Analysis – Business Impact Analysis – BC Technology Solutions, Backup and Recovery: Backup Purpose – Backup Considerations – Backup Granularity – Recovery Considerations – Backup Methods – Backup Process – Backup and Restore Operations – Backup Topologies – Backup in NAS Environments – Backup Technologies, Local Replication: Source and Target – Uses of Local Replicas – Data Consistency – Local Replication Technologies – Restore and Restart Considerations – Creating Multiple Replicas – Management Interface, Remote Replication: Modes of Remote Replication – Remote Replication Technologies – Network Infrastructure

Unit V

Securing the Storage Infrastructure: Storage Security Framework – Risk Triad – Storage Security Domains – Security Implementations in Storage Networking, Managing the Storage Infrastructure: Monitoring the Storage Infrastructure – Storage Management Activities – Storage Infrastructure Management Challenges – Developing an Ideal Solution

Text Books:

1. EMC Corporation, Information Storage and Management, Wiley Publishing Inc. USA, 2009, ISBN 978-81-265-2147-0.
2. Tom Clark, Designing Storage Area Networks: A Practical Reference for Implementing Fibre Channel and IP SANs, Addison Wesley, Second Edition, 2003, ISBN 978-0321136503.

Reference Books:

1. Robert Spalding, Storage Networks: The Complete Reference, Tata McGraw Hill, 2003, ISBN 978-0-07-053292-2.
2. Meeta Gupta, Storage Area Network Fundamentals, Cisco Press, 2002, ISBN 1-58705-065-X.

11IT303 ANALYSIS OF ALGORITHMS

Credits: 4:0:0

Course Objective:

- To learn the basics of various algorithms
- To learn and understand the various sorting and searching methods.
- To learn the fundamentals of Algebraic problems.

Unit I

Introduction: What is an Algorithm? , Algorithm Specification, Performance Analysis, Randomized Algorithms. Elementary Data Structures: Stacks and Queues, Trees, Priority Queues, Graphs.

Unit II

Divide and Conquer: General Method, Binary Search, Finding the maximum and minimum, Merge sort, Quick sort, Selection, Strassen's Matrix Multiplication, Convex Hull.

Unit III

The Greedy method: The general method, Knapsack Problem, Tree vertex Splitting, Job Sequencing with deadlines, Minimum-cost spanning trees, Optima storage on tapes. Dynamic Programming: The general method, All pairs shortest paths, Single-source shortest paths – Optimal binary search trees – The traveling salesperson problem. Basic Traversal and Search Techniques: Techniques for Binary trees, Techniques for graphs, Connected components and spanning trees, Biconnected components and DFS.

Unit IV

Backtracking: The general method, The 8-Queens problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem. Branch –And-Bound: The Method, 0/1 Knapsack Problem, Traveling Salesperson(*), Efficiency Considerations.

Unit V

Algebraic Problems: The general method, Evaluation and Interpolation, The fast Fourier transform, Modular Arithmetic, Even Faster Evaluation and Interpolation. NP-Hard and NP-Complete Problems: Basic concepts, Cook's theorem, NP-Hard Graph Problems, NP-Hard Scheduling Problems, NP-Hard Code generation problems, Some simplified NP-Hard problems.

Text Book:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Computer Algorithms, Second Edition, Galgotia Publications Pvt. Ltd, 2001. ISBN: 0929306414.

Reference Book:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, University Press(India) Pvt. Ltd, 2008. ISBN: 13:978 81 7371 611 9.
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Second Edition, Pearson Education, 2005. ISBN: 81-7808-670-0.
3. Robert Kruse, C.L.Tondo, Bruce Leung, Data Structures and Program design in C, Second Edition, Pearson Education, 2003. ISBN: 81-7808-496-1.

11IT304 ELEMENTS OF MULTIMEDIA SYSTEMS

Credits: 4:0:0

Course Objective:

- To learn the basic components of multimedia
- To understand the fundamentals of media components such as audio, video and images
- To learn and understand the need of data compression

- To understand various compression methods
- To understand colour schemes in multimedia
- To learn the fundamentals of storage mechanisms in multimedia

Unit I

Introduction: Interdisciplinary aspects of Multimedia-Media characteristics-Media compression-Optical storage-Content Processing-Media and Data Streams: The term "Multimedia" –The term "Media" –Key properties of a multimedia system – Characterizing Data Streams –Audio Technology: What is Sound-Audio representation on computers-Music and the MIDI Standard – Speech Signals-Speech Output-Speech Input-Speech Transmission.

Unit II

Graphics and Images –Introduction –Capturing graphics and Images – Computer assisted Graphics and Image Processing – Reconstructing Images – graphics and Image Output Options – Video Technology: Basics – Television Systems – Digitization of video signals – Digital television – Computer Based Animation: Basic Concepts – Specification of Animations – Methods of controlling Animation – Display of animation – Transmission of Animation – Virtual reality modeling language(VRML)

Unit III

Graphics and Image Data Representations: Graphics/Image Data Types-Popular File Formats-Further Exploration-Colour in Image and video: Colour Science-Colour Models in Images-Colour Models In video

Unit IV

Data Compression: Storage space – Coding Requirements – Source, Entropy, and Hybrid Coding – Basic Compression Techniques – JPEG – H.261 and H.263-MPEG – Fractal Compression-Wavelet Based Coding-The JPEG2000 Standard

Unit V

Optical Storage Media: History of optical storage – Basic Technology – Video Discs and other WORMs – Compact disc digital audio – Compact Disc read only memory-CD-ROM Extended Architecture-Further CD-ROM Based Developments-Compact Disc recordable-Compact Disc Magneto-Optical-Compact Disc Read/Write-Digital Versatile Disc-Closing Observations, Content Analysis: Simple vs Complex features- Analysis Of Individual Images- Analysis Of Image Sequences-Audio Analysis-Applications

Text Books:

1. Ralf Steinmetz, Klara Nahrstedt, Multimedia Fundamentals, Pearson Education, Second Edition, 2004. ISBN: 978-81-317-0976-4.
2. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Education, 2004. ISBN 81-297-0438-2.

Reference Books:

1. J-R Ohm, Multimedia Communication Technology, Springer-Verlag, 2004. ISBN: 3-540-01249-4.
2. Daniel Cunliffe, Geoff Elliott, Multimedia Computing, Crucial, 2003. ISBN: 1-903337-18-6.

11IT305 MULTIMEDIA COMMUNICATION

Credits: 4:0:0

Course Objective:

- To learn the multimedia communication standards and compression techniques.
- To learn the Internet protocols.
- To learn the Multimedia communication across the networks.

Unit I

Multimedia Communications: Introduction-Multimedia networks-Multimedia applications-Applications and networking terminology- Audio compression and Video Compression

Unit II

Standards for Multimedia Communications: Introduction-Reference models-Standards relating to interpersonal communications-Standards relating to interactive applications over the Internet-Standards for entertainment applications. Digital communication basics: Transmission media-Sources of signal impairment-Asynchronous transmission-Synchronous transmission-Error Detection methods

Unit III

The Internet: IP datagrams-Fragmentation and reassembly-IP addresses-ARP and RARP- Routing algorithms-ICMP-QoS support-The PPP link layer protocol-IPv6-IPv6/IPv4 interoperability

Unit IV

Broadband ATM networks: Cell format and switching principles- Switch architectures-Protocol architecture. Entertainment networks and high-speed modems: Cable TV networks-Satellite television networks-Terrestrial television networks-High-speed PSTN access technologies-Transport protocols: TCP/IP protocol suite-UDP-RTP and RTCP

Unit V

Multimedia Communications Across Networks: Packet Audio/Video in the network Environment - Video transport across generic networks-Multimedia transport across ATM networks – Multimedia across IP networks – Multimedia across DSLs – Internet access Networks – Multimedia across wireless - Mobiles Networks – Broadcasting Networks – Digital Television infrastructure for interactive multimedia services

Text Books:

1. Fred Halsall, Multimedia Communications, Pearson, Seventh Indian Reprint, 2005. ISBN: 81-7808-532-1.
2. K .R. Rao, Zaron S. Bojkovic, Dragorad A. Milocanovic, Multimedia Communication Systems, Prentice Hall India, 2002. ISBN: 81-203-2145-6.

Reference Book:

1. Steve Heath, Multimedia and Communication Technology, Second Edition, Focal Press, 2003. ISBN: 81-8147-145-8.

11IT306 WIRELESS SENSOR NETWORKS

Credits: 4:0:0

Course Objective:

- To gain knowledge about the applications of wireless sensor networks
- To learn the technologies and protocols used
- To gain insight on managing the wireless sensor network

Unit I

Introduction and Overview of Wireless Sensor Networks: Background of Sensor Network Technology – Application of Sensor Networks-Basic overview of the technology- Basic Sensor Network Architectural Elements- Survey of Sensor Networks - Applications of Sensor Networks: Introduction- Background-Range of Applications-Examples of Category 2 WSN Applications- Examples of Category 1 WSN Applications-Taxonomy of WSN Technology.

Unit II

Basic Wireless Sensor Technology: Introduction-Sensor Node Technology-Sensor Taxonomy-WN Operating Environment-WN Trends -Wireless Transmission Technology and Systems: Radio Technology Primer-Propagation and Propagation Impairments- Available Wireless Technologies-Campus Applications- MAN/WAN Applications.

Unit III

Medium Access Control Protocols for Wireless Sensor Networks: Introduction-Background-Fundamentals of MAC Protocols-Performance Requirements-Common Protocols-MAC Protocols for WSNs-Sensor-MAC Case Study-IEEE 802.15.4 LR –WPANs Standard Case Study-PHY Layer-MAC Layer.

Unit IV

Routing Protocols for Wireless Sensor Networks: Data Dissemination and Gathering-Routing Challenges and Design Issues in Wireless Sensor Networks-Routing Strategies in Wireless Sensor Networks- Transport Control Protocols for Wireless Sensor Networks: Traditional Transport Control Protocols- Transport Protocol Design Issues- Examples of Existing Transport Control Protocols-Performance of Transport Control Protocols- Middleware for Wireless Sensor Networks :WSN Middleware Principles-Middleware Architecture-Existing Middleware.

Unit V

Network Management for Wireless Sensor Networks-Traditional Network Management Models-Network Management Design Issues-Example of Management Architecture: MANNA-Naming – Localization Operating Systems for Wireless Sensor Networks-Design Issues-Examples of Operating Systems Performance and Traffic Management – WSN Design Issues –Performance Modelling of WSNs-Case Study Simple Computation of the System Life Span.

Text Book:

1. Kazem Sohraby, Daniel Minoli and Taieb Znati, Wireless Sensor Networks: Technology, Protocols, and Applications**,** John Wiley & Sons, 2007, 978-0471743002.

Reference Books:

1. Mohammad Ilyas and Imad MahGoub (Editors), Handbook of Sensor Network: Compact Wireless and Wire Sensing System, CRC Press, 2005, ISBN 0-8493-1968-4.
2. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley & Sons, 2007, 978-0471718161.

11IT307 IP TELEPHONY

Credits: 4:0:0

Course Objective:

- To learn technology basics of IP telephony
- To understand the protocols that support VOIP

Unit I

Protocols for Voice over IP and Interactive Applications: IP Telephony Fundamentals – SGCP, MGCP and NCS overviews – H.323 An Overview of the ITU-T Approach for VOIP Telephony – SIP Summary of Features of the Session Initiation Protocol

Unit II

Media Transport in Packet Networks: RTP and RTCP Definition for Media Transport in IP Networks – RSVP The Resource Reservation Protocol – A Quick look at AAL2 for Voice Transport – Edge Bandwidth Management A look at AAL2

Unit III

Basic Call Control for Voice Telephony: An overview of SS7 – The Services of SSCP and TCAP – Call Control in packet networks – Heterogeneous Call Setup – Mapping SS7 to IP based Call Control – Closing thoughts on mixed network voice Telephony

Unit IV

Metrics for Voice Quality: Voice Quality in Converging TDM and IP Networks – Auditory perception and Testing Methodologies – Perceptual Speech Quality Measurement – Voice Quality Test Instrumentation – Echo measurement and Control

Unit V

Voiceband Call considerations A detailed look at Fax: A look at a Real-time Trace of the T.30 Protocol – Fax over packet networks – Real time Internet Fax – Basics of V.34 Fax – Group 3 Fax error Correction mode(ECM) – Voiceband Data transport Revisited AAL2

Text Book:

1. Bill Douskalis, IP Telephony: The integration of Robust VoIP Services, Pearson Education, 2002, ISBN: 81-7808-285-3

Reference Book:

1. Kevin Brown, IP Telephony Unveiled, CISCO Press, 2004, ISBN 1-58720-075-9.

LIST OF SUBJECTS

Sub. Code	Name of the Subject	Credits
12IT201	Signals and Systems	4:0:0
12IT202	Information Coding Techniques	3:0:0
12IT203	Principles of Mobile Communication	3:0:0
12IT204	Computer Architecture	3:0:0
12IT205	Data Structures and Algorithms	3:0:0
12IT206	Digital Principles and System Design	3:0:0
12IT207	Microprocessor and Interfacing	3:0:0
12IT208	Cryptography and Network Security	3:0:0
12IT209	Computer Networks	3:0:0
12IT210	Communication Engineering	3:0:0
12IT211	Web Technology	3:0:0
12IT212	Multimedia Systems and Design	3:0:0
12IT213	CASE Tools Lab	0:0:2
12IT214	Data Structures and Algorithms in C++	0:0:2
12IT215	Web Technology and Multimedia Lab	0:0:2
12IT216	Digital Design Lab	0:0:2
12IT217	Network Security Lab	0:0:2
12IT218	Microprocessor and Interfacing Lab	0:0:2
12IT219	Networking Lab	0:0:2
12IT220	Computer Graphics	3:0:0
12IT221	Software Testing	3:0:0
12IT222	Software Project Management	3:0:0
12IT223	E-Commerce	3:0:0
12IT224	User Interface Design	3:0:0
12IT225	Essential of Information Technology	3:0:0
12IT226	Computer Hardware and Peripherals Lab	0:0:2
12IT227	Embedded Systems	3:0:0
12IT301	Mobile Computing and Communication	4:0:0
12IT302	High Performance Communication Networks	4:0:0
12IT303	Analysis, Architecture and Design of Networks	4:0:0
12IT304	Wireless Networks Lab	0:0:2
12IT305	Internetworking and Web Technology Lab	0:0:2
12IT306	Network Design and Management Lab	0:0:2
12IT307	Information Security Lab	0:0:2
12IT308	Advanced Communication Engineering	3:0:0
12IT309	Internetworking	4:0:0
12IT310	Network Management	3:0:0
12IT311	Web Technology	4:0:0
12IT312	Information Storage Management	4:0:0
12IT313	Cloud Computing	3:1:0
12IT314	Grid Computing	4:0:0
12IT315	Wireless Sensor Networks	4:0:0
12IT316	Soft Computing	4:0:0
12IT317	Wireless Security	4:0:0
12IT318	Virtual Reality Technology	4:0:0

12IT319	Internetworking Multimedia	4:0:0
12IT320	Digital Image Processing Lab	0:0:2
12IT321	Computer Graphics Lab	0:0:2
12IT322	Elements of Multimedia Systems	4:0:0
12IT323	Computer Graphics	3:0:0
12IT324	Computer Vision	4:0:0
12IT325	Multimedia Communication	4:0:0
12IT326	Computer Animation	3:0:0
12IT327	Computer Vision Lab	0:0:2
12IT328	Animation Lab	0:0:2
12IT329	Interactive Game Design	4:0:0
12IT330	Multimedia Database	4:0:0
12IT331	Mathematical Foundation for Image and video Processing	4:0:0
12IT332	User Interface Design	4:0:0
12IT333	Software Project Management	3:0:0

12IT201 SIGNALS AND SYSTEMS

Credits: 4:0:0

Course Objective:

- To develop continuous-time and discrete-time concepts/methods in parallel, highlighting the similarities and differences
- To feature introductory treatments to applications in areas such as filtering, communication and sampling.

Course Outcome:

- Students will able to understand the fundamental characteristics of signals and systems for both analog and discrete domain
- Students will able to understand the concept of impulse response and convolution in both analog and discrete time domain.
- Students will able to obtain the mathematical skills to solve problems involving convolution, filtering, modulation and sampling.
- Students will able to understand the concept of sampling and reconstruction of analog signals.
- Students will able to understand the concept of Laplace transform and Z-transform and their applications in analysis of linear and time-invariant analog and discrete systems.

Unit I

SIGNAL AND SYSTEMS: Introduction – Continuous Time and Discrete Time signals – Transformations of independent variable – Exponential and sinusoidal signals – Unit Impulse and Unit Step functions – Continuous Time and Discrete Time systems – Basic system properties.

Unit II

LINEAR TIME INVARIANT SYSTEMS: Introduction – Discrete Time LTI systems: Convolution sum – Continuous Time LTI systems: Convolution Integral – Properties of Linear Time-Invariant systems – Causal LTI systems described by differential and difference equations – Singularity functions.

Unit III

FILTERING, TIME AND FREQUENCY CHARACTERIZATION: Frequency shaping and selective filters, Time and frequency characterization Introduction – Magnitude phase representation of Fourier transform – Magnitude phase representation of the frequency response of LTI system – Time Domain properties of ideal frequency selective filters – Time Domain and Frequency Domain aspects of non ideal filters – First order, Second order continuous time system - First order, Second order discrete time system – Example of time and frequency domain analysis of systems

Unit IV

SAMPLING: Introduction – Representation of continuous time signal by its samples: Sampling Theorem – Reconstruction of signal from its samples using interpolation – Effect of under sampling: aliasing – Discrete time processing of continuous time signals – Sampling of discrete time signals – Analysis and Characterization of LTI system using the Laplace Transform, System function algebra and block diagram representation – Unilateral Laplace transform.

Unit V

REPRESENTING SIGNALS BY USING DISCRETE – TIME COMPLEX EXPONETIALS: The Z-transform: Introduction – Region of convergence of Z transform – The inverse Z transform – Geometric evolution of the fourier transform from the Pole-Zero plot – Properties of the Z transform – Some common Z transform pairs - Analysis and Characterization of LTI system using

the Z Transform – System function algebra and block diagram representation – Unilateral Z transform.

Text Book:

1. Alan V Oppenhiem, Alan S Wilsky, and Hamid Nawab S, *"Signals and Systems"*, second edition, Prentice Hall, New Delhi, 2006, ISBN 0138097313.

Reference Books:

1. John G.Proakis and Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, Third Edition., PHI, 2007, ISBN 0133737624.
2. Rodger E. Ziemer, William H. Tranter, D. Ronald Fannin, "Signals and Systems: Continuous and Discrete", Fourth Edition, Prentice Hall, 2001, ISBN 0024316504.
3. Simon Haykin and Barry Van Veen, "Signals and Systems", Second Edition, John Wiley & Sons Inc., New York, 2003, ISBN 0471164747.
4. Steven T. Karris "Signals and Systems: With MATLAB Applications", Second Edition,Orchard Publications, 2003,ISBN 970951167.

12IT202 INFORMATION CODING TECHNIQUES

Credits: 3:0:0

Course Objective:

- To get started in practice of Information Engineering
- To provide idea of Channels and channel capacity
- To study the features the introduction of various Error control codes

Course Outcome:

- Students will be able to evaluate performance of various coding techniques
- Students will be able to understand advanced coding theory of next generation broadband communication systems
- Students will be able to understand the concepts of cryptography fundamentals

Unit I

SOURCE CODING: Introduction to Information Coding – Uncertainty and Information – Average Mutual Information and Entropy – Information Measures for Continuous Random Vriables – Source Coding Theorem – Huffman Coding – The Lempel-Ziv Algorithm – Run Length Encoding and the PCX Format – Rate Distortion Function – Optimum Quantizer Design – Introduction to Image Compression – The JPEG Standard for Lossless Compression - The JPEG Standard for Lossy Compression

Unit II

CHANNEL CAPACITY AND CODING: Introduction- Channel models- Channel capacity- Channel coding- Information capacity Theorem- The Shannon limit- Random selection of codes- The discrete memoryless channel model-channel capacity and the binary symmetric channel- block coding and Shannon second theorem- markov processes and source with memory- Markov chain and data processing- constrained channels- autocorrelation and power spectrum sequences- data translation codes.

Unit III

LINEAR BLOCK CODES: Introduction- Definition- Matrix description-Equivalent codes-Parity check codes- Decoding- Syndrome decoding- Error probability after decoding- Perfect codes - Hamming codes- Optimal linear codes- Maximum distance separable codes

Unit IV

CYCLIC CODES & BOSE CHAUDHURI HOCQUENGHEM (BCH) CODES: Introduction to cyclic codes- Polynomials-The division algorithm for polynomials method for generating cyclic codes-Matrix description of cyclic codes-Burst error correction- Fire Codes- Golay Codes- Cyclic Redundancy Check (CRC) Codes-Circuit Implementation of Cyclic Codes. Bose Chaudhuri Hocquenghem (BCH) Codes: Introduction to BCH codes- Primitive elements-Minimal polynomials-Generator Polynomials in terms of Minimal Polynomials-Some examples of BCH codes-Decoding of BCH codes-Reed Solomon Codes - Implementation of Reed Solomon encoders and decoders-Nested Codes.

Unit V

CONVOLUTIONAL CODES & TRELLIS CODED MODULATION (TCM): Introduction - Tree codes and Trellis codes-Polynomial description (Analytical Representation)-Distance Notions-The Generating Function-Matrix description- Viterbi decoding -Distance Bounds-Performance Bounds-Known good convolutional codes- Turbo Codes-Turbo decoding. Trellis Coded Modulation (Tcm): Introduction-The concept of Coded Modulation-Mapping by set partitioning-Ungerboeck's TCM Design Rules-TCM decoder Performance Evaluation for AWGN Channel-Computation of *dfree*- TCM for Fading Channels.

Text Books:

1. Ranjan Bose, Information Theory, Coding and Cryptography, Tata McGraw-Hill, 2003, ISBN 0070482977.
2. Richard B.Wells, Applied coding and Information Theory for Engineers, Pearson Education, 2005, ISBN 8129704021

Reference Books:

1. Fred Halsall, Multimedia Communications, Applications Networks Protocols & Standards, Pearson education, Asia 2002, ISBN 0201398184.
2. R.E.Blahut, Algebraic Codes for data Transmission, Cambridge University Press Cambridge, UK.2003, ISBN 0521553741.
3. Todd K.Moon, Error Correction Coding, Wiley-Interscience, 2005, ISBN 0471739146.
4. Shu Lin and Daniel J. Costello, Error Control Coding, Second Edition, Prentice Hall, 2002, ISBN 0-13-042672-5.

12IT203 PRINCIPLES OF MOBILE COMMUNICATION

Credits: 3:0:0

Course Objective

- To introduce the various protocols and technologies involved in mobile communication
- To impart to the students, basic knowledge of wireless transmission, LAN and ATM
- To make the students understand the fundamentals of mobile transport layer

Course Outcome

- Students will be equipped with in-depth knowledge of the principles of mobile communication
- The students will acquire the basic concepts of satellite and telecommunication systems and mobile transport layer.

Unit I

INTRODUCTION AND WIRELESS TRANSMISSION: History of Mobile Communication, Simplified Reference Model, Wireless Transmission- Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular Systems, Medium Access Control- SDMA, FDMA, TDMA, and CDMA ; Comparison of S/F/T/CDMA.

Unit II

TELECOMMUNICATION AND SATELLITE SYSTEMS: Telecommunication Systems- GSM, DECT, TETRA, UMTS and IMT- 2000; Satellite Systems- Basics - Routing - Localization – Handover.

Unit III

WIRELESS LAN AND HIPERLAN: Wireless LAN- Infrared Vs radio transmission, Infrastructure and ad hoc networks, IEEE802.11, HYPERLAN, and Bluetooth.

Unit IV

WIRELESS ATM AND MOBILE NETWORK LAYER: Wireless ATM-Motivation, Working group, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Quality of service, Access point control protocol; Mobile network layer- Mobile IP, Dynamic host configuration protocol, Ad-hoc networks.

Unit V

MOBILE TRANSPORT LAYER AND SUPPORT FOR MOBILITY: Mobile transport layer- Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmission/ fast recovery, Selective retransmission, Transaction oriented TCP; Support for mobility-Wireless application protocol, mode, SyncML, WAP2.0.

Text Book

1. Jochen Schiller, Mobile Communications, Pearson Education, Second Edition, 2004. ISBN-10: 0321123816, ISBN-13: 9780321123817.

Reference Books

1. Yi-Bing Lin and Imrich Chlamtac, Wireless and Mobile Network Architecture, John Wiley and Sons, Second Edition, 2001. ISBN: 0-471-39492-0.
2. Jochen Schiller, Mobile Communications, Pearson Education, First Edition, 2000.

12IT204 COMPUTER ARCHITECTURE

Credits: 3:0:0

Course Objective:

- To provide a thorough discussion of the fundamentals of computer architecture.
- To discuss in detail the operation of the control UNIT and arithmetic operations.
- To study in detail the different types of control and the concept of pipelining.

Course Outcome:

- Students will be able to understand the architecture and organization of computer and internal working.
- Students will be able to get a detailed knowledge about arithmetic, addressing modes instruction execution, pipelining and working of micro-operations.

Unit I

COMPUTER ORGANIZATION AND CACHE: Computer organization & architecture, Function & Structure, Top level view of computer components, Computer function, Interrupts, Multiple interrupts, Cache memory.

Unit II

MEMORY SYSTEMS AND EXTERNAL DEVICES: Computer memory systems overview, Semiconductor main memory, Error correction, Advanced DRAM organization, External devices and I/O modules, Programmed I/O, Interrupt driven I/O, Direct Memory

Unit III

COMPUTER ARITHMETIC AND ADDRESSING: Computer Arithmetic - M/C instruction characteristics, Types of operands, Types of operation, Transfer of control, Pentium operations, PowerPC operations, Assembly language, Addressing, Pentium & PowerPC addressing modes

Unit IV

INTERNAL ORGANIZATION AND INSTRUCTION CYCLE: Processor and Register organization, Instruction cycle, Instruction pipelining, Intel 80486 pipelining, Pentium & Power PC processors.

Unit V

MICRO OPERATIONS: Micro operations, Control of the CPU, Intel 8085, Hardwired implementation, Micro programmed control basic concept, Microinstruction sequencing, Microinstruction execution.

Text Book:

1. William Stallings, Computer Organization and Architecture, Sixth Edition, Prentice Hall India, 2003. ISBN: 81-7808-792-8.

Reference Books:

1. John P.Hayes, Computer Organization and Architecture, McGraw Hill, Third Edition, 1998. ISBN: 0-07-115997-5.
2. John L.Hennessy, David A.Patterson, Computer Architecture, Third Edition. ISBN: 81-
3. 8147-205-5.

12IT205 DATA STRUCTURES AND ALGORITHMS

Credits: 3:0:0

Course Objective:

- To learn and to be able to judge the appropriateness of alternate implementations of elementary data structures such as Stacks, Queues, Trees, and Graphs in computer programming.
- To learn different sorting methods and applications.

Course Outcome:

- Students will be able to use and implement fundamental data structures including stacks, queues, priority queues, lists and trees.
- Students will be able to implement search and sorting algorithms including the quick sort, the heap sort and hashing.
- Students will be able to use recursion and Back Tracking to solve problems.

Unit I

ELEMENTARY DATA STRUCTURES: Introduction to Data Structures - Stacks – Introduction to Recursion – Principles of Recursion –Back Tracking: Postponing the work – Queues – Definitions – Implementation of Queues – Circular Queues – Application of Queues: Simulation – Linked Queues.

Unit II

LISTS & SEARCHING: List Specification - Implementation of Lists – Linked list in Arrays - Searching: Introduction and Notation – Sequential Search – Binary Search – Comparison Trees.

Unit III

SORTING: Introduction and Notation – Insertion Sort – Selection Sort – Shell Sort – Divide and Conquer Sorting, Merge sort for Linked Lists – Quick Sort for Contiguous Lists – Heap and Heap Sort – Table and Information Retrieval - Introduction - Rectangular Arrays – Tables of Various Shapes – Application: Radix Sort – Hashing.

Unit IV

TREES: Binary Trees – Binary Search Trees – Building a Binary Search Trees – Height Balance: AVL Trees – Multi way Trees: B-Trees.

Unit V

GRAPHS: Mathematical Background – Graph Traversal - Topological Sorting – A Greedy Algorithm – The Polish Notation: The Problem – The Idea – Evaluation of polish notation – Translation from infix to Polish form.

Text Book

1. Robert L.Kruse, Bruce P Leung and Clovis L.Tondo, Data Structures and Program Design, Prentice Hall, Second Edition, 1997, 4th Indian Reprint 2003 ISBN – 81-7808-496-1.

Reference Books

1. Mark Allen Weiss, Data Structures and Algorithms Analysis in C++, Second Edition, Pearson Education, 1999. ISBN: 81-7808-670-0.
2. Peter Smith, Applied Data Structures with C++, First Edition, Narosa Publishers, 2004. ISBN: 81-7319-617-6.
3. Sartaj Sahni, Data Structures, Algorithms and Applications in C++, Second Edition, Silicon Press, 2005. ISBN: 81-7371-522-X.

12IT206 DIGITAL PRINCIPLES AND SYSTEM DESIGN

Credits: 3:0:0

Course Objective:

- To understand different methods used for the simplification of Boolean functions.
- To design and implement combinational, synchronous, and asynchronous sequential circuits.

- To study the fundamentals of HDL.

Course Outcome:

- Students will be able to apply the principles of Boolean Algebra to manipulate and minimize logic expressions and use of K-maps to minimize and optimize two-level logic functions up to 5 variables
- Students will be able to understand the operation of latches, flip-flops, counters, registers, and register transfers
- Students will be able to analyze the operation of sequential circuits built using various flip-flops, the concepts of data paths, control UNITs and micro-operations and building block of digital systems.
- Students will be able to design two-level logic functions with AND, OR, NAND, NOR and XOR gates with minimum number of gate delays or literals, combinational circuits using decoders, ROM, Synchronous Sequential and Asynchronous Sequential circuits

Unit I

BOOLEAN ALGEBRA AND LOGIC GATES: Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map – Logic gates.

Unit II

COMBINATIONAL LOGIC: Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL).

Unit III

DESIGN WITH MSI DEVICES: Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits.

Unit IV

SYNCHRONOUS SEQUENTIAL LOGIC: Sequential circuits – latches -Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters - HDL for registers and counters.

Unit V

ASYNCHRONOUS SEQUENTIAL LOGIC: Analysis and design procedure of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards.

Text Book:

1. M.Morris Mano, Digital Design, Fourth edition, Pearson Education, PHI 2007. ISBN :0131989243

Reference Books:

1. Charles H.Roth, Jr. Fundamentals of Logic Design, Fifth Edition, Ontario-Thomson Publications, 2006. ISBN: 0534378048.
2. Donald D.Givone, Digital Principles and Design, Tata McGraw-Hill, 2003. ISBN 0072525037

12IT207 MICROPROCESSORS AND INTERFACING

Credits: 3:0:0

Course Objective:

- The course deals with applications, organization, architecture and design of microprocessors systems
- To implement interfacing from a microprocessors based system to peripheral devices

Course Outcome:

- Students will be able to learn how the hardware and software components of a microprocessor-based system work together to realize system-level features
- Students will be able to understand both hardware and software aspects of integrating digital devices (such as memory and I/O interfaces) into microprocessor-based systems
- Students will be able to understand the operating principles of, and gain hands-on experience with, common microprocessor peripherals such as UARTs, timers, and analog-to-digital and digital-to-analog converters

Unit I

ARCHITECTURE OF 8088/86: Introduction – 8088 & 8086 Microprocessors architecture – software model of 8088/8086Microprocessor – Memory address space & data organization – Data types Segment registers and memory segmentation – Dedicated reserved and general use Memory Instruction Pointer – Data Registers – Pointers and Index Registers – Status Registers Generating a Memory Address – The Stack – I/O Address space

Unit II

PROGRAMMING 8088/86: Instruction set – Addressing Modes – Integer instructions and computations – Control flow instructions and Program structures.

Unit III

MEMORY I/O INTERFACES: Minimum-mode and Maximum-mode systems – Minimum-mode and Maximum-mode Interface signals – Electrical Characteristics – Bus cycle & Time states –Hardware organization of the memory address space – Address Bus status codes – Memory control signals – Read/Write Bus Cycles – Memory Interface Circuits – Types of I/O –Isolated I/O interface – I/O Data Transfer – I/O Instructions – I/O Bus Cycles

Unit IV

I/O INTERFACE CIRCUITS: core and special purpose I/O Interfaces – Byte wide I/O ports using Isolated I/O – I/O Handshake and parallel printer interface – 8255A Programmable Peripheral Interface – Memory Mapped I/O 8254A - Programmable Interval Timer- 8237A Programmable Direct Memory Access controller – Serial Communication Interface – Programmable Communication Interface Controllers – Keyboard & Display Interfaces – 8279 Programmable Keyboard/Display Controller.

Unit V

INTERRUPT INTERFACE OF 8088 & 8086 MICROPROCESSORS: Interrupt mechanism – Types & Priority– Interrupt Vector Table – Interrupt Instructions – Enable/Disable of Interrupts – External Hardware – Interrupt sequence – 8259A Programmable Interrupt Controller– Interrupt Interface Circuits using 8259A – S/W Interrupts – NonMaskable Interrupt Reset – Internal Interrupt functions.

Text Book:

1. Walter A. Triebel, Avatar Singh, The 8088 & 8086 Microprocessor, program, Interfacing, Software, Hardware and Applications, Prentice Hall of India, Fourth Edition, 2002. ISBN 81-297-0298-3

Reference Books:

1. Badri .Ram Fundamentals of Microprocessors and Microcomputers, Prentice Hall of India, Fifth Edition, 2003. ISBN 0-07-043448-4
2. Douglas V. Hall, Microprocessors and Interfacing Programming and Hardware, Tata Mc Graw Hill, Second Edition, 1991, Reprint 2004. ISBN 0-07-025742-6

12IT208 CRYPTOGRAPHY AND NETWORK SECURITY

Credits: 3:0:0

Course Objective

- To facilitate the students to understand the different kinds of security issues.
- To introduce the various principles of cryptosystems.
- To make the students aware of hashing algorithms and digital signatures.

Course Outcome:

- Students will be enabled to put into practice the various symmetric and asymmetric key algorithms.
- Students will understand the importance of network security.
- Students will be equipped the students to handle different kinds of attacks.

Unit I

SYMMETRIC KEY CIPHERS: Security Attacks – Security Services – Security Mechanisms – Block cipher principles – The Data Encryption Standard – The Strength of DES – Evaluation Criteria for AES – The AES Cipher

Unit II

ASYMMTERIC KEY CIPHERS: Principles of Public-Key Cryptosystems – The RSA Algorithm – Key Management – Diffie-Hellman Key Exchange – Elliptic Curve Cryptography

Unit III

HASHING AND AUTHENTICATION ALGORITHMS: Secure Hash Algorithms – Whirlpool – CMAC – HMAC – Digital Signature Standard – Kerberos – X.509 Authentication Service

Unit IV

E-MAIL AND IP SECURITY: Pretty Good Privacy – S/MIME – IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Security Payload

Unit V

WEB SECURITY: Web Security Considerations – Secure Socket Layer and Transport Layer Security – Secure Electronic Transactions – Intruders – Intrusion Detection – Password Management – Firewall Design Principles – Trusted Systems

Text Book:

1. William Stallings, Cryptography and Network Security, Fourth Edition, Prentice Hall, 2006. ISBN: 81-203-3018-8.

Reference Books:

1. Bruce Schneier, Applied Cryptography, Second Edition, John Willey and Sons, 2002. ISBN: 9971-51-348-X
2. Wenbo Mao, Modern Cryptography, First Edition, Pearson Education,2004. ISBN: 81-297-0692-X
3. Roberta Bragg, Mark Rhodes, Keith Strassberg, Network Security, Tata McGraw Hill Edition,2004. ISBN-13: 978-0-07-058671-0
4. Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security, Second Edition, Prentice Hall, 2002. ISBN: 81-203-2213-4.

12IT209 COMPUTER NETWORKS

Credits: 3:0:0

Course Objective:

- To introduce key trends on network principles and practices.
- To provide a top down approach which focus on the internet and its accessible styles.

Course Outcome:

- Students will be able to understand the organization of computer networks, factors influencing computer network development and the reasons for having different types of networks.
- Students will be able to understand the Internet structure and can see how standard problems are solved in that context.
- Students will be able to analyze network protocols and understand literature concerning computer networks.

Unit I

INTRODUCTION: Computer Networks and the Internet-The network edge-The Network Core-Access networks and physical media-ISPs and Internet backbones- Delay and loss in packet switched networks- Protocol layers and their service models

Unit II

APPLICATION LAYER: Principles of network applications- The web and the HTTP- File transfer: FTP- Electronic mail in the internet- DNS- The Internet's Directory Service- P2P file sharing-Socket Programming with TCP, Socket Programming with UDP

Unit III

TRANSPORT LAYER: Introduction to transport layer services- Multiplexing and De–Multiplexing- Connectionless transport: UDP- Principles of reliable data transfer-Connection-oriented transport: TCP-Principles of congestion control-TCP congestion control

Unit IV

NETWORK LAYER: Introduction-Virtual circuit and datagram networks- What's inside a router?-The Internet protocol (IP): Forwarding and addressing in the internet- Routing algorithms-Routing in the Internet

Unit V

LINK LAYER: introduction and services- Error detection and correction techniques- multiple access protocols-Link layer addressing-Ethernet, Network Management**:** Introduction-The Infrastructure for Network Management- the Internet standard management framework-ASN 1

Text Book:

1. J. F. Kurose, K. W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, 4th Ed, Addison-Wesley,2007, ISBN 0321497708.

Reference Books

1. William Stallings, Data and Computer Communications, Prentice Hall, Eighth Edition, 2007,ISBN9780132433105
2. Andrew S.Tanenbaum, Computer Networks, Prentice Hall of India, fourth edition, 2002 ISBN 0130661023.
3. F.Halsai ,Data Communications, Computer Networks and Open Systems, Addison-Wesley Publications , Fourth Edition ,1996,ISBN 9780201422931
4. W. Richard Stevens , TCP/IP Illustrated Volume – I " The Protocols , Addison Wesley Longman, 1995,ISBN 9780201633542

12IT210 COMMUNICATION ENGINEERING

Credits: 3:0:0

Course Objective:

- To learn the functional blocks and circuitry used in modulators and transmitters
- To understand the benefits and weaknesses of FM/PM compared with each other and with AM
- To understand the relationship between analog signals and their digital representation in various digital formats
- Use state transition diagrams to map out the possible states of the communication system
- To understand the technical and operating requirements of RS-232 standard and to troubleshoot RS-232 interfaces.

Course outcome:

- Students will be able to understand the communications systems into system-specific architectures.
- Students will be able to understand the advantages and disadvantages of individual communications systems, system characteristics and requirements, elements of system build-out, and measurement and analysis of system performance.

Unit 1

ANALOG MODULATION TECHNIQUES: Fourier and spectrum analysis -Amplitude Modulation - Receivers for AM: RF stage - IF stage - Frequency and phase modulation

Unit II

COMMUNICATION MEDIUM: Wire and Cable Media: Parameters - Balanced and Unbalanced Lines - Drivers and Receivers--Propagation and Antennas-Digital information

Unit III

DIGITAL COMMUNICATION: Digital information -Digital Communication Fundamentals-Digital Communication Systems - Digital Modulation and Testing**.**

Unit IV

TV, RS232 AND MODEM: TV/Video, facsimile- RS 232 Interface Standard, Modems and High Speed POTS Links

Unit V

SATELLITE AND CELLULAR COMMUNICATION: Satellite Communication - Navigation, Global Positioning System - Cellular Telephone and advanced wireless systems

Text Book:

1. William Schweber, Electronic Communication Systems A complete course, Fourth edition, Prentice Hall International,2002 ISBN: 0130916218

Reference Books:

1. Simon Haykin, Communication Systems, Fourth Edition,2006.Wiley publications ISBN: 812650904X
2. Michael O. Kolawole, Satellite Communication Engineering ,Published by CRC Press, 2002. ISBN :082470777X, 97808247077
3. Anokh Singh, Principles Of Communication Engineering, Published by S Chand & Company Ltd, 2006.ISBN: 8121904765

12IT211 WEB TECHNOLOGY

Credits: 3:0:0

Course Objective:

- To build web applications using ASP and client side script technologies use with Microsoft's IIS.
- To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.

Course Outcome:

- Students will be able to create richly interactive environments natively within browsers.
- Students will be able to build web application frameworks which facilitate rapid application development.
- Students will be able to integrate web applications easily into other server-side web procedures, such as email and searching.

Unit I

VBSCRIPT LANGUAGE ELEMENTS: Constants - Variables and Data Types - Mathematical Operations - Logical Operators - Looping and Decision Structures - VBScript Functions and Objects - Data Conversion Functions - Mathematical Functions - Data Formatting Functions - Text Manipulation Functions - Data and Time Functions - Built-in Objects.

Unit II

ASP FUNDAMENTALS: Using Server Side Includes- Learning the SSI Directives – Creating Modular ASP Code - Using the Request Object - Using Form Information - Using Query String Information – Using Server Variables - Using the Response Object - Create Output – Managing Output – Managing the Connection.

Unit III

USING COOKIES: Introduction to Cookies – Cookies and Your Browser – Creating a Cookie – Modifying and removing Cookies – Tracking Preferences with Cookies Using the Application,

Session, and Server Objects - The application Object - The Session Object – The Server Object – Using the global .asa file - Active Data Objects Essentials - Microsoft's Universal Data Access Strategy – The Connection Object – The Record set and Field Objects – The Command and Parameter Objects – Using the Errors Collection.

Unit IV

XML: What is XML - Why are Developers Excited About XML? – The Life of an XML documents - Related technologies- Your First XML Document - Hello XML – Exploring the Simple XML Document – Assigning Meaning to XML Tags – Writing a Style Sheet for an XML Document – Attaching a Style Sheet to an XML Document – Style Languages - CSS Style Sheets,CSS Layouts,CSS Text Styles.

Unit V

ATTRIBUTES, EMPTY TAGS &XSL: Attributes – Attributes versus Elements – Empty Elements and Empty Element Tags – XSL-DTDs and Validity: Document Type Definitions - Element Declarations – DTD Files – Document Type Declarations – Validating Against a DTD- Element Declaration - Entity Declarations: What Is an Entity – Internal General Entities – External General Entities – Internal Parameter Entities – External Parameter Entities – Building a Document from Places-Attribute Declaration: What is an Attribute – Declaring Attributes in DTDs - Declaring Multiple Attributes – Specifying Default Values for Attributes – Attribute Types – Predefined Attributes – A DTD for Attribute- Based Baseball Statistics.

Text Books:

1. Eric A. Smith, "ASP 3 Programming Bible", Wiley-Dreamtech India (P) Ltd, 2003, ISBN: 81- 265-0049-2.
2. Elliotte Rusty Harold, "XML Bible", IDG Books India (P) Ltd, 2003,Second Edition , ISBN: 81- 265-0212-6.

Reference Books:

1. Dave Mercer, ASP 3.0 Beginners Guide, Tata McGraw-Hill Edition, Sixth reprint, 2004, ISBN: 0072127414.
2. Kenneth L. Spencer, Kenneth C. Miller & Lauran Lassesen, Introducing VBScript &
3. ActiveX, Comdex Computer Publication, 1997, ISBN: 9780764580109.

12IT212 MULTIMEDIA SYSTEMS AND DESIGN

Credits: 3:0:0

Course Objective:

- To present a step-by-step approach to multimedia systems design
- To introduce multimedia standards and compression and decompression technologies.
- To provide a detailed analysis of the various storage technologies

Course Outcome:

- Students will be capable of understanding different realizations of multimedia tools and their usage.
- Students will be capable of implementing various multimedia standards and compression technologies
- Students will be capable of analyzing various storage technologies

Unit I

MULTIMEDIA SYSTEMS DESIGN: An Introduction – Multimedia Elements – Multimedia applications – Multimedia Systems Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Need for Data compression - Multimedia Databases.

Unit II

COMPRESSION AND DECOMPRESSION: Types of compression – Binary Image compression Schemes – Color, Gray scale and Still - video Image compression – Video Image Compression - Audio compression – Fractal Compression.

Unit III

MULTIMEDIA INPUT/OUTPUT TECHNOLOGIES: Key Technology Issues – Pen Input – Video and Image Display systems – Print output technologies – Image scanners - Digital Voice and Audio – Digital Camera - Video images and animation – Full-motion video.

Unit IV

STORAGE AND RETRIEVAL TECHNOLOGIES: Magnetic Media Technology – Optical Media – Hierarchical Storage management – Cache management for storage systems.

Unit V

MULTIMEDIA APPLICATION DESIGN: Multimedia Application classes – Types of Multimedia systems – Virtual reality design – Components of Multimedia systems – Organizing Multimedia databases – Application workflow design issues – Distributed application design issues.

Text Book:

1. Prabhat K Andleigh and Kiran Thakrar, Multimedia Systems and Design, PHI, 2003. ISBN: 81-203-2177-4.

Reference Books:

1. Tay Vaughan, Multimedia Making it work,Fourth Edition, Tata McGraw-Hill. ISBN: 0-07-463953-6.
2. Ze-Nain Li, Mark S.Drew, Fundamentals of Multimedia, PHI. ISBN :81-203-2817-5.
3. John F. Koegel Buford, Multimedia Systems, Third Edition, 2000. ISBN: 8177588273.
4. Gaurav Bhatnager, Shikha Mehta, Sugata Mitra, Introduction to Multimedia Systems, First Edition, 2004. ISBN: 0125004524.

12IT213 CASE TOOLS LAB

Credits: 0:0:2

1. Study of software engineering basics and UML
2. Study of UML diagrams with an example
3. Implementation of use case diagram with an example
4. Implementation of class diagram with an example
5. Implementation of sequence diagram with an example
6. Implementation of collaboration diagram with an example
7. Implementation of state chart diagram with an example
8. Implementation of Activity diagram with an example
9. Implementation of Component diagram with an example

10. Implementation of Deployment diagram with an example
11. Forward and Reverse Engineering

12IT214 DATA STRUCTURES AND ALGORITHMS IN C++ LAB

Credits: 0:0:2

1. Implementation of Stack
2. Implementation of Queue
3. Implementation of towers of Hanoi
4. Implementation of Singly Linked List
5. Implementation of doubly Linked List
6. Implementation of linear and binary searching
7. Implementation of insertion and selection sort
8. Implementation of shell and quick sort
9. Implementation of merge sort
10. Implementation of Heap sort
11. Implementation of binary search tree

12IT215 WEB TECHNOLOGY AND MULTIMEDIA LAB

Credits: 0:0:2

1. Working with HTML
2. Working with VB-Script
3. Form validation using VB-Script
4. Usage of Session Object
5. Online Ticket Reservation
6. Word game design using ASP
7. Working with Database
8. Working with XML and CSS
9. Working with XML and XSL
10. Adobe Photoshop
11. Macromedia Flash MX
12. Macromedia Flash MX- Calculator

12IT216 DIGITAL DESIGN LAB

Credits: 0:0:2

1. a. Study of Logic Gates
   b. Realization of Logic gates using universal gates
2. Half Adder and Full Adder implementation using Logic Gates
3. Design of Decoder and Encoder implementation using Logic Gates
4. Multiplexer and De-multiplexer implementation using Logic Gates
5. Code Converter implementation using Logic Gates
6. Parity generator and Checker implementation using Logic Gates
7. a. Study of Flip-Flops
   b. Implementation of Shift Register
8. Implementation of Counters using Flip Flops

9. a. Study of Verilog Hardware Description Language
   b. Binary Adder using Verilog Hardware Description Language.
10. Shift Register using Verilog Hardware Description Language.

12IT217 NETWORK SECURITY LAB

Credits: 0:0:2

1. Substitution and Transposition Cipher
2. Vignere cipher
3. RSA Implementation
4. One-time Pad
5. Simplified DES
6. Feistel Cipher
7. Diffie-Hellman Key Exchange
8. Frequency Analysis on Caesar Cipher
9. Digital Signature Algorithm
10. Hashed Message Authentication Code
11. Message Digest-5
12. Secure Electronic Transaction

12IT218 MICROPROCESSORS AND INTERFACING LAB

Credits: 0:0:2

1. Study of 8086 /8088
2. Arithmetic Operations
3. String Operations
4. Operations on arrays
5. Code Conversion
6. 8255 Programmable peripheral Interface
7. 8253 Programmable Interval Timer
8. 8259 Programmable Interrupt Controller
9. 0809 Analog to Digital Converter
10. 0800 Digital to Analog Converter
11. 8279 Programmable Display Interface
12. Stepper Motor Interface

12IT219 NETWORKING LAB

Credits: 0:0:2

1. TCP two way communication
2. UDP two way communication
3. File Transfer Protocol
4. Remote method Invocation
5. Shortest path Algorithm
6. Study of Wireless Network
7. Realization of wireless network using WAP and wireless adaptors
8. Router Management
9. Introduction of OPNET
10. Simulation of LAN and Ethernet

11. Simulation of WAN
12. Simulation of TCP
13. Network Design
14. Video Conferencing Application

12IT220 COMPUTER GRAPHICS

Credits: 3:0:0

Course Objective:

- To understand the fundamental idea of graphics and animation.
- The learn the concept of Principles of 2D Graphics, 3D Graphics, Visible Surface Determination**,** are studied in detail for a competitive computer professional.

Course Outcome:

- Students will be able to understand the basic concepts of geometric modeling and computer graphics.
- Students will be able to offer intuitive, attractive and efficient designs that maintains a crisp clarity along aesthetic lines.
- Students will be able to develop skills in the design and analysis of practical engineering problems through the integration of geometric modeling, and computer graphics.

Unit I

BASIC PRINCIPLES OF TWO DIMENSION GRAPHICS: Raster versus vector graphics-The first java 2D program-Basic geometric objects-Geometric transformations-Homogenous coordinates- Applications of transformations-Geometric transformations in java 2D-Animation and movements based on transformations- Interpolators for continuous changes- implementations of interpolators in Java 2D-Single or double precision.

Unit II

DRAWING LINES AND CURVES: Lines and pixel graphics-The midpoint algorithm for lines-Structural algorithms-Pixel densities and line styles-Lineclipping-Midpoint algorithm for circles-Drawing arbitrary curves-Antialiasing-Drawing thick lines-Filling areas-Buffered images in java 2D-Displaying text-Text in java 2D-Grey images and intensities-Colour Model-Colour Interpolation with java 2D.

Unit III

BASIC PRINCIPLES OF THREE DIMENSIONAL GRAPHICS: Geometric transformations-The scenegraph-Elementary geometric objects in java 3D-The scenegraph in java 3D- Animations and moving objects- Projections in Java 3D-Modelling Three dimensional objects-Three Dimensional objects and their surfaces-Topological notions-Modelling techniques-Surface Modeling with polygons in java 3D-importing geometric objects in to java3D-Parametric curves and freedom surfaces-normal vectors for surfaces.

Unit IV

VISIBLE SURFACE DETERMINATION: Clipping volumes-Algorithms for visible surface determination-Image precision techniques-Priority algorithms-Illumination and shading- Light sources-Light sources in java 3D-Reflection-Shading in java 3D-Shading-Shadows-Transparency-Textures-Textures in java 3D-The radiosity model-Ray tracing.

Unit V

SPECIAL EFFECTS AND VIRTUAL REALITY: Fog and particle systems- Fog in Java 3D-Dynamic surfaces- Interaction-Interaction in Java 3D-Collision detection-Collision detention in Java 3D-Sound effects-Sound effects in Java 3D- stereoscopic viewing.

Text Book:

1. Frank Klawonn, Introduction to Computer Graphics Using Java 2D and 3D, Springer, 2008, ISBN: 978-1-84628-847-0

Reference Books:

1. Rick Parent, Computer Animation Algorithms and Techniques, Morgan Kaufmann publishers, 2002, ISBN 1558605797
2. James D.Foley, et al,Computer Graphics Principles and Practices, Addison Wesley, 1996,ISBN-31-2043-22-2,
3. F.S.Hilljr ,Computer graphics using Open GL,Prentice Hall of India,2006,ISBN-81-203-2813-2
4. Peter Shirley, et al, Fundaments of Computer Graphics, AK Peters Ltd, 2005, ISBN: 978-1-56881-269-4**.**
5. Issac Victor Kerlow, The Art of 3D Computer Animation and Effects, John Wiley,2004, ISBN:0471430366 .

12IT221 SOFTWARE TESTING

Credits: 3:0:0

Course Objective:

- To highlight the importance of the software testing during software development.
- To provide an exposure to the development tools and languages for testing.

Course Outcome:

- Students will be capable of understanding the reason behind software testing.
- Students will be capable of gaining knowledge about the methods in software testing.

Unit I

BASICS AND TOOLS FOR TESTING: Assessing testing-capabilities and competencies-Creating an environment supportive of software testing-Building Software testing process-Tools available for software testing-selecting and using tools.

Unit II

TESTING PROCESS: Seven step Testing process- Overview- Organizing for testing-Developing test plan-Verification Testing.

Unit III

VALIDATION AND ACCEPTANCE TESTING: Validation testing-Analyzing and reporting test results-Acceptance and operational testing.

Unit IV

POST TESTING: Post-Implementation Analysis-Testing Client/Server Systems-RAD testing-Testing COTS and contracted software.

Unit V

TESTING OF APPLICATION: Testing software system security-Testing a data warehouse-Testing Web-based systems

Text Book:

1. William Perry, Effective Methods for Software Testing, Third Edition, John Wiley and Sons, 2006, ISBN 81-265-0893-0.

Reference Books:

1. Ron Patton, Software Testing, SAMS Publishers, 2001, ISBN 0672319837.
2. Ilene Burnstein, Practical Software Testing, Springer, 2003, ISBN NO: 81-8128- 089-X.
3. Glenford J.Myers, "The Art of Software Testing", Second Edition, John Wiley & Sons, 2004, ISBN 047167835X.
4. Boris Beizer, John Wiley & Sons, Black-Box Testing: Techniques for Functional Testing of Software and Systems, 1995, ISBN 0471120944

12IT222 SOFTWARE PROJECT MANAGEMENT

Credits: 3:0:0

Course Objective:

- To provide an overview of the concepts, processes, and techniques associated with formal project management and to learn about the project management strategies.
- To develop skills that will enable to construct software of high quality, software that is reliable, easy to understand, modify and maintain.
- To foster an understanding on the importance of these skills.

Course Outcome:

- Students will be able to plan and manage projects at each stage of the project development
- Students will be able to acquire skills for tracking and controlling software deliverables
- Students will be able to build an effective and committed team and keep them motivated day to day
- Students will be able to describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Students will be able to implement a project by managing project schedule, expenses and resources using suitable project management tools.

Unit I

TRADITIONAL PROJECT MANAGEMENT - PART I: What is a Project - Traditional, Adaptive, Extreme: A Dynamic Project Management Landscape - Defining the Project – Building the Work Breakdown Structure.

Unit II

TRADITIONAL PROJECT MANAGEMENT - PART II: Estimating Duration, Resource Requirements, and Cost - Constructing and Analyzing the Project Network Diagram - Finalizing the Schedule and Cost Based on Resource Availability - The Need to Plan: Conducting the Joint Project Planning Session.

Unit III

TRADITIONAL PROJECT MANAGEMENT - PART III: Building and Managing an Effective Project Team - Monitoring and Reporting Project Progress - Closing out the Project - Critical Chain Project Management..

Unit IV

ADAPTIVE PROJECT FRAMEWORK: Introduction - Version Scope - Cycle Plan - Cycle Build - Client Checkpoint - Post-Version Review - Extreme Project Management and Other Variations to APF.

Unit V

ORGANIZATIONAL CONSIDERATIONS: Project Portfolio Management - Project Support Office.

Text Book:

1. Robert K. Wyzocki, Rudd McGary, Effective Project Management, WILEY Dreamtech, 2006, Edition: 4, illustrated, revised ISBN 0470042613, 9780470042618.

Reference Books:

1. Walker Royce "Software Project Management – A Unified Framework ", Pearson Education, 2004. ISBN :0201309580, 9780201309584.
2. Bob huges, Mike cotterell, "Software Project Management", Tata McGraw Hill, New Delhi, 2002. ISBN: 1850321906, 9781850321903.

12IT223 E-COMMERCE

Credits: 3:0:0

Course Objective:

- To have an awareness about role of IT in business.
- To have knowledge of basic concepts of ecommerce.
- To have in depth knowledge in security and legal issues in ecommerce.

Course Outcome:

- Able to identify the type of ecommerce and security mechanism to be used for particular application.
- Able to build virtual book store based on requirements.

Unit I

ECOMMERCE INTRODUCTION AND WWW – Electronic commerce and physical commerce-Digital phenomenon-ecommerce different perspective-types-examples-scenarios-changes brought by ecommerce-advantages-myths about ecommerce-system model-Internet and World Wide Web **–**Overview of internet-history of internet-web system architecture-URL-HTTP-Dynamic web page-cookies-Client Side Programming-Factors-web page design-HTML-Text formatting-Link-Images-Image MAP-Tables-Frames-Form-CSS-Javascript.

Unit II

SERVELET DATABASE AND SESSION: Server side Programming**:** Servlet Fundamentals **–** Three tier model-CGI-ASP-Java Servlet-Architecture-API-Building VBS-Compilation and execution of servlets-Interactive servlet program- Database Connectivity **–** Relational database systems-JDBC-JDBC program-Advanced book query-JDBC servlet-Session Tracking-Traditional session tracking techniques-Servlet session tracking API-VBS shopping cart.

Unit III

SECURITY: Basic Cryptography for enabling e-commerce **–** Security concerns-Encryption-Private key encryption-key distribution problem-Diffie Hellman-Public key encryption-RSA-Hybrid-Stream cipher and block cipher-Message digest-Authentication code-Digital Signature-Authentication-Internet Security **–** Ip sec protocol-Security associations-Authentication header-ESP service-Application-Firewalls-Types of firewall-SSL-Advanced Technologies for e-commerce -Mobile agents-WAP-XML-Data mining.

Unit IV

PAYMENT SYSTEMS: Internet Payment Systems –4C Payment system-SET Protocol-Ecash-Echeck-Micropayment-Smart card-Mondex- Consumer oriented e-commerce –Traditional retailing- Benefits-Key success factors- Model of eretailing-Features-Developing consumer oriented ecommerce-PASS model-Business oriented ecommerce-B2B-Business model-Integration.

Unit V

WEB ADVERTISING AND VBS: Web Advertising and Web Publishing – Web advertising versus internet advertising-advertising techniques-business model-pricing model-web publishing-Website development-Logical design-Usability Testing-Web presence and visibility-Building the Virtual Book Store-VBS homepage design-Form validation-Search engine-Quick search-Category search-Advanced search-Access control –cart login.

Text Book:

1. Henry Chan, Raymond Lee, Tharam Dillon and Elizabeth Chang, E-Commerce Fundamentals and Applications, John Wiley and Sons Ltd., 2001. ISBN 9971-51-411-7

Reference Books:

1. R Kalokota, Andrew V.Winston, Elecronic Commerce-a Managers Guide, Fourth Edition, Pearson Education, 2006. ISBN:81-780-8158-X.
2. ErfanTurban,Dave King,Jae Kyu Lee,Dennis Viehland ,Electronic Commerce-A Managerial Perspective, Fourth Edition Pearson Education,2006:ISBN: 81-780-8362-0.

12IT224 USER INTERFACE DESIGN

Credits: 3:0:0

Course Objective:

1. To understand the basics of User Interface Design.
2. To design the user interface, design, menu creation and windows creation
3. To understand the concept of menus, windows, interfaces, business functions, various problems in windows design with color, text, Nonanthropomorphic Design.
4. To study the importance of documentation.

Course Outcome:

- Students will be able to understand development methodologies , evaluation techniques and user interface building tools
- Students will be able to design their own Human Computer Interaction design project

Unit I

USABILITY OF INTERACTIVE SYSTEMS, GUIDELINES, PRINCIPLES, AND THEORIES AND MANAGING DESIGN PROCESSES: Introduction - Usability Measures - Usability Motivations - Universal Usability - Goals for Our Profession - Introduction – Guidelines – Principles - Theories - Introduction - Organizational Design to Support Usability - The Four Pillars of Design - Development Methodologies - Ethnographic Observation - Participatory Design - Scenario Development - Social Impact Statement for Early Design Review - Legal Issues

Unit II

EVALUATING INTERFACE DESIGNS, DIRECT MANIPULATION AND VIRTUAL ENVIRONMENTS AND MENU SELECTION, FORM FILL-IN, AND DIALOG BOXES : Introduction - Expert Reviews - Usability Testing and Laboratories - Survey Instruments - Acceptance Tests - Evaluation During Active Use - Controlled Psychologically Oriented

Experiments - Introduction - Examples of Direct Manipulation - Discussion of Direct Manipulation - 3D Interfaces – Teleoperation - Virtual and Augmented Reality - Introduction - Task-Related Menu Organization - Single Menus - Combinations of Multiple Menus - Content Organization - Fast Movement through Menus

Unit III

SELECTION, FORM FILL-IN, DIALOG BOXES, COMMAND AND NATURAL LANGUAGES AND INTERACTION DEVICES: Data Entry with Menus: Form Fill-in, Dialog Boxes and Alternatives - Audio Menus and Menus for Small Displays - Introduction - Command-Organization Functionality, Strategies, and Structure - Naming and Abbreviations - Natural Language in Computing - Introduction - Keyboards and Keypads - Pointing Devices - Speech and Auditory Interfaces - Displays – Small and Large

Unit IV

COLLABORATION AND SOCIAL MEDIA PARTICIPATION, QUALITY OF SERVICE AND BALANCING FUNCTION AND FASHION: Introduction - Goals of Collaboration and Participation - Asynchronous Distributed Interfaces: Different Place, Different Time - Synchronous Distributed Interfaces: Different Place, Same Time - Face-to-Face Interfaces: Same Place, Same Time **–** Introduction - Models of Response Time Impacts - Expectations and Attitudes - User Productivity - Variability in Response Time - Frustrating Experiences - Introduction - Error Messages - Nonanthropomorphic Design - Display Design - Web Page Design - Window Design - Color

Unit V

USER DOCUMENTATION AND ONLINE HELP, INFORMATION SEARCH AND INFORMATION VISUALIZATION: Introduction - Online versus Paper Documentation - Reading from Paper versus from Displays - Shaping the Content of the Documentation - Accessing the Documentation - Online Tutorials and Animated Demonstrations - Online CommUNITies for User Assistance - The Development Process - Introduction - Searching in Textual Documents and Database Querying - Multimedia Document Searches - Advanced Filtering and Search Interface - Introduction - Data Type by Task Taxonomy - Challenges for Information Visualization

Text Book:

1. Ben Shneiderman, Maxine Cohen, the user interface-Strategies for Effective Human-Computer Interaction, Fifth Edition, Pearson Education, 2008. ISBN-13: 9780321537355

Reference Books:

1. Wilbert. O. Galitz , The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques,Second Edition, John Wiley and Sons, 2007. ISBN 81-265-0280-0
2. JoAnn T. Hackos, Janice C. Redish, User and Task Analysis for Interface Design,First Edition, Wiley, ISBN 978-0471178316
3. Alan J. Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, Janet E. Finley., Human-Computer Interaction, Second Edition, Prentice Hall, 1998. ISBN 978-0132398640
4. Helen Sharp, Yvonne Rogers, Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, Second Edition, Wiley, 2007. ISBN-13: 978-0470018668

12IT225 ESSENTIAL OF INFORMATION TECHNOLOGY

Credits: 3:0:0

Course Objectives:

- To provide extensive knowledge on IT Essentials including client-server modeling, designing data store, and working with Internet.
- To document artifacts using common quality standards.

Course Outcome:

- Students will able to understand the steps in the IT project lifecycle and demonstrate the ability to execute each of these steps at a professional level.
- Students will able to understand techniques, skills, and tools necessary for engineering practice.
- Students will be able to analyze a problem, and identify and define the computing requirements appropriate to its solution

Unit I

FUNDAMENTALS OF COMPUTER ARCHITECTURE AND OPERATING SYSTEM:
Fundamentals of Computer architecture-introduction-organization of a small computer-Central Processing UNIT - Execution cycle – Instruction categories – measure of CPU performance Memory – Input/output devices - BUS-addressing modes - System Software –Assemblers – Loaders and linkers – Compilers and interpreters - Operating system – introduction – memory management schemes - Process management - Scheduling – threads.

Unit II

PROBLEM SOLVING WITH ALGORITHMS AND USER INTERFACE DESIGN: Problem solving with algorithms- Programming styles – Coding Standards and Best practices - Introduction to C Programming Testing and Debugging-Code reviews System Development Methodologies – Software development Models User interface Design – introduction – The process – Elements of UI design and reports.

Unit III

RDBMS: RDBMS- data processing – the database technology – data models. ER modeling concept –notations – Extended ER features- Logical database design – normalization SQL – DDL statements – DML statements – DCL statements - Writing Simple queries – SQL Tuning techniques – Embedded SQL – OLTP.

Unit IV

OBJECT ORIENTED CONCEPTS: Objected oriented concepts – object oriented programming - UML Class Diagrams– relationship – Inheritance – Abstract classes – polymorphism Object Oriented Design methodology - Common Base class Alice Tool – Application of OOC using Alice tool.

Unit V

COMPUTER NETWORKS AND INTRODUCTION TO INFORMATION TECHNOLOGIES: Client server computing - Internetworking – Computer Networks – Working with TCP/IP – IP address – Sub netting – DNS – VPN – proxy servers World Wide Web – Components of web application - browsers and Web Servers - URL – HTML – HTTP protocol – Web Applications - Application servers – Web Security.

Text Books:

1. Andrew Tanenbaum, Modern Operating Systems, Pearson Education, Third Edition, 2007. ISBN-10: 0136006639, ISBN-13: 9780136006633.
2. Elmasri, Navathe, Fundamentals of Database Systems, Addison Wesley, Fifth Edition, 2006. ISBN-10: 0321369572, ISBN-13: 978-0321369574.

Reference Books:

1. Sivasubramanyam Y, Deepak Ranjan Shenoy, Foundation Program - Computer Hardware & System Software Concepts, version 1.0 Vol-1, Infosys: Campus Connect 2008.
2. Hanumesh V.J.,Seema Acharya, Foundation Program - Relational Database Management System, Client Server Concepts, Introduction to Web technologies version 1.0 Vol-2, Infosys: Campus Connect 2008.
3. Sundar K.S., Foundation Program - Analysis of Algorithms, Object Oriented Concepts, System Development Methodology, User Interface Design version 1.0 Vol-3, Infosys: Campus Connect 2008.

12IT226 COMPUTER HARDWARE AND PERIPHERALS LAB

Credits: 0:0:2

1. Study of different types of cables and network topologies
2. Study of different types of network devices
3. Study and identification of Major parts of PC
4. Assembly and Disassembly of PC
5. Study and identification of Major parts of Laptop
6. Assembly and Disassembly of Laptop
7. Connecting a small LAN
8. IP configuration and Subnet masking.
9. Study and troubleshoot the boot process
10. Installation and configuration of Windows 2000
11. Router configuration
12. Implementation of Wireless Network
13. Study, Identification, Assembly and Disassembly of Keyboard and Mouse
14. Study, Identification, Assembly and Disassembly of Printer and Monitor

12IT227 EMBEDDED SYSTEMS

Credits: 3:0:0

Course Objectives:

- To understand the architecture of embedded processors, microcontrollers, and peripheral devices.
- To appreciate the nuances of programming micro-controllers in assembly for embedded systems.
- To understand the challenges in developing operating systems for embedded systems. To learn about programming these systems in high-level languages such as C.

Course Outcome:

- Students will be able to understand the embedded systems design, embedded programming and their operating system.

Unit I

EMBEDDED COMPUTING : Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

Unit II

MEMORY AND INPUT / OUTPUT MANAGEMENT: Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupt handling.

Unit III

PROCESSES AND OPERATING SYSTEMS: Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.

Unit IV

EMBEDDED C PROGRAMMING: Programming embedded systems in C – C-looping structures – Register allocation –Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.

Unit V

EMBEDDED SYSTEM DEVELOPMENT : Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design issues – Design methodologies – Case studies – Complete design of example embedded systems.

Text Books

1. Wayne Wolf, "Computers as Components:Principles of Embedded Computer System Design", Elsevier, 2006.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems",Pearson Education,Second edition,2007(UNIT 1)
4. Andrew N Sloss, D. Symes, C. Wright," Arm system developers guide", Morgan Kauffman/ Elsevier, 2006. (UNIT 4)

Reference Books

1. Michael J. Pont, "Embedded C", Pearson Education , 2007.
2. Steve Heath, "Embedded System Design", Elsevier, 2005.

12IT301 MOBILE COMPUTING AND COMMUNICATION

Credits: 4:0:0

Course Objective:

- To impart the basic principles of mobile computing and communication.
- To introduce to the students, basic knowledge of wireless transmission, LAN and mobile network layer.
- To enable the students to understand the latest mobile devices and services.

Course Outcome:

- Students will be equipped with in-depth knowledge of the concepts of mobile communication.
- Students will able to acquire the latest techniques in pervasive computing, software and services.

Unit I

WIRELESS TRANSMISSION AND BROADCAST SYSTEMS: Introduction –Wireless transmission: Antennas - Spread Spectrum - Cellular systems -Medium access control: SDMA-FDMA- TDMA-CDMA– Comparison of S/T/F/CDMA -Telecommunication systems: GSM - DECT – TETRA - UMTS and IMT 2000 – Broadcast systems : Cyclic repetition of data - Digital audio broadcasting - Digital video broadcasting.

Unit II

WIRELESS LAN AND WIRELESS ATM: Wireless LAN: Infrared Vs Radio transmission - Infrastructure and adhoc networks – IEEE 802.11 – HIPERLAN– Bluetooth- Wireless ATM: WATM services - Reference model functions- Radio access layer – Handover - Location Management – Addressing –Mobile quality of service - Access point control protocol

Unit III

MOBILE NETWORK LAYER AND SUPPORT FOR MOBILITY: Mobile network layer: Mobile IP - Dynamic host configuration protocol - adhoc networks - Mobile transport layer : Traditional TCP-- Indirect TCP - Snooping TCP - Mobile TCP – Fast retransmit/ fast recovery - Transmission/ time-out freezing - Selective retransmission - Transaction oriented TCP - Support for mobility : File systems - World Wide Web – Wireless application protocol – i-mode – SyncML – WAP 2.0.

Unit IV

INTRODUCTION TO PERVASIVE COMPUTING AND DEVICES: Pervasive Computing – Information Access Devices - Smart Identification – Embedded Controls - Entertainment Systems.

Unit V

SOFTWARE AND SERVICES: Software – Java-Operating Systems-Client Middleware-Security-New services – Home Services - Travel and Business Services- Consumer Services

Text Books:

1. Jochen Schiller, Mobile Communication, Pearson Education, Second Edition 2003. ISBN 81-7758-263-1.
2. Uwe Hansmann, Lothar Merk, Martin S.Nicklous and Thomas Stober, Principles of Mobile Computing, Second Edition, Springer International Edition, 2003. ISBN 81-8120-073-3.

Reference Books:

1. Jochen Schiller, Mobile Communication, Pearson Education, 2000. ISBN 81-7808-170-9.
2. Yi-Bing Lin and Imrich Chlamtac, Wireless and Mobile Network Architecture, JohnWiley and Sons Inc., 2001. ISBN 0-471-39492-0.
3. William Stallings, Wireless Communications and Networks, Pearson Education, 2002. ISBN 81-7758-355-7.

12IT302 HIGH PERFORMANCE COMMUNICATION NETWORKS

Credits: 4:0:0

Course Objective:

- To develop a comprehensive understanding of network architectures, protocols, control, performance, and economies
- To focus on the convergence of the telephone, computer networking, cable TV, and wireless networks that explains current and emerging networking technologies.

Course Outcome:

- Students will be able to describe and determine the Packet switched networks, circuit switched networks, Internet and TCP / IP Networks.
- Students will be able to develop the Wireless Network and control of networks
- Students will be able to describe and determine the ATM, Optical network and the various switching techniques.

Pre-requisites: Computer Networks

Unit I

PACKET - SWITCHED NETWORKS, INTERNET AND TCP/IP NETWORKS: OSI and IP models - Ethernet (IEEE 802.5) - Token Ring - FDDI - DQDB - Frame Delay – SMDS. Internet and TCP/IP Networks: The Internet -Overview of Internet Protocols - Internet Protocol - TCP and UDP - Internet Success and Limitation - Performance of TCP/IP Network.

Unit II

CIRCUIT SWITCHED NETWORKS AND ATM: Performance of Circuit Switched Networks - SONET - Dense Wave Division Multiplexing (DWDM) - Fiber to the Home - Digital Subscriber Line (DSL) - Intelligent Networks – CATV. ATM: Main Features of ATM - Addressing Signaling & Routing - Header Structure - ATM Adaptation layer - Management control - BISDN - Internetworking with ATM.

Unit III

WIRELESS NETWORKS AND CONTROL OF NETWORKS: Introduction - The wireless channel - Link level design - Channel access - Network design - Wireless Networks Today - Future Systems and standards. Control of Networks: Objectives and methods of control – Circuit Switched Networks –Datagram networks **–** ATM Networks

Unit IV

CONTROL OF NETWORKS – MATHEMATICAL BACKGROUND AND OPTICAL NETWORKS: Markov Chains - Circuit Switched Networks –Datagram networks **–** ATM Networks. Optical Networks: Optical Links - DWDM Systems - Optical Cross Connects - Optical LANs-Optical paths and Networks.

Unit V

SWITCHING: Switch Performance Measure – Time and Space Division Switching – Modular Switch Designs – Packet Switching – Distributed Buffer – Shared Buffer – Output Buffer – Input Buffer. Global Multimedia Network: Attributes of the Global Network – Technology areas – Challenges.

Text Book:

1. Walrand. J. Varaiya, High Performance Communication Network, Morgan Kaufmann-Harcourt Asia Pvt., Ltd., 2nd Edition, 2000, ISBN 15-5860-574-6.

Reference Books:

1. J.F.Kurose & K.W. Ross, Computer Networking-A top-down approach featuring the internet, Addison Wesley, 4th Edition, 2007, ISBN 03-2149-770-8.
2. William Stallings, ISDN & Broadband ISDN with frame Relay & ATM, Pearson Education, 4th Edition, 2000, ISBN 81-7808-422-8.
3. Rainer Handel, Manfred N. Huber, Steffen Schroeder, ATM Networks, Concepts, Protocols Applications, Pearson Education, 3rd Edition, 1999, ISBN 81-7808-338-8.

4. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edition, Addison-Wesley, 1996, ISBN 81-7808-098-2.

12IT303 ANALYSIS, ARCHITECTURE AND DESIGN OF NETWORKS

Credits: 4:0:0

Course Objective:

- This course covers the principles of network analysis, architecture, and design. These principles help in identifying and applying the services and performance levels that a network must satisfy.
- Principles of network analysis include network service characteristics, performance characteristics, network requirements analysis, and network flow analysis.
- Principles of network architecture and design include addressing and routing, network management architecture, performance architecture and design, security and privacy architecture, and quality of service design.

Course Outcome:

- Students will be able to develop a comprehensive understanding of the Analysis, Architecture and Design methodologies as applied to Network or Solution projects.
- Students will be able to gain an interdisciplinary understanding of the relationships and interactions between Network AA&D, Systems AA&D theories, principals, methods and techniques Project Management and Systems-of-Systems Architectures.
- Students will be able to create a knowledge base for understanding various Simulation/Emulation Tools

Prerequisites: Computer Networks

Unit I

INTRODUCTION – Overview of Analysis, Architecture and Design Processes – A Systems Methodology – System Description – Service Description – Service Characteristics – Performance Characteristics – Network Supportability. Requirements Analysis: Concepts – User Requirements – Application Requirements – Device Requirements – Network Requirements – Other Requirements – The Requirements Specification and Map.

Unit II

REQUIREMENTS AND – FLOW ANALYSIS: Process – Gathering and Listing Requirements – Developing Service Metrics – Characterizing Behavior – Developing RMA Requirements – Developing Delay Requirements – Developing Capacity Requirements – Developing Supplemental Performance Requirements – Environment-Specific Thresholds and Limits – Requirements for Predictable and Guaranteed Performance – Requirements Mapping – Developing the Requirements Specification – Flow Analysis: Flows – Identifying and Developing Flows – Data Sources and Sinks – Flow Models – Flow Prioritization – Flow Specification – Example Application of Flow Analysis.

Unit III

NETWORK ARCHITECTURE, ADDRESSING AND ROUTING ARCHITECTURE: Component Architectures – Reference Architecture – Architectural Models – Systems and

Network Architectures – Addressing and Routing Architecture: Addressing Mechanisms – Routing Mechanisms – Addressing Strategies – Routing Strategies – Architectural Considerations.

Unit IV

NETWORK MANAGEMENT, PERFORMANCE, SECURITY AND PRIVACY ARCHITECTURE: Defining Network Management – Network Management Mechanisms – Architectural Considerations – Performance Architecture: Developing Goals for Performance – Performance Mechanisms – Architectural Considerations – Security and Privacy Architecture: Developing a Security and Privacy Plan – Security and Privacy Administration – Security and Privacy Mechanisms – Architectural Considerations.

Unit V

NETWORK DESIGN: Design Concepts – Design Process – Vendor, Equipment, and Service-Provider Evaluations – Network Layout – Design Traceability – Design Metrics - Selecting Technologies for Network Design: Developing Goals for Network Design – Developing Criteria for Technology Evaluation – Guidelines and Constraints on technology Evaluations – Making Technology Choices for the Network Design – Interconnecting Technologies within the Network Design: Shared medium (No Interconnection) – Switching – Routing – Hybrid Mechanisms – Applying Interconnection Mechanisms to the Design.

Text Book:

1. James D. McCabe, Network Analysis, Architecture and Design, Third Edition, Elsevier, 2007. ISBN: 978-0-12-370480-1.

Reference Books:

1. James D. McCabe, Network Analysis, Architecture and Design, Second Edition, Elsevier, 2003. ISBN: 1-55860-887-7.
2. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, Prentice Hall, Upper Saddle River, New Jersey, 2003. ISBN: 0-13-066102-3

12IT304 WIRELESS NETWORKS LAB

Credits: 0:0:2

Course Objectives:

- To simulate various communication and mobility models of wireless Networks
- To understand the characteristics of wireless MAC Protocols.
- To analyze the performance of various wireless routing protocols.
- To give hands on experience on protocol analyzer.

Lab Exercises:

1. Performance analysis of Unicast routing protocol for ad hoc network.
   - i) Table-driven protocols (e.g., link state or DSDV)
   - ii) On demand protocols with caching (e.g., DSR, AODV, TORA)
   - iii) Hybrid protocols (e.g., ZRP, contact-based architectures)
   - iv) Hierarchical protocols (e.g., cluster based and landmark-based)
   - v) Geographic routing (e.g., greedy routing, GPSR)
2. Performance analysis of Multicast routing for ad hoc network.
   - i) Using tree-based or mesh-based approaches (ODMRP, CAMP, FGMP)
   - ii) Extensions of unicast ad hoc routing (MAODV, MCEDAR)
3. Performance analysis of broadcast routing

i) Using naïve flooding, heuristics (e.g., probabilistic, counter based),
ii) Minimum dominating sets (e.g., MPR multi-point relays, CEDAR)

4. Resource discovery and rendezvous routing using contact-assisted protocols (e.g., MARQ, CARD, PARSE), and distributed consistent hashing (e.g.,Rendezvous regions, GHT)
5. Comparison between various Wireless MAC protocols (CSMA/CA (802.11), MACA, MACAW, PAMAS, SMAC)
6. Analysis of using TCP over various queuing disciplines (FIFO, RED, and WFQ).
7. Measurement of physical and MAC layer characteristics of wireless Links: using signal strength, data rate, retransmission and delay measurements. Program for bit stuffing and CRC computation
8. Comparison of various mobility models using GloMoSim/NS2 (Random way point, group mobility, highway model, Manhattan model,hybrid models, Spatial correlation, temporal correlation, relative speed, link durations)
9. Measurement of network parameters for WLAN (SNR, overall throughput and Delay)
10. Short range Bluetooth communications (formation of Piconet and scatternet) (Topology maintenance and Multihop transmissions, Mobility issues,File transfer rate)
11. Analysis of various protocols using protocol analyzer. (Wireshark, tcpdump, iperf)

12IT305 INTERNETWORKING AND WEB TECHNOLOGY LAB

Credits: 0:0:2

1. Client - Server chat using TCP
2. Client - Server chat using UDP
3. File Transfer using FTP
4. Data Dictionary
5. IP Addressing and Subnet Masking
6. Online shopping using Request and Response Object
7. Online Quiz using Cookies
8. Changing background Color using Session Objects
9. Active Data Objects
10. Creating menu Using CSS and Ajax
11. Changing webpage style using DHTML and Ajax

12IT306 NETWORK DESIGN AND MANAGEMENT LAB

Credits: 0:0:2

1. Introduction to NS-2 and Installation Guide
2. Throughput Calculation using AWK Scripts and Band width Calculation using Loss Monitor
3. Simulation of TCP using NS-2
4. Performance evaluation of Routing Protocols
5. Performance evaluation of Different Queues and effect of Queues and buffer
6. Ping implementation using NS2
7. Introduction of OPNET and theory about OPNET
8. Simulation of LAN and Ethernet
9. Simulation of Switched LAN
10. Network Design
11. Simulation of TCP
12. Simulation of UDP

12IT307 INFORMATION SECURITY LAB

Credits: 0:0:2

1. Substitution Cipher and Transposition Cipher
2. One time Pad
3. Simplified DES
4. Vignere Cipher
5. RSA
6. Diffie-Hellman Key Exchange
7. Frequency Analysis on Caesar Cipher
8. Feistel Cipher
9. Digital Signature algorithm
10. HMAC

12IT308 ADVANCED COMMUNICATION ENGINEERING

Credits: 3:0:0

Course Objectives:

- To impart in-depth knowledge on the basic concepts of Modern Digital and Data Communications Systems and Networks
- To provide better understanding of Optical fiber Transmission, Satellite and Microwave Radio Communication

Course Outcome:

- Students will be equipped with in-Depth knowledge about digital modulation techniques and systems
- Students will be able to learn about components, architecture, protocols and topology of data communications
- Students will be able to learn of optic fiber and satellite communication

Unit I

DIGITAL MODULATION AND TRANSMISSION: Introduction-Information capacity-Amplitude Shift Keying-Frequency Shift Keying-Phase Shift Keying-Quadrature Amplitude Modulation-Bandwidth Efficiency-Carrier recovery-Clock Recovery-Differential Phase Shift Keying-Trellis Code Modulation-Pulse Modulation-PCM sampling-Signal to Quantization Noise Ratio-PCM codes-Coding Methods-Companding-Vocoders-Delta Modulation PCM-Differential PCM-Pulse Transmission.

Unit II

DATA COMMUNICATIONS: History of DataCommunications-NetworkArchitecture-Protocols-Standards-Organizations -Layered Network Architecture-Open System Interconnection-Circuits-Serial and Parallel Data Transmission-Circuit Arrangements-Networks-Codes-Error control, detection and correction-Character Synchronization-Data communication hardware-Line control UNIT- Modems.

Unit III

DATA LINK PROTOCOLS AND NETWORKS: Protocol Functions-Character and Bit Oriented Data link protocols-Asynchronous and Synchronous Data link protocol-Synchronous and High level Data link control-Public Switched Data Networks-CCITT X.25 User to Network Interface Protocol-Integrated Services Digital Network-Asynchronous Transfer Mode-Local Area Networks-Ethernet.

Unit IV

DIGITAL MULTIPLEXING AND OPTICAL FIBER TRANSMISSION: Time Division Multiplexing-T1 Digital Carrier-Line Encoding-T Carrier Systems-Digital Carrier Frame Synchronization-Bit versus Word Interleaving-Statistical Time Division Multiplexing-Codecs and Combo chips-Frequency Division Multiplexing-Wavelength Division Multiplexing-History of Optical Fiber Communications-Optical Fibers versus Metallic Cable Facilities-Electromagnetic spectrum-Optical fiber communications system –Fiber types-Light Propagation-Optical Fiber Configurations and Classifications-Losses in Optical Fiber Cables-Light Sources-Optical Sources-Light Detectors-Lasers.

Unit V

MICROWAVE RADIO COMMUNICATIONS AND SATELLITE COMMUNICATIONS: Introduction-Advantages and Disadvantages of Microwave Radio-Analog versus Digital Microwave-FM Microwave Radio System-Radio Repeaters- Radio Stations- Diversity-Protection Switching Arrangements-Microwave Repeater Station-History of satellites-Keplers Laws-Satellite orbits-Geosynchronous satellites-Antenna Look angles-Satellite classifications-Spacing and Frequency Allocation-Radiation Patterns-Satellite System Link Models.

Text Book:

1. Wayne Tomasi, Advanced Electronic Communication Systems, Sixth Edition, Prentice Hall of India, 2005. ISBN: 81-203-2497-8.

Reference Books:

1. George Kennady, Bernard Davis, Electronic communication systems, Fourth Edition, Tata McGraw Hill. ISBN: 978-0-07-463682-4.
2. Hebert Taub, Donald L Schilling, Principles of Communication Systems, Third Edition, Tata McGraw Hill, 2008. ISBN: 978-0-07-064811-1.
3. Simon Haykins, Communication Systems, Fifth Edition, Wiley Publications, 2009. ISBN: 978-0471697909.
4. Timothy Pratt, Satellite Communications, Second Edition, John Wiley & Sons, 2003. ISBN: 9814-12-684-5.
5. Ray Horak, Communication Systems and Networks, Third Edition, Wiley Publications, 2002. ISBN: 978-0764548994.

12IT309 INTERNETWORKING

Credits: 4:0:0

Course Objective:

- To understand the layers of TCP/IP and how all protocols in the TCP/IP suite fit into the five-layer model.
- To understand the possibilities of interconnecting multiple physical networks into a coordinated system.

- To learn the details of the global TCP/IP internet including the architecture of its router system and the application protocols it supports.
- To learn the working principles of Multiprotocol Label Switching.

Course Outcome:

- Students will be able to identify the various TCP/IP protocols that used for particular networking application, the type of Interior and exterior routing protocol that used for different networks.
- Students will be able to understand the behavior of internetworking different networks in MPLS networks.

Pre-requisites: Fundamentals of Computer Networks.

Unit I

LAYERING, LINK LAYER AND IP PROTOCOLS: Layering – TCP/IP Layering – Internet Addresses – The Domain Name System –Encapsulation – Demultiplexing – Port Numbers - Ethernet and IEEE 802 Encapsulation -Trailer Encapsulation – SLIP – Compressed SLIP – PPP – Loopback Interface - MTU –Path MTU - IP Header – IP Routing – Subnet Addressing – Subnet Mask – Special Case IP Addresses – IPv6 Addressing – IPv6 Protocol - ARP Packet Format – Proxy ARP –Gratuitous ARP – RARP Packet Format – ICMP Message Types.

Unit II

DYNAMIC ROUTING PROTOCOLS ,UDP PROTOCOL: IP Routing Principles – ICMP Host and Network Unreachable Errors – ICMP Redirect Errors – ICMP Router Discovery Messages - Dynamic Routing – RIP – RIP Version 2 –OSPF – BGP – CIDR - User Datagram Protocol –Broadcasting and Multicasting-IGMP-DNS Basics – DNS Message Format –Resource Records – TFTP Protocol – BOOTP Packet Format.

Unit III

TCP PROTOCOL &APPLICATION LAYER PROTOCOLS :TCP Services – TCP Header – TCP Connection Establishment and Termination –TCP Interactive Data Flow-TCP Timeout and Retransmission- TCP Persist Timer-TCP Keepalive Timer-SNMP Protocol –Telnet and Rlogin – FTP Protocol – SMTP Protocol – NFS Protocol.

Unit IV

MPLS SWITCHING AND FORWARDING OPERATIONS: MPLS Introduction - Label Switching Basics – Switching and Forwarding Operations – MPLS Key Concepts.

Unit V

LABEL DISTRIBUTION, ATM AND FRAME RELAY NETWORKS, TRAFFIC ENGINEERING & OSPF: Label Distribution Operations - MPLS and ATM and Frame Relay Networks - Traffic Engineering-OSPF in MPLS Networks.

Text Books:

1. W. Richard Stevens, TCP/IP Illustrated Volume – I, The Protocols, Pearson Education, 2000. ISBN: 81-7808-101-6.
2. Uyless Black, MPLS and Label Switching Networks, Pearson Education, Second Edition, 2002. ISBN: 81-7808-650-6.
3. Behrouz A. Forouzan, TCP/IP Protocol Suite, Tata McGraw Hill, Fourth Edition, 2006. ISBN: 0-07-060004-Xs.

Reference Book:

1. Douglas E. Comer, Internetworking with TCP/IP – Principles, Protocols and Architecture, Pearson Education, Fifth Edition, 2007. ISBN: 978-81-203-2998-0.

12IT310 NETWORK MANAGEMENT

Credits: 3:0:0

Course Objectives:

- To present the foundations of models which are needed to build various network management architectures and protocols.
- To provides exposure to SNMP-based protocols that manage TCP/IP networks with real-world examples.

Course Outcome:

- Students will be able to acquire the knowledge of basic network management concepts, SNMPv1 Network management organization, Information models, communication and functional models
- Students will be able to compare and analyze SNMPv2 and SNMPv3
- Students will be able to gain theoretical background about RMON, network management tools and systems and web based management

Unit I

DATA COMMUNICATIONS AND NETWORK MANAGEMENT OVERVIEW: Introduction-Analogy of telephone network management -Data and Telecommunication network-Distributed Computing Environments-TCP/IP Based Networks –Communication Protocols and standards-Network Management: Goals, Organization and Functions-Network Management System Platform.

Unit II

SNMPV1 NETWORK MANAGEMENT: SNMPV Network Management – History – Internet or Organizations and standards – SNMP Models – Organization Model – Information Model – Communication Model-Functional Model.

Unit III

SNMP MANAGEMENT: SNMP V2 – System Architecture – Structure Of Management Information – MIB – Protocol –Compatibility with SNMPV1 – SNMPV3 – Documentation – Architecture-Applications – MIB security – User band security model access control.

Unit IV

SNMP MANAGEMENT RMON,TOOLS & SYSTEMS: Remote Monitoring – RMON SMI and MIB – RMON1 – RMON2 – ATM Remote Monitoring –Case Study of Internet Traffic Using RMON-Network Management Tools – Network Statistics Measurement Systems – History of Enterprise Management – Network Management Systems – Commercial Network Management Systems – system Management – Enterprise Management Solution.

Unit V

WEB BASED MANAGEMENT: Web based Management – Web Interface – Desktop Management Interface – Enterprise Management – WBEM –Java Management Extension.

Text Book:

1. Mani Subramanian, Network Management Principles and Practice, Addison Wesley, 2000. ISBN: 0201357429.

Reference Books:

1. Stephen B. Morris, Network Management, MIBs and MPLS: Principles Design and Implementation, Pearson, 2003. ISBN-10: 0131011138, ISBN-13: 9780131011137.
2. Alexander clemm, Network Management Fundamentals, CISCO Press, 2006. ISBN: 1587201372.
3. Sebastian Abeck, Adrian Farrel, Network Management Know it all, Elsevier Morgan Caufmann, 2008. ISBN: 9780123745989.

12IT311 WEB TECHNOLOGY

Credits: 4:0:0

Course Objectives:

- To enable the student to design, develop, build and manage real web applications using current software development technologies and methodologies.
- To highlight the features of different Scripting Languages and Open source web development.

Course Outcome:

- Students will be able to understand the technologies and protocols used on the Internet.
- Students will be able to acquire knowledge on the effective Internet tools technologies in web-based applications and web development methodologies.

Unit I

HTML AND JAVASCRIPT: HTML Essentials- Document Structure Elements - Text Formatting - Positioning tags - List Tags - Table Formatting Tags - Other Tags - Exploring Javascript - Javascript and HTML Text-Variables-Operators -Global Variables-Expressions – Conditionals – Looping - Javascript Functions – Objects – Arrays.

Unit II

ASP FUNDAMENTALS: Using Server Side Includes - Learning the SSI Directives – Creating Modular ASP Code - Using the Request Object - Using Form Information - Using Query String Information – Using Server Variables - Using the Response Object- Create Output – Managing Output – Managing the Connection.

Unit III

COOKIES AND ACTIVE DATA OBJECTS: Using Cookies - Introduction to Cookies – Cookies and Your Browser – Creating a Cookie Modifying and removing Cookies – Tracking Preferences with Cookies - Using the Application, Session, and Server Objects - The application Object - The Session Object – The Server Object – Using the global .asa file - Active Data Objects Essentials - Microsoft's Universal Data Access Strategy – The Connection Object – The Recordset and Field Objects – The Command and Parameter Objects-Using the Errors Collection.

Unit IV

XML, AJAX AND DYNAMIC HTML: Creating Ajax Applications - Writing Ajax-Interacting with Server-Side Code-Passing Data to Server Side - XML and Ajax - Creating XML-Handling XML with JavaScript-Retrieving Data from an XML Document - Accessing XML Attributes Values- Cascading Style Sheets and Ajax: Ajax Enabled Menus-Getting Text Noticed in Ajax Applications-Scrolling Text- Styling Text Using CSS- Styling Colors and Backgrounds Using

CSS-Styling Locations in Web Pages- Dynamic HTML and Ajax - Creating Mouse overs - Using Dynamic Styles - Using document.write - Using Dynamic HTML Methods to Update Part of a Page - Using Dynamic HTML Properties to Update Part of a Page-Using Text Ranges to Update Part of a Page-Using createElement to Create New Elements on the Fly Creating Dynamic Tables-Catching the User's Attention with Animation.

Unit V

PHP AND MYSQL: The Structure of PHP- Expressions – Operators – Conditionals – Looping - Implicit and Explicit casting - PHP Functions - Including and Requiring Files – Objects – PHP Arrays - Basic Access – foreach - Multidimensional Arrays - Using Array Functions - MySQL – Basics Summary of Database Terms-Querying a MySQL Database with PHP.

Text Books:

1. Eric A. Smith, ASP 3 Programming Bible, Wiley-Dreamtech, 2002. ISBN: 81-265-0049-2.
2. Robin Nixon, Learning PHP, MySQL and Javascript, O'Reilly Media, Inc., 2009. ISBN: 978-0-596-15713-5.
3. Steve Holzner, Ajax Bible, Wiley India Pvt. Ltd, 2007. ISBN: 81-265-1217-2.

Reference Books:

1. Deitel & Deitel, Internet and world wide web – How to Program, Pearson Prentice Hall, Fourth Edition, 2007. ISBN: 0131752421.
2. Keyton Weissinger, ASP in a Nutshell - A Desktop Reference, Second Edition, O'Reilly & Associates, 2000. ISBN: 1-56592-843-1.
3. Janet Valade, PHP and MySQL for Dummies, Wiley Publishing, Inc., Fourth Edition, 2010. ISBN: 978-0-470-52758-0.

12IT312 INFORMATION STORAGE AND MANAGEMENT

Credits: 4:0:0

Course Objective:

- Evaluate storage architecture; understand logical and physical components of a storage infrastructure including storage subsystems
- Describe storage networking technologies such as FC-SAN, NAS, IP-SAN and data archival solution – CAS
- Identify different storage virtualization technologies and their benefits
- Understand and articulate business continuity solutions including, backup and recovery technologies, and local and remote replication solutions
- Define information security, and storage security domains
- Identify parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions

Course Outcome:

- Students will be able to gain knowledge on the physical and logical components of a storage infrastructure and parameters of managing and monitoring storage infrastructure
- Students will be able to understand on different storage virtualization technologies and their benefits, information security and storage security domains

Unit I

INTRODUCTION TO INFORMATION STORAGE: Information Storage – Evolution of Storage Technology and Architecture – Data Centre Infrastructure – Key Challenges in Managing Information – Information Lifecycle , Storage System Environment: Components of a Storage System Environment – Disk Drive Components – Disk Drive Performance – Fundamental Laws Governing Disk Performance – Logical Components of the Host – Application Requirements and Disk Performance, Data Protection: RAID: Implementation of RAID – RAID Array Components – RAID Levels – RAID Comparison – RAID Impact on Disk Performance – Hot Spares

Unit II

INTELLIGENT STORAGE SYSTEM: Components of an Intelligent Storage System – Intelligent Storage Array - Direct Attached Storage and Introduction to SCSI: Types of DAS – DAS Benefits and Limitations – Disk Drive Interfaces – Introduction to Parallel SCSI – SCSI Command Model, Storage Area Networks: Fibre Channel Overview – The SAN and its Evolution – Components of SAN – FC Connectivity – Fibre Channel Ports – Fibre Channel Architecture – Zoning – Fibre Channel Login Types – FC Topologies

Unit III

NETWORK ATTACHED STORAGE : General Purpose Servers vs NAS Devices – Benefits of NAS – NAS File I/O – Components of NAS – NAS Implementations – NAS File Sharing Protocols – NAS I/O Operations – Factors affecting NAS Performance and Availability, IP SAN: iSCSI – FCIP, Content Addressed Storage : Fixed Content and Archives – Types of Archives – Features and Benefits of CAS – CAS Architecture – Object Storage and Retrieval in CAS – CAS Examples, Storage Virtualization: Forms of Virtualization – SNIA Storage Virtualization Taxonomy – Storage Virtualization Configurations – Storage Virtualization Challenges – Types of Storage Virtualization

Unit IV

INTRODUCTION TO BUSINESS CONTINUITY: Information Availability – BC Terminology – BC Planning Life Cycle – Failure Analysis – Business Impact Analysis – BC Technology Solutions, Backup and Recovery: Backup Purpose – Backup Considerations – Backup Granularity – Recovery Considerations – Backup Methods – Backup Process – Backup and Restore Operations – Backup Topologies – Backup in NAS Environments – Backup Technologies, Local Replication: Source and Target – Uses of Local Replicas – Data Consistency – Local Replication Technologies – Restore and Restart Considerations – Creating Multiple Replicas – Management Interface, Remote Replication: Modes of Remote Replication – Remote Replication Technologies – Network Infrastructure

Unit V

SECURING THE STORAGE INFRASTRUCTURE: Storage Security Framework – Risk Triad – Storage Security Domains – Security Implementations in Storage Networking, Managing the Storage Infrastructure: Monitoring the Storage Infrastructure – Storage Management Activities – Storage Infrastructure Management Challenges – Developing an Ideal Solution

Text Books:

1. EMC Corporation, Information Storage and Management, Wiley Publishing Inc. USA, 2009, ISBN 978-81-265-2147-0.
2. Tom Clark, Designing Storage Area Networks: A Practical Reference for Implementing Fibre Channel and IP SANs, Addison Wesley, Second Edition, 2003, ISBN 978-0321136503.

Reference Books:

1. Robert Spalding, Storage Networks: The Complete Reference, Tata McGraw Hill, 2003, ISBN 978-0-07-053292-2.
2. Meeta Gupta,Storage Area Network Fundamentals,Cisco Press, 2002,ISBN 1-58705-065-X

12IT313 CLOUD COMPUTING

Credits: 3:1:0

Course Objective:

- To provide an insight into the evolution of Cloud Computing.
- To impart basic knowledge on Architecture of Cloud Computing.
- To overview security issues in Cloud Computing implementations
- To introduce various cloud application, developmental tools & Standards.

Course Outcome:

- Students will be able to understand cloud Computing and various Cloud Architectures
- Students will be able to insight the security threats pertaining to cloud.
- Students will be able to learn various existing cloud applications.

Unit I

THE EVOLUTION OF CLOUD COMPUTING: The Emergence of Cloud Computing, Cloud based service offerings, Grid Computing Vs Cloud Computing, Key characteristics of Cloud Computing, Challenges for the cloud, Various Technological revolution that contributes to the evolution of Cloud - Hardware Evolution, Internet software Evolution, Server Virtualization; Services delivered over Cloud – Infrastructure as a Service, Platform as a service, Software as a service.

Unit II

CLOUD ARCHITECTURES: Cloud computing infrastructure models- public, private and hybrid clouds, Architectural layers of Cloud computing, Cloud application programming interfaces; Architectural considerations for IaaS – CPU virtualization(hypervisors), storage virtualization (SAN, ISCSI), Network virtualization(VLAN);Case Study- Amazon EC2, S3, DB, Queues, Cloud Front.

Unit III

SECURITY ISSUES IN CLOUD COMPUTING: Cloud Security Challenges, security management, security governance, risk management, risk assessment, security monitoring and incident response, Security architecture design, Vulnerability Assessment, password assurance testing, security images, data privacy, data security, application security, virtual machine security, Identity Access management, physical security, Business continuity and disaster recovery, Is security as a service the New MSSP?

Unit IV

COMMON STANDARDS AND BACKBONE TECHNOLOGIES FOR THE EMERGENCE OF CLOUD COMPUTING: Distributed Management Task Force, Standards for Application Developers- Ajax, XML, JSON, LAMP, LAPP, Standards for Messaging – SMTP, POP,IMAP, Atom, APP, RSS, HTTP, SIMPLE, XMPP, Standards for Security- SAML OAuth, SSL/TLS, OpenID; SOA as a step towards Cloud; Role of Virtualization in the Cloud.

Unit V

CLOUD COMPUTING APPLICATIONS AND TOOLS FOR DEVELOPMENT: YouTube- YouTube API overview, Widgets, YouTube player APIs, The You Tube Custom Player, YouTube data API, Zimbra- Zimbra Collobration Suite (ZCS), Facebook – Facebook development, Zoho – Zoho cloud SQL, Introduction to MapReduce- Discussion of Google paper, Big Tables, GFS, HDFS, Hadoop Framework, Hadoop Framework examples

Text Book:

1. Cloud Computing - Implementation, Management & Security, John W. Rittinghouse, James F. Ransome, CRC Press, 2010.

Reference Books:

1. Judith Hurich, Robin Bloor, Marcia Kaufman, Fern Halper, Cloud Computing for Dummies, Wiley Publication Inc., 2010.
2. Tom White, Hadoop the Definite Guide, O'REILLY, 2009.
3. George Reese, Cloud Application Architectures, O'REILLY, 2009.
4. Tim Mather, Subra Kumarasamy, Shahed Latif, Cloud Security and Privacy, O'REILLY, 2009.
5. Introduction to Cloud Computing Architecture, White paper, SUN, Microsystems, 1st edition, June 2009.
6. Cloud Computing Specialist Certification kit.

12IT314 GRID COMPUTING

Credits: 4:0:0

Course Objective:

- To understand the basic concepts of Grid Computing and the emerging technology standards on Grid infrastructure
- To expose on the prominent toolkits and middleware solutions that impact the Grid adoption.

Course Outcome:

- Students will be able to predict the behavior of grid computing environment
- Students will be able to understan the working principles of grid applications and grid components

Unit I

GRID INTRODUCTION: Early grid activities – Current grid activities – An overview of grid business areas – Grid applications – Grid infrastructure – Organizations developing Grid standards and best practice guidelines – Global grid forum – Organizations developing grid computing tool kits and the framework – Organizations building and using grid based solutions to solve computing, data and network requirements – Commercial organizations building and using grid based solutions. The Grid problem – Autonomic computing – Business on demand and infrastructure virtualization – Service oriented architecture and Grid – Semantic Grids

Unit II

GRID ARCHITECTURES: Service Oriented Architecture – Web service architecture XML, Related technologies and their relevance to web services – XML messages and enveloping – Service message description mechanisms – Relationship between web service and grid service – Web service interoperability and the role of the WS-I organization. OGSA architecture and goal – Commercial data center – National fusion collaboratory – Online media and entertainment –

Native platform services and transport mechanisms – OGSA hosting environment – Core networking services transport and security – OGSA infrastructure – OGSA basic services

Unit III

GRID SERVICES: A high level introduction to OGSI – Technical details of OGSI specification – Introduction to service data concepts – Grid service: Naming and change management recommendations – Common management model – Service domains – Policy architecture – Security architecture – Metering and accounting – Common distributed logging – Distributed data access and replication.

Unit IV

GRID SIMULATION TOOLS: GT3 software architecture model – Service-programming model

Unit V

GRID RESOURCE MANAGEMENT: Acme search service implementation in a top down approach – Resource discovery and monitoring – Resource allocation – Data management – Information services – Index services – Resource information provider service – Resource management services – Data management services – OGSI.NET framework implementation

Text Book:

1. Joshy Joseph and Craig Fellenstein, Grid Computing, Pearson Education, 2004. ISBN 81-297-0527-3

Reference Book:

1. Ian Foster and Carl Kesselman, The Grid: Blueprint for a New Computing Infrastructure, Second Edition, Morgan Kaufmann, 2004. ISBN:1558609334

12IT315 WIRELESS SENSOR NETWORKS

Credits: 4:0:0

Course Objective:

- To gain knowledge about the applications of wireless sensor networks
- To learn the technologies and protocols used
- To gain insight on managing the wireless sensor network

Course Outcome:

- Students will be able to predict the working procedure of a Wireless Sensor Network
- Students will be able to identify the Basic components needed for Wireless Sensor Network
- Students will be able to understand the knowledge of simulators and operating systems for wireless sensor network

Unit I

INTRODUCTION AND OVERVIEW OF WIRELESS SENSOR NETWORKS: Background of Sensor Network Technology – Application of Sensor Networks-Basic overview of the technology- Basic Sensor Network Architectural Elements- Survey of Sensor Networks - Applications of Sensor

Networks: Introduction- Background-Range of Applications-Examples of Category 2 WSN Applications- Examples of Category 1 WSN Applications-Taxonomy of WSN Technology.

Unit II

BASIC WIRELESS SENSOR TECHNOLOGY: Introduction-Sensor Node Technology-Sensor Taxonomy-WN Operating Environment-WN Trends -Wireless Transmission Technology and Systems: Radio Technology Primer-Propagation and Propagation Impairments- Available Wireless Technologies-Campus Applications- MAN/WAN Applications.

Unit III

MEDIUM ACCESS CONTROL PROTOCOLS FOR WIRELESS SENSOR NETWORKS: Introduction-Background- Fundamentals of MAC Protocols-Performance Requirements-Common Protocols-MAC Protocols for WSNs-Sensor-MAC Case Study-IEEE 802.15.4 LR –WPANs Standard Case Study-PHY Layer-MAC Layer.

Unit IV

ROUTING PROTOCOLS FOR WIRELESS SENSOR NETWORKS: Data Dissemination and Gathering-Routing Challenges and Design Issues in Wireless Sensor Networks-Routing Strategies in Wireless Sensor Networks- Transport Control Protocols for Wireless Sensor Networks: Traditional Transport Control Protocols- Transport Protocol Design Issues- Examples of Existing Transport Control Protocols-Performance of Transport Control Protocols- Middleware for Wireless Sensor Networks :WSN Middleware Principles-Middleware Architecture-Existing Middleware.

Unit V

NETWORK MANAGEMENT FOR WIRELESS SENSOR NETWORKS: Traditional Network Management Models- Network Management Design Issues-Example of Management Architecture: MANNA-Naming –Localization Operating Systems for Wireless Sensor Networks-Design Issues-Examples of Operating Systems Performance and Traffic Management – WSN Design Issues –Performance Modelling of WSNs-Case Study Simple Computation of the System Life Span.

Text Book:

1. Kazem Sohraby, Daniel Minoli and Taieb Znati, Wireless Sensor Networks: Technology, Protocols, and Applications, John Wiley & Sons, 2007, 978-0471743002.

Reference Books:

1. Mohammad Ilyas and Imad MahGoub (Editors), Handbook of Sensor Network: Compact Wireless and Wire Sensing System, CRC Press, 2005, ISBN 0-8493-1968-4.
2. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley & Sons, 2007, 978-0471718161.

12IT316 SOFT COMPUTING

Credits: 4:0:0

Course Objectives:

- To familiarize with soft computing concepts.
- To introduce the ideas of Neural Networks, fuzzy logic and use of heuristics based on human experience.
- To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications.

Course Outcomes:

- Students will be able to gain basic knowledge on soft computing and in depth knowledge on Neural Networks.

- Students will be equipped with basic knowledge of fuzzy set theory and its impact on fuzzy system Design, genetic algorithm approach and the soft computing applications.

Unit I

ARTIFICIAL NEURAL NETWORK I: Introduction – Fundamental concept – Evolution of Neural Networks – Basic Models of Artificial Neural Networks – Important Terminologies of ANNs – McCulloch-Pitts Neuron – Linear Separability – Hebb Network. Supervised Learning Network: Perceptron Networks – Adaline – Multiple Adaptive Linear Neurons – Back-Propagation Network – Radial Basis Function Network.

Unit II

ARTIFICIAL NEURAL NETWORK II: Associative Memory Networks: Training Algorithms for Pattern Association – Autoassociative Memory Network – Heteroassociative Memory Network – Bidirectional Associative Memory – Hopfield Networks – Iterative Autoassociative Memory Networks – Temporal Associative Memory Network. Unsupervised Learning Networks: Fixed weight Competitive Nets – Kohonen Self-Organizing Feature Maps – Learning Vector Quantization – Counter propagation Networks – Adaptive Resonance Theory Networks – Special Networks.

Unit III

FUZZY SET THEORY I: Introduction to Classical Sets and Fuzzy sets – Classical Relations and Fuzzy Relations – Tolerance and Equivalence Relations – Noninteractive Fuzzy sets – Membership Functions: Fuzzification – Methods of Membership Value Assignments – Defuzzification – Lambda-Cuts for Fuzzy sets and Fuzzy Relations – Defuzzification Methods.

Unit IV

FUZZY SET THEORY II: Fuzzy Arithmetic and Fuzzy Measures: Fuzzy Rule Base and Approximate Reasoning: Truth values and Tables in Fuzzy logic – Fuzzy Propositions – Formation of Rules – Decomposition and Aggregation of rules – Fuzzy Reasoning – Fuzzy Inference Systems (FIS) – Fuzzy Decision Making – Fuzzy Logic Control Systems.

Unit V

GENETIC ALGORITHM: Introduction – Basic Operators and Terminologies in GAs – Traditional Algorithm vs. Genetic Algorithm – Simple GA – General Genetic Algorithm – The Scheme Theorem – Classification of Genetic Algorithm – Holland Classifier Systems – Genetic Programming. Applications of Soft Computing: A Fusion Approach of Multispectral Images with SAR Image for Flood Area Analysis – Optimization of Travelling Salesman Problem using Genetic Algorithm Approach – Genetic Algorithm based Internet Search Technique – Soft Computing based Hybrid Fuzzy Controllers – Soft Computing based Rocket Engine – Control.

Text Book:

1. S.N. Sivanandan and S.N. Deepa, Principles of Soft Computing, Wiley India, 2007. ISBN: 10: 81-265-1075-7.

Reference Books:

1. S. Rajasekaran and G.A.V.Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2003.
2. Timothy J.Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill, 1997.
3. J.S.R.Jang, C.T.Sun and E.Mizutani, Neuro-Fuzzy and Soft Computing, PHI, 2004, Pearson Education.

12IT317 WIRELESS SECURITY

Credits: 4:0:0

Course Objectives:

- To provide exposure to various threats in wireless networks and security solutions.
- To understand the technologies and protocols that support security in wireless networks.

Course Outcome:

- Students will be able to gain and in-depth understanding of the development of Wireless Security and its related attacks.
- Students will be able to learn about the technologies and protocols that makes up real secured wireless Network.

Unit I

SECURITY PRINCIPLES AND ATTACKS: Introduction- Security Principles - Wi-Fi Vulnerabilities – Different Types of Attack – Wireless Information warfare.

Unit II

IEEE 802.11, EAP AND RADIUS PROTOCOLS: IEEE 802.11 Protocol Primer- IEEE 802.11 WEP Working - WPA, RSN and IEEE 802.11i-Access Control: IEEE 802.1X, EAP, and RADIUS.

Unit III

UPPER LAYER AUTHENTICATION PROTOCOLS: Upper- Layer Authentication - WPA and RSN Key Hierarchy- TKIP.

Unit IV

WIRELESS KEY MANAGEMENT AND HOTSPOTS: AES- CCMP-Wi-Fi LAN Coordination: ESS and IBSS- Public Wireless Hotspots.

Unit V

WIRELESS ATTACKS, BLUETOOTH AND VoIP SECURITY: Known Attacks: A Technical Review – Actual Attack Tools – Open Source Implementation Example – Security in Wireless Application Protocol – Bluetooth Security – VoIP Security.

Text Book:

1. Jon Edney, William A.Arbaugh, Real 802.11 Security Wi-Fi Protected Access and 802.11i, Pearson Edition, 2004. ISBN: 81-297-0312-2.

Reference Books:

1. Randall K.Nichols, Panos C. Lekkas, Wireless Security: Models, Threats and Solutions, Tata McGraw Hill, 2006. ISBN: 0-07-061884-4.
2. Merrit Maxim, David Pollino, Wireless Security, McGraw-Hill. ISBN: 0-07-222286-7.

12IT318 VIRTUAL REALITY TECHNOLOGY

Credits: 4:0:0

Course Objective:

- To learn the fundamental principles of virtual reality
- To learn virtual reality hardware and software

- To design and construct a simple virtual environment

Course Outcome:

- Students will be able to predict the behavior of any virtual reality hardware
- Students will be able to understand the type of software used for particular virtual reality hardware
- Students will be able to construct a simple virtual environment depending upon the requirement

Unit I

INTRODUCTION AND INPUT DEVICES: Introduction - Three dimensional position trackers - Navigation and Manipulation, Interfaces-Gesture Interfaces.

Unit II

OUTPUT DEVICES: Graphic displays- Sound displays-Hap tic Feedback.

Unit III

ARCHITECTURE: Computing Architecture of VR-The Rendering Pipeline-PC Graphic Architecture-Workstation based Architectures-Distributed VR Architectures.

Unit IV

MODELLING AND PROGRAMMING: Modelling – Geometric modelling- Kinematics Modelling- Physical Modelling-Behavior Modelling-Model management-VR Programming-Toolkits and Scene Graphs-World Toolkit-Java 3D-General Hap tics open Software Toolkit-People shop.

Unit V

VR FACTORS: Human Factors in VR-Methodology and Terminology-User Performance Studies-VR health and safety Issues-VR and Society.

Text Book:

1. Grigore C.Burdea and Philippe Coiffet, Virtual Reality Technology, Second Edition, Wiley Interscience, 2003. ISBN: 0-471-36089-9.

Reference Book:

1. John Vince, Virtual Reality Systems, Pearson Education. ISBN: 81-7808-504-6.

12IT319 INTERNETWORKING MULTIMEDIA

Credits: 4:0:0

Course Objective:

- To identify and analyze the requirements that a distributed multimedia application may enforce on the communication network.
- To include all the important aspects that has significant impact on the enhancements to the basic Internet architecture and its associated protocols.

Course Outcome:

- Students will be able to identify internetworking principles and issues in multimedia technologies, difference between different network service mode and to describe how multicasting on the Internet works

- Students will be able to acquire knowledge on how session directories, advertisement and invitation protocols work.
- Students will be able to understand security measures and policies suitable for multicast multimedia.

Unit I

INTRODUCTION - A BRIEF HISTORY OF REAL TIME: Content and delivery-From letters and numbers to sound and vision-Analogue and digital-Protocols-Internet Service models-Multicast in the internet-Transport Protocols-Multimedia Sessions-Conference Membership and Reception feedback-Security-Application other than Audio and Video Network Service Models: Sharing and caring-Service schedules and Queues-Evolution of the internet service models-Resource reservation protocol (RSVP), Service classes and assurance-Detailed analysis of the integrated services-Host functions- Resource reservation protocol (RSVP)revisited-QoS routing-Futures-IP and ATM- Recent simplified approaches to service differentiation.

Unit II

MULTICAST, CODING AND COMPRESSION: Host Functions -Routing and addressing-Multicast routing-Multicast scoping-Reliable multicast transport- Calling down traffic on a Site Coding And Compression: System Components-Nature of the signal-lossless data compression-Audio-Still image-Moving image-Multiplexing and synchronizing-performance-Processing requirements for video Compression.

Unit III

TRANSPORT PROTOCOLS, SESSION DIRECTORIES, ADVERTISEMENT AND INVITATION PROTOCOLS: Introduction-TCP adoption algorithms-MPEG systems-Transport and program streams-RTP-Synchronization-Reliable multicast transport

Session Directories, Advertisement And Invitation Protocols**:** Session Description protocol **(**SDP)-Session announcement protocol (SAP)-Section initiation protocol (SIP)

Conference Controls**:** ITU model H.320/TGCC-MMCC a Centralized Internet model-CCCP distributed Internet model-Using ISDN to do IP access to the Mbone.

Unit IV

APPLICATIONS: Introduction-Shared applications in the Mbone: Design-Limitations of the data model-Usability Issues-Asynchronous events-Generalizing the models-Distributed virtual reality: General idea and problems-Virtual reality operations, user views and network considerations-application model-Distributed virtual reality multicast protocol (DVRMP).

Unit V

MEDIA-ON-DEMAND, SECURITY AND POLICY IN MULTICAST MULTIMEDIA: Recording and playing back Mbone sessions- Recording -Remote control of playback Security And Policy In Multicast Multimedia**:** Introduction-Roadmap-A brief introduction to cryptographic technology-Network-level solutions-media encryption-key distribution.

Text Book:

1. Jon Crowcroft, Mark Handley, Ian Wakeman, Internetworking Multimedia, Publisher: Morgan Kaufmann; Illustrated Edition, 1999, ISBN: 1558605843.

Reference Books:

1. B.O. Szuprowicz, Multimedia Networking, McGraw Hill, NewYork. 1995. ISBN-13: 978-0070631083
2. Tay Vaughan, Multimedia Making it work, Sixth Edition, Tata McGraw-Hill, 2003. ISBN-13: 978-0072230000.

12IT320 DIGITAL IMAGE PROCESSING LAB

Credits: 0:0:2

1. Image Enhancement using point operations - contrast Stretching, Clipping, Histogram Equalization
2. Image Transforms - DFT, DCT, Wavelet
3. Image Compression - DCT
4. Image Compression - Wavelet
5. Image Restoration - Inverse, Pseudo-Inverse, Wiener
6. Edge Detection - Sobel, Canny, Isotropic
7. Edge Detection - Laplacian of Gaussian, Zero Crossing
8. Image Filters - Spatial and Frequency Domain filters, Average, Weighted Average, Median
9. Image Quantization - Uniform Quantizer
10. Arithmetic & Logic operations - Zooming ,Shrinking
11. Color Image Processing - Color Model conversion, Pseudo Coloring
12. Image Morphology

12IT321 COMPUTER GRAPHICS LAB

Credits: 0:0:2

1. To implement Bresenham's algorithms for line,circle and ellipse drawing.
2. To perform 2D Transformations such as translation,rotation,scaling,reflection and sharing.
3. To implement Cohen-Sutherland 2D clipping and window-viewpoint mapping.
4. To perform 3D Transformations such as translation,rotation and scaling.
5. To visualize projections of 3D images.
6. To convert between color models.
7. To implement text compression algorithm
8. To implement image compression algoithm
9. To perform animation using any Animation Software
10. To perform basic operations on image using any image editing software

12IT322 ELEMENTS OF MULTIMEDIA SYSTEMS

Credits: 4:0:0

Course Objective:

- To learn the basic components of multimedia
- To understand the fundamentals of media components such as audio, video and images
- To learn and understand the need of data compression
- To understand various compression methods
- To understand colour schemes in multimedia
- To learn the fundamentals of storage mechanisms in multimedia

Course Outcome:

- Students will be equipped with in depth knowledge on the need of data compression, various compression methods.
- Students will be able to implement colour schemes in multimedia.

Unit I

INTRODUCTION TO MULTIMEDIA AND AUDIO TECHNOLOGY: Interdisciplinary aspects of Multimedia-Media characteristics-Media compression-Optical storage-Content Processing-Media and Data Streams: The term "Multimedia" –The term "Media" –Key properties of a multimedia system – Characterizing Data Streams –Audio Technology: What is Sound-Audio representation on computers-Music and the MIDI Standard – Speech Signals-Speech Output-Speech Input-Speech Transmission.

Unit II

GRAPHICS AND IMAGES: Introduction –Capturing graphics and Images – Computer assisted Graphics and Image Processing – Reconstructing Images – graphics and Image Output Options – Video Technology: Basics – Television Systems – Digitization of video signals – Digital television –Computer Based Animation: Basic Concepts – Specification of Animations – Methods of controlling Animation – Display of animation – Transmission of Animation – Virtual reality modeling language(VRML)

Unit III

GRAPHICS AND IMAGE DATA REPRESENTATIONS: Graphics/Image Data Types-Popular File Formats-Further Exploration-Colour in Image and video: Colour Science-Colour Models in Images-Colour Models In video

Unit IV

DATA COMPRESSION: Storage space – Coding Requirements – Source, Entropy, and Hybrid Coding – Basic Compression Techniques – JPEG – H.261 and H.263-MPEG – Fractal Compression-Wavelet Based Coding-The JPEG2000 Standard

Unit V

OPTICAL STORAGE MEDIA: History of optical storage – Basic Technology – Video Discs and other WORMs – Compact disc digital audio – Compact Disc read only memory-CD-ROM Extended Architecture-Further CD-ROM Based Developments-Compact Disc recordable-Compact Disc Magneto-Optical-Compact Disc Read/Write-Digital Versatile Disc-Closing Observations, Content Analysis: Simple vs Complex features- Analysis Of Individual Images- Analysis Of Image Sequences-Audio Analysis-Applications

Text Books:

1. Ralf Steinmetz, Klara Nahrstedt, Multimedia Fundamentals, Pearson Education, Second Edition, 2004. ISBN: 978-81-317-0976-4.
2. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Education, 2004. ISBN 81-297-0438-2.

Reference Books:

1. J-R Ohm, Multimedia Communication Technology, Springer-Verlag, 2004. ISBN: 3-540-01249-4.
2. Daniel Cunliffe,Geoff Elliott, Multimedia Computing, Crucial,2003. ISBN: 1-903337-18-6.

12IT323 COMPUTER GRAPHICS

Credits: 3:0:0

Course Objectives:

- To understand the foundations of computer graphics: hardware systems, math basis, light and colour.
- To implement key components of the rendering pipeline, especially visibility, rasterization, viewing, and shading.

- To appreciate the complexities of modeling realistic objects through modeling complex scenes
- using a high-level scene description language.
- To acquaint with few advanced topics in computer graphics.

Course Outcome:

- Students will be equipped with knowledge of fundamental hardware and software concepts of interactive computer graphics such as raster displays, color systems, processor architectures and displays.
- Students will be able to understand of the mathematics of geometric transformations as applied to two and three-dimensional graphics.
- Students will be able to understand graphics application programming through projects using standard graphics libraries

Unit I

INTRODUCTION: Video Display Devices – Raster Scan Systems **–** Line Drawing Algorithms – Parallel Line Algorithms – Setting Frame Buffer Values – Circle Generating Algorithms –Ellipse Generating Algorithms – other Curves – Parallel curve Algorithms – Pixel addressing and object Geometry – Fill area Primitives – Polygon Fill Areas – Attributes of Graphics Primitives: Line Attributes – Curve attributes – Fill area Attributes – General Scan Line Polygon Fill Algorithms – Scan Line Fill of Convex Polygons – Scan Line Fill for Regions with Curved Boundaries.

Unit II

FUNDAMENTAL MATHEMATICS AND GEOMETRIC TRANSFORMATIONS: Basic Two Dimensional Geometric Transformations –Matrix Representations and Homogeneous Coordinates – Inverse transformations – Two dimensional Composite Transformations – Other Two Dimensional Transformations –Raster Methods for Geometric Transformations – Raster Transformations –Transformations Between Two Dimensional Coordinate Systems – Geometric Transformations in Three Dimensional space – Three dimensional Translations – Three Dimensional Rotation – Three Dimensional Scaling – Composite Three Dimensional Transformations – Other Three Dimensional Transformations – Transformations Between Three Dimensional Coordinate Systems – Affine Transformations – Geometric Transformation Functions – The Two Dimensional Viewing Pipeline – The Clipping Window – Normalization and Viewport – Clipping Algorithms – Two Dimensional Point Clipping – Two dimensional Line Clipping – Polygon Fill Area Clipping – Curve Clipping – Text Clipping.

Unit III

RENDERING AND THREE DIMENSIONAL VIEWING: Overview of Three Dimensional Viewing Concepts – The Three Dimensional Viewing Pipeline – Three Dimensional Viewing Coordinate Parameters – Transformation from World to viewing Coordinates – Projection Transformations – Orthogonal Transformations – Oblique Parallel Projections – Perspective Projections – The Viewport Transformation and Three dimensional Screen coordinates – Three Dimensional Viewing Functions – Three Dimensional Clipping Algorithms – Optional Clipping Planes – Polyhedra – Polyhedron Functions – Curved surfaces – Quadric Surfaces – Blobby Objects – Spline Transformations – Cubic-Spline Interpolation Methods – Beizer Spline Curves – Beizer Surfaces – B-Spline Curves – BSpline surfaces –Beta lines – Rational Splines – Displaying Spline Curves and Surfaces.

Unit IV

ILLUMINATION: Light Sources - Surface Lighting Effects - Basic Illumination Models – Transparent Surfaces – Atmospheric Effects – Shadows – Camera Parameters – Displaying Light

Intensities – Halftone Patterns and Dithering Techniques – Polygon Rendering Methods – Ray Tracing Methods – Modeling Surface Detail with polygons – Texture mapping –Illumination and Surface Rendering Functions – Texture Functions.

Unit V

COLOR MODELS AND ANIMATION: Interactive Picture Construction Techniques – Virtual Reality Environments –Interactive Input Device Functions - Color Models and Color Applications: Properties of Light – Color Models – Standard Primaries and the Chromaticity Diagram – The RGB Color Models – The YIQ and Related Color Models – The CMY and CMYK Color Models – The HSV Color Model – The HLS Color Model – Color section and applications –Computer Animations: Raster Methods for Computer Animation – Design of Animation sequence – Traditional Animation Techniques – General Computer animation Functions –Computer animation Languages – Key Frame Systems – Motion Specifications –Articulated Figure animation – Periodic Motions – Animation Procedures – Hierarchical Modeling - Graphics File Formats: Image File Configurations – Color Reduction Methods – File Compression Techniques – Composition of the Major File formats.

Text Book:

1. Donald Hearn, M.Pauline Baker, Computer Graphics with OpenGL, Pearson Education, Third Edition, 2009. ISBN: 978-81-317-2738-6.

Reference Books:

1 F.S.Hill JR, Computer graphics using Open GL, Second Edition, Prentice Hall, 2001. ISBN: 81-203-2813-2.
2 Edward Angel, Interactive Computer Graphics - A Top Down approach with OpenGL, Addison Wesley, 2000. ISBN: 0-201-38597-X.
3 Donald Hearn, M.Pauline Baker, Computer Graphics, Prentice Hall, Second Edition, 1999. ISBN: 81-203-0944-8.

12IT324 COMPUTER VISION

Credits: 4:0:0

Course objective:

- To understand the concepts in computer Vision.
- To provide Knowledge on basic geometry, physics of imaging and probabilistic techniques.

Course Outcome:

- Students will be able to understand of Image Formation, Camera models and Parameters, Multiple View Geometry and Segmentation.
- Students will be able to apply Various Filters in practice.

Unit I

IMAGE FORMATION AND IMAGE MODEL: Cameras: Pinhole Cameras-Cameras with Lenses, The Human Eye, Geometric Camera Models: Elements of Analytical Euclidean Geometry-Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations, Geometric Camera Calibration: Least Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account.

Unit II

RADIOMETRY MEASURING LIGHT: Light in space, Light at Surfaces ,Important Special Cases, Sources, Shadows and Shading: Qualitative Radiometry Sources and their effects, Local Shading Models, Color: The Physics of Color, Human Color Perception, Representing Color, A Model For Image Color, Surface Color from Image Color.

Unit III

LINEAR FILTERS: Linear Filters and Convolution, Shift Invariant Linear System, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, Technique Normalizes Co-relation and Finding Pattern, Edge Detection: Noise, Estimating Derivatives, Detecting Edges, Texture: Representing Texture, Analysis Using Oriented Pyramids, Application: Synthesizing Textures for Rendering, Shape From Texture.

Unit IV

THE GEOMETRY OF MULTIPLE VIEWS: Two Views, Three Views, More Views, Stereopsis: Reconstruction, Human Stereopsis, Binocular Fusion, sing More Camera, Affine Structure from Motion: Elements of Affine Geometry, Affine Structure and Motion from Two Images, Affine Structure and Motion from Multiple Images, From Affine to Euclidean Images, Affine Motion Segmentation, Projective Structure from Motion: Elements Of Projective Geometry, Projective Structure and Motion from Binocular Correspondences, Projective Motion Estimation from Multi-linear Constraints.

Unit V

SEGMENTATION BY CLUSTERING: Human Vision**:** Grouping and Gestalt, Applications: short Boundary detection and Background subtraction, Image Segmentation by Clustering Pixels, Segmentation By Graph-Theoretic Clustering, Segmentation By Fitting a Model: The Hough Transform, Fitting Lines, fitting Curves, Segmentation and Fitting Using Probabilistic Methods: Missing Data Problems, Fitting and Segmentation

Text Book:

1. David A.Forsyth, Jean Ponce, Computer Vision A Modern Approach, Prentice Hall, 2003. ISBN-81-203-2372-6

Reference Books:

1. Linda G. Shapiro, George C. Stockman ,Computer Vision, Published by Prentice Hall,2001. ISBN 0130307963, 9780130307965
2. Dana H. Ballard, Christopher M. Brown, Computer Vision,2003. Prentice Hall, ISBN:13:9780131653160 ISBN: 0131653164

12IT325 MULTIMEDIA COMMUNICATION

Credits: 4:0:0

Course Objective:

- To learn the multimedia communication standards and compression techniques.
- To learn the Internet protocols.
- To learn the Multimedia communication across the networks.

Course Outcome:

- Students will be equipped with knowledge on implementing the concepts based on multimedia communication standards and compression techniques, Internet protocols.
- Students will be able to understand multimedia communication and broad band ATM Networks across the networks.

Unit I

MULTIMEDIA COMMUNICATIONS AND AUDIO VIDEO COMPRESSION: Introduction-Multimedia networks-Multimedia applications-Applications and networking terminology- Audio compression and Video Compression

Unit II

STANDARDS AND DIGITAL MULTIMEDIA COMMUNICATIONS: Introduction-Reference models-Standards relating to interpersonal communications-Standards relating to interactive applications over the Internet-Standards for entertainment applications. Digital communication basics: Transmission media-Sources of signal impairment-Asynchronous transmission-Synchronous transmission-Error Detection methods

Unit III

THE INTERNET: IP datagrams-Fragmentation and reassembly-IP addresses-ARP and RARP-Routing algorithms-ICMP-QoS support-The PPP link layer protocol-IPv6-IPv6/IPv4 interoperability

Unit IV

BROADBAND ATM NETWORKS AND ENTERTAINMENT NETWORKS: Cell format and switching principles- Switch architectures-Protocol architecture. Entertainment networks and high-speed modems: Cable TV networks-Satellite television networks-Terrestrial television networks-High-speed PSTN access technologies-Transport protocols: TCP/IP protocol suite-UDP-RTP and RTCP

Unit V

MULTIMEDIA COMMUNICATIONS ACROSS NETWORKS: Packet Audio/Video in the network Environment -Video transport across generic networks-Multimedia transport across ATM networks – Multimedia across IP networks – Multimedia across DSLs – Internet access Networks – Multimedia across wireless - Mobiles Networks – Broadcasting Networks – Digital Television infrastructure for interactive multimedia services

Text Books:

1. Fred Halsall, Multimedia Communications, Pearson, Seventh Indian Reprint, 2005. ISBN: 81-7808-532-1.
2. K .R. Rao, Zaron S. Bojkovic, Dragorad A. Milocanovic, Multimedia Communication Systems, Prentice Hall India, 2002. ISBN: 81-203-2145-6.

Reference Books:

1. Steve Heath, Multimedia and Communication Technology, Second Edition, Focal Press, 2003. ISBN: 81-8147-145-8.

12IT326 COMPUTER ANIMATION

Credits: 3:0:0

Course Objective:

- To provide knowledge about the techniques of 3D computer animation.

Course Outcome:

- Students will be able to know, how to produce a storyboard, create characters and background in film as well as various animation techniques.

- Students will be able to understand language development through aesthetic learning processes and how these relate to other learning processes.
- Students will be able to understanding the processes related to animation and how these can be applied for real time animation and stimulates facial expressions.

Unit I

PREPRODUCTION AND MODELING BASICS: Preproduction - Introduction – Storyboarding - Character and Model Design - Sound Design –Technical Tests - Production Scheduling - Modeling Basics - Introduction - Polygonal Modeling -Splines and Patches - Coordinate Systems - Viewing Windows - Geometric Primitives –Transformations - Common Modeling Techniques – Hierarchies - Booleans and Trims - Basic Deformations.

Unit II

RENDERING BASICS: Introduction - The Camera – Lights - Surface Characteristics - Shading Algorithms - Rendering Algorithms - Background Images - Surface Texture Mapping - Solid Texture Mapping – Final Rendering.

Unit III

ANIMATION BASICS AND ADVANCED MODELING: Animation Basics - Introduction - Key framing – Interpolations – Parameter - curve Editing – Dope Sheet Editing - Forward Kinematics - Inverse Kinematics - Motion Paths - Shape Deformations - Camera Animation - Animating Lights and Surface Properties - Pose-based Animation - Advanced Modeling: Introduction - Virtual Sculpting - Digitizing Techniques –Procedural Modeling - Stitched Patches - Subdivision Surfaces - Displacement Mapping - Hair and Fur-Paint based Modeling - Higher-level Primitives.

Unit IV

ADVANCED RENDERING: Introduction - Atmospheric Effects – Fractals - Lighting Subtleties - Advanced Texturing - Texturing Polygons - Background Shaders - Non-Photorealistic Rendering - Reflection Maps and Environment Procedures - More Rendering Algorithms - Rendering for Output.

Unit V

ADVANCED ANIMATION AND POSTPRODUCTION: Introduction - Animated Fillets - Limits and Constraints – Metaballs - Expressions and Driven Keys - Motion Dynamics - Principles, Rigid Bodies - Soft-Body Dynamics - Particle Systems - Cloth Dynamics - Motion Capture - Camera-Motion Matching - Character Rigging - Movement Controls, Deformation Controls - Facial Animation - Nonlinear Animation Postproduction - Introduction-Compositing-Editing.

Text Book:

1. Michael O'Rourke, Principles of Three-Dimensional Computer Animation, Third Edition, W.W.Norton & Company Ltd., 2003. ISBN: 0-393-73083-2.

Reference Books:

1. John Vince, Essential Computer Animation, Springer-Verlag, 2000. ISBN: 1-85233-141-0.
2. Marcia Kuperberg, A Guide to Computer Animation, Focal Press, 2002. ISBN: 0-240-51671-0.
3. Daniel Cunliffe, Geoff Elliott,Multimedia Computing,Crucial, 2003. ISBN: 1-903337-18-6.

12IT327 COMPUTER VISION LAB

Credits: 0:0:2

1. Creating panoramic images from series of images.
2. Video segmentation.
3. Homographic Estimation.
4. Hough Transform based line/circle detection.
5. Stereo Geometry.
6. Multiple View Geometry.
7. Projective Transformation.
8. Camera Calibration.
9. Structure from Motion.
10. Finding Depth map.

12IT328 ANIMATION LAB

Credits: 0:0:2

1. To perform shape tweening using Flash.
2. To implement motion tweening using Flash.
3. To frame by frame tweening using Flash.
4. To add a motion guide by Flash.
5. To create web pages and buttons using Flash.
6. To create multiple scenes using Flash.
7. To create an advertisement within a banner using Flash.
8. To implement an interactive player using Flash.
9. To create primitive and text animation using Maya.
10. To implement texture mapping using Maya.
11. To implement interactive animation using Maya.
12. To implement rendered animation like video using Maya.

12IT329 INTERACTIVE GAME DESIGN

Credits: 4:0:0

Course Objective:

To learn the concepts of designing a game and the role of a Game Designer.

Course Outcome:

- Students will be equipped with knowledge on the role of game designer, and game designing.
- Students will be able to acquire knowledge about the formal and dramatic elements of game design

Unit I

INTRODUCTION – GAME DESIGN BASICS: The role of the game Designer- Passion and Skills- A Play centric design process- Designing for innovation **–** The Structure of Games: Go fish versus Quake-Engaging the player- The sum of parts- Defining games.

Unit II

DESIGNING A GAME I : Working with formal elements: Players-Objectives- procedures-rulesresources-conflicts-boundaries-outcome. Dramatic elements: Challenge-Play-Premise-characterstory-world building. Working with system Dynamics: Games as Systems-System dynamics, interacting with systems-Tuning game systems.

Unit III

DESIGNING A GAME II: Conceptualization: Ideas-Brain Storming skills-alternate methods-Editing and refining – turning idea into game. Prototyping: Methods of prototyping-Prototyping original game idea. Digital Prototyping: Types of digital prototype-designing control schemes-selecting view points – effective interface design-prototyping tools.

Unit IV

WORKING AS A GAME DESIGNER I: Play Testing: Play testing and interactive design – Play testing session-methods- the play matrix- usability techniques- test control situation – Functionality, Completeness & Balance, Fun & Accessibility

Unit V

WORKING AS A GAME DESIGNER II: Team Structure- Developers team – publishers team-contribution to the design- team communication. Stages of Development: Stages- project plan-The Design Document: Communication- contents-writing.

Text Book:

1. 1.Tracy Fulerton, Christopher Swain, Steven Haffman, Game Design Workshop: A PlayCentric Approach to Creating Innovative Games, Second Edition, Elsevier, 2003, ISBN: 0240809748, 9780240809748.

12IT330 MULTIMEDIA DATABASE

Credits 4:0:0

Course Objective:

- To study the design, indexing and retrieval of centralized and distributed Multimedia Database.
- To introduce trends in Multimedia Data Management and Mining used for Electronic Enterprise.

Course Outcome:

- Students will be equipped with knowledge on the concepts on Distributed Multimedia Database, video indexing and retrieval techniques
- Students will be able to implement the text document and retrieval techniques

Unit 1

INTRODUCTION TO MULTIMEDIA DATABASE: Multimedia Data Types and Formats - Multimedia Database Design Issues.

Unit II

TEXT DOCUMENT INDEXING AND RETRIEVAL:- Indexing and Retrieval of Audio - Image Indexing and Retrieval

Unit III

VIDEO INDEXING AND RETRIEVAL: Integrated Multimedia Indexing and Retrieval -. Techniques and Data Structures for Efficient Multimedia Similarity Search.

Unit IV

SYSTEM SUPPORT FOR DISTRIBUTED MULTIMEDIA DATABASES: Introduction - QoS Management - Design Goals of Multimedia Systems - Multimedia Data Storage Devices and Management - Multimedia Computer Architectures - Multimedia Operating Systems - Multimedia Networks - Multimedia Transport Protocols - Achieving Overall Synchronous Presentation.

Unit V

MEASUREMENT OF MULTIMEDIA INFORMATION RETRIEVAL EFFECTIVENESS: Products, Applications and New Developments - Multimedia for Web and E-Commerce - Multimedia for Collaboration, Knowledge Management and Training for the Web - Security and Privacy Considerations for Managing and Mining Multimedia Databases - Standards, Prototypes and Products for Multimedia Data Management and Mining.

Text Books:

1. Guojun Lu, Multimedia Database Management Systems, First Edition, Artech House Publishers, 1999. ISBN: 0890063427, 9780890063422.
2. Bhavani M. Thuraisingham, Managing and Mining Multimedia Databases, First Edition, CRC Press, 2001. ISBN: 0849300371, 9780849300370

Reference Books:

1. Lynne Dunckley, Multimedia Databases, First Edition, Addison-Wesley, 2003. ISBN :0201788993, 9780201788990.
2. Kingsley C. Nwosu, Bhavani M. Thuraisingham, P. Bruce Berra, Multimedia Database Systems, First Edition, Springer, 1996. ISBN: 0792397126, 9780792397120.

12IT331 MATHEMATICAL FOUNDATION FOR IMAGE AND VIDEO PROCESSING

Credits: 4:0:0

Course Objective:

- To understand basic mathematical concepts and signal processing involved in image processing.
- To provide basic idea behind image segmentation.

Course Outcome:

- Students will be able to understand matrix, differentiation and integration techniques required for image processing.
- The student will be able to understand various filters and have basic knowledge required for segmentation

Unit I

LINEAR ALGEBRA: Rank of a matrix – Consistency of linear system of equations – Eigen value problem –Eigen values and eigenvectors of a real matrix – Characteristic equation – Properties of eigen values and eigenvectors – Cayley –Hamilton theorem (without proof) – Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal

transformation. Transforms: Fourier transforms pairs, Properties, Cosine transforms, Wavelet transforms.

Unit II

DIFFERENTIATION TECHNIQUES: Derivatives of elementary function from first principle – Derivatives of inverse functions –Logarithmic differentiation – Differentiation of parametric functions – Second order derivatives.

Unit III

INTEGRATION TECHNIQUES: Integrals of functions – Methods of integration – Decomposition method – Method of substitution – Integration by parts.

Unit IV

FILTERS: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters: Smoothing – Sharpening filters – Homomorphic filtering.

Unit V

SEGMENTATION: Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors.

Text Books

1. Grewal, B.S., Higher Engineering Mathematics, Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
2. S Salivahanan, Digital Signal Processing, Tata McGraw-Hill, 2000.
3. Gonzalez and Woods, Digital Image Processing, Third Edition, 2008.

12IT332 USER INTERFACE DESIGN

Credits: 4:0:0

Course Objective:

- To provide an introduction to the human computer interface.
- To address the interface and screen design from the user's perspective.
- To study and understand the testing methods.

Course Outcome:

- Students will be able to understand reasoning behind the guidelines and use of the design methods.
- Students will be able to understand interesting possibilities for supporting users in the performance of their tasks and design user interfaces for business web applications.

Unit I

IMPORTANCE OF THE USER INTERFACE: Defining the User Interface-The Importance of Good Design-A Brief History of Human Computer Interface- Characteristics of graphical and web user interface: The Graphical User Interface-The Web User Interface-The Merging of Graphical Business Systems and the Web- The User interface design process: Obstacles and pitfalls in development path-Usability.

Unit II

UNDERSTAND THE CLIENT: Important Human Characteristics in Design-Human considerations in the design of business systems - Human interaction speed-Understand the Business Function - Determining Basic business Functions- Design standards and style guides-Documentation-Understand the principles of good Screen Design: Human Considerations in screen design.

Unit III

DEVELOP SYSTEM MENUS AND NAVIGATION SCHEMES: Structures of menus – Functions of menus – Content of menus –Formatting of Menus-Phrasing the Menus-Selecting Menu choices-Navigating Menus-Select the Proper Kinds of Windows - Characteristics-Components-Presentation styles-Types-Managements-organizations- Web systems.

Unit IV

USER INTERFACE CONTROLS: Characteristics-selecting proper device-based controls-Chose the proper Screen -based controls -Operable control – Text Entry/Read-only controls-Selection controls-Combination control-Custom control-Presentation control –Write clear text and messages - Text for Web pages – Provide effective feedback, guidance & assistance - Providing proper feedback-Guidance and Assistance-Provide Effective Internationalization and Accessibility - Internationalization-Accessibility-Create Meaningful graphics, Icons and Images- Icons-Multimedia.

Unit V

CHOOSING COLORS AND WINDOWS LAYOUTS: Color-uses-Problems with Color – Choosing Colors for Textual Graphic screens – Choosing Colors for Statistical Graphics Screens – Organize and Layout Windows and Pages: Organizing and Laying Out Screens – Test and Retest - Prototypes - Kinds of tests – Developing and conducting a test.

Text book:

1. Wilbert. O. Galitz , The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques, John Wiley and Sons, 2007. ISBN 81-265-0280-0.

Reference Books:

1. Ben Shneiderman, Maxine Cohen, Designing the user interface-Strategies for Eeffective Human-Computer Interaction, Fifth Edition, Pearson Education, 2008. ISBN:13: 9780321537355
2. JoAnn T. Hackos, Janice C. Redish, User and Task Analysis for Interface Design, First Edition, Wiley, ISBN :978-0471178316
3. Alan J. Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, Janet E. Finley., Human-Computer Interaction, Second Edition, Prentice Hall, 1998. ISBN: 978-0132398640
4. Helen Sharp, Yvonne Rogers, Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, Second Edition, Wiley, 2007. ISBN-13: 978-0470018668

12IT333 SOFTWARE PROJECT MANAGEMENT

Credits: 3:0:0

Course Objectives:

- To understand Traditional Project Management, Resource Requirements and Cost.
- To create project Management Life Cycles and Strategies.

- To build an effective Project Management Infrastructure.

Course Outcomes:

- Students will be able to understand the developing high quality software systems, principles, concepts and techniques associated with software development.
- Students will be able to analyze and evaluate problems and draw on the theoretical and technical knowledge to develop and implement plans for their resolution.

Unit I

PROJECT MANAGEMENT: Defining Project –A program-Understanding the scope triangle-Envisioning scope triangle as system in balance-Managing Creeps- Understanding project Management Process Groups- Using Tools, templates, and processes to scope a project-Managing Client Expectations-Wants versus Needs-Conducting conditions of satisfaction-Planning and Conducting the Project Scoping Meeting-gathering requirements-Building the requirement breakdown structure-Using the RBS to choose a Best –Fit PMLC Model-Diagramming Business Processes- .Prototyping your solution-Use Cases-validating the Business Case-Outsourcing to vendors and contractors-procurement Management Life cycle-Vendor Evaluation-Vendor Selection-Vendor Contracting-Contract Management-Vendor management-Writing an effective Project Overview Statement-Gaining approval to plan project.

Unit II

ADAPTIVE PROJECT FRAMEWORK: Tools, templates, and processes used to plan a project-the importance of planning-using application software packages to plan a project-Planning and conducting joint project planning sessions-building the work breakdown structure-Approaches to building the WBS-Estimating-Estimation life cycles-Estimating resource requirement-Resource planning –Estimating Cost-Constructing the project network diagram-Planning for project risk: The Risk Management Life Cycle-Writing an effective project proposal- Tools, templates, and processes used to launch a project-recruiting the project team-Establishing Team Operating rules-Managing Scope changes-Managing team communication-Assigning resources-Resource leveling strategies- Tools, templates, and processes used to monitor and control a project-establishing your progress reporting system-Applying Graphical Reporting Tools-Managing the scope bank-Building and maintaining the issues log-managing project status meetings-defining a problem escalation strategy-Gaining approval to close the project.

Unit III

PROJECT MANAGEMENT LANDSCAPE: Tools, templates, processes used to close a project-writing & maintain client acceptance procedures-closing a project-getting client acceptance-installing project deliverables-documenting the project-Conducting post implementation audit-writing final report- Project management landscape-Traditional Project Management-Using Critical Chain Project management.

Unit IV

PROJECT ESTABLISHMENT: Agile Project Management-Extreme Project Management-Establishing & Maturing a Project Support Office.

Unit V

MANAGEMENT OF PROJECT: Establishing and Managing a Project Portfolio- Establishing and Managing a Continuous process Improvement Program-Managing Distressed Projects-Managing Multiple Team Projects.

Text Book:

1. Robert K. Wyzocki, Rudd McGary, Effective Project Management, Fifth Edition, WILEY-Dreamtech India Pvt. Ltd., 2009. ISBN: 978-81-265-2156-2.

Reference Books:

1. Roger S Pressman, Pressman Roger, Software Engineering: A Practitioner's Approach, Seventh Edition, McGraw-Hill Higher Education, 2009. ISBN: 0073375977, 9780073375977.
2. Pankaj Jalote, Software project management in practice, Addison-Wesley, 2002. ISBN: 0201737213, 9780201737219.
3. Walker Royce, Software project management: a unified framework, Addison-Wesley, 1998. ISBN: 0201309580, 9780201309584.

LIST OF SUBJECTS

Sub. Code	Name of the Subject	Credits
13IT201	System Administration	3:0:0
13IT202	Ethics in Information Technology	3:0:0
13IT203	Fundamentals of Human Computer Interaction	3:0:0

13IT201 SYSTEM ADMINISTRATION

Credits: 3:0:0

Objective:

- To guide through the basics of Linux Technology and to train as a System Administrator to maintain a Linux Server.
- To familiarize Kernel Components and System Management.
- To establish a Network and Secure Network Services.

Outcome:

Upon successful completion of this course, students will be able to:

- Gain in-depth knowledge on the working of Linux systems
- Work on a Linux system and to locate additional utilities, configurations and maintenance.
- Demonstrate a working knowledge of networking terms and concepts pertaining to system administration

Prerequisites - Introduction to UNIX and Principles of Operating Systems

Unit I

INTRODUCTION: Introducing Linux–Exploring the Desktop: Linux Graphical Desktop-Configuring GNOME and KDE-Core Graphical Utilities-popular graphical Programs-Exploring the Bash Shell-Shell Variables-Data Redirection-Editing Text with vi-Printing from the Command Line

Unit II

PROCESS MANAGEMENT: Understanding Users and File systems: Linux Users and Groups-File Permissions, Introducing the File System- Managing File Archives.
Understanding Text Processing: Regular Expressions-Manipulating Files-Using sed and awk-More advanced Text Editing, Managing Processes: Defining Managing Linux Processes-Managing Memory-Scheduling Process-Controlling Access to at and crontab.

Unit III

KERNEL ADMINISTRATION: Using Network Clients: Remote Login-Data Services-Networking and Diagnostic Tools, Installing Linux: Reviewing Computer's Hardware-Configuring disk Space-Installing Linux-Kickstart Installations, Understanding System initialization: Hardware Initialization-Configuring Boot Loaders-init and its scripts-Controlling Services

Unit IV

MANAGING SOFTWARE PACKAGES AND FILE SYSTEMS: Managing Packages: Updating the System-Understanding the file system, Managing Users: Creating and managing user accounts-Complex File Permissions- User Security Issues.

Unit V

SECURITY AND NETWORK ADMINISTRATION: Configuring Networks: Configuring Linux Networking-DHCP-printing services, System and Kernel Management: Linux system back up – System Logs-Exploring, Configuring and updating Kernel Components-Writing Shell Scripts-Advanced Configuration and Troubleshooting.

Text Book:

1. Nicholas Wells, The Complete Guide to LINUX System Administration, Indian Edition, Cengage Learning, 2005.

References Books:

1. Nicholas Wells, Guide to Linux installation and administration, Volume 1, Thomson Course Technology, 2003
2. Evi Nemeth, Garth Snyder, Trent R. Hein , Linux administration handbook, Second Edition, Pearson Education, 2007.
3. Tom Adelstein, Bill Lubanovic, Linux System Administration, O'Reilly Media Inc., First Edition, 2007.

13IT202 ETHICS IN INFORMATION TECHNOLOGY

Credits: 3:0:0

Objective:

- To understand the development and need for issues regarding social, legal, privacy and the application of computer ethics to information technology.
- To learn professional ethics, privacy, criminal conduct, property rights, free speech, access, and reliability.

Outcome:

- Be able to identify issues of professional conduct in information technology.
- Be able to determine the impact of the privacy laws on information security policies.
- Understand the issues related to intellectual freedom, intellectual property, and copyright law as they relate to electronic publishing.
- Identify key ethical concerns of information technology specialists.
- Respond to and apply appropriate decisions around ethical issues in an array of information and technology practices.

Prerequisite: Nil

Unit I

AN OVERVIEW OF ETHICS: Introduction to Ethics - Ethics in the Business World-Ethics in information technology-Ethics for IT Workers and IT Users-IT Professionals-IT professional malpractice-IT Users

Unit II

COMPUTER AND INTERNET CRIME, PRIVACY: IT Security Incidents: A major concern-Implementing Trustworthy Computing- Privacy-Privacy Protection and the Law-Key Privacy and Anonymity Issues

Unit III

FREEDOM OF EXPRESSION AND INTELLECTUAL PROPERTY: First Amendment Rights-Freedom of Expression: Key Issues-Intellectual Property-What is Intellectual Property?-Copyrights-Patents-Trade Secrets-Key Intellectual Property Issues

Unit IV

SOFTWARE DEVELOPMENT AND THE IMPACT OF INFORMATION TECHNOLOGY ON THE PRODUCTIVITY AND QUALITY OF LIFE: Strategies to Engineer Quality Software-Key Issues in Software Development- The impact of IT on the Standard of Living and Productivity - The impact of IT on Healthcare Costs

Unit V

SOCIAL NETWORKING, ETHICS OF INFORMATION TECHNOLOGY ORGANIZATIONS: Social Networking Web Site – Business Applications of Online Social Networking-Social Networking Ethical Issues-Online Virtual Worlds-Key ethical issues for Organizations-Need for Nontraditional Workers-Contingent Workers-H-1B Workers-Outsourcing-Whistle Blowing-Green Computing-ICT Industry Code for Conduct

Text Book:

1. Ethics in Information Technology, Fourth Edition, by George Reynolds, CENGAGE Learning, 2012.

Reference Books:

1. Case Studies in Information Technology Ethics, Second Edition, by Richard A. Spinello, Prentice-Hall, 2003.
2. A Gift of Fire:social, legal, and ethical issues for computing and the Internet, Second Edition, by Sara Baase, Prentice Hall, 2008.
3. Ethics and Technology: Ethical Issues in an Age of Information and Communication Technology, Second Edition by Tavani, H, John Wiley and Sons 2007.

13IT203 FUNDAMENTALS OF HUMAN COMPUTER INTERACTION

Credits: 3:0:0

Objective:

- To learn the human computer interaction fundamentals.
- To address the basics of 2D graphics, event handling, widget architecture, layout algorithms and management of multiple views of the same data.
- To study and understand the human physiology on user interface design.

Outcome:

Students will able to

- Design, implement and evaluate effective and usable graphical computer interfaces.
- Describe and apply core theories, models and methodologies in the field of Human Computer Interaction.
- Learn current research in the field of Human Computer Interaction.
- Understand reasoning behind the guidelines and use of the design methods.

Prerequisite: Nil

Unit I

INTRODUCTION TO INTERACTIVE SYSTEMS, DRAWING, EVENT HANDLING AND WIDGETS: Humans as part of Information processing Systems – Architecture of interactive Systems – Forms of Presentation – Forms of Expression - Redraw – Graphics Object – Light and Color – Drawing Models – Draw Methods – Text Drawing – Windows System – Input Events – Event / Code Binding – Model / View Notification – Essential Geometry – Controller Implementation – Polled Input- Simple, Widgets – Container Widgets – Application Widgets – Model, View, Controller with Widgets

Unit II

LAYOUT CONSTRAINTS, MODELS, INTERFACE DESIGN TOOLS AND INTERNATIONALIZATION: Layout – Constraints -Multiple View Models: Review of Model, View Controller – Multiple Views with Differing View controls – Synchronized Selection – Managing Model Persistence – Abstract Model Widgets: Tree, Table, Drawing Widget – Look and Feel: Consistency – Look – Feel – Layout Design – Properties - Binding Events to Code - Locales – Unicode – Numbers, Currency, and Measurements – Date and Time – Compound String Formatting – Sorting

Unit III

INPUT SYNTAX SPECIFICATION, 2D GEOMETRY, TRANSFORMATIONS AND INTERACTING WITH GEOMETRY: Mouse Event Diagrams – State Representations of Syntax – Propositional Production Systems – Scroll Bar Syntax Example – Translating PPS into Code - Basic matrix Algebra – Geometric problems for user interface work – forms of equations and their Solutions – Geometric Shapes – Geometric Transformations –Interacting Coordinates – Creating Shapes, Selecting Shapes, Manipulating Control Points, Transformations – Cut, Copy, Paste, Drag and Drop: Appropriate Data Transfer – Making the Connection – Source / Destination Relationship – Drag and Drop – Undo, Scripts and Versions: Undo Issues – Baseline and Forward Undo – Command Objects and Backup Undo – Representing the History -Versioning

Unit IV

DISTRIBUTED AND COLLABORATIVE INTERACTION, TEXT, DIGITAL INK AND SELECTION INPUT: Collaboration – Device Consistency – MVC and Distributed of the User Interface – Pixel / Event Distribution – Graphics Package layer – Programmable API – Model Semantics Distribution – Data Layer Distribution – Asynchronous Collaboration - Nature of Language – Evaluating

Text Input – Keyboard Input – Buttons – Chorded Text Entry – Other Inputs – Stylus – Pen / Touch Input Devices – Stroke Processing – Gesture / Character Recognition – Digital Ink as a Data Type – Sketching Tools – Annotation - Selection Theory – Standard menus – Improving Menus – Marking Menus – Stoke Selection – Area / Cursor Modification for Icon Selection – Display Space Management: Window Styles – Big Worlds in Small Windows

Unit V

PRESENTATION ARCHITECTURE, INTERACTION AND FUNCTIONAL DESIGN: Web Interaction: Redirecting the Graphics Object – Image Space Architectures – Scene Graphs – Web Interaction: Web Basics – Web model view controller – Enhancing Web Interaction – AJAX – Tools – Beyond the Web – Physical Interaction: Controlling Light and Attention Demands – Polite Presentation – Sensing the User and the World – Physical Sensing -A Historical perspective – Object Based Task / Function Models –Evaluating Interaction: Situation / Task/ User (STU) – Formative Evaluation – Summative Evaluation

Text book:

1. Dan R. Olsen, Human – Computer Interaction, Cengage Learning, 2010.

Reference Books:

1. Alan J. Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, Janet E. Finley., Human-Computer Interaction, Third Edition, Prentice Hall, 2004.
2. Christine Faulkner, The Essence of Human-Computer Interaction, First Impression 2011, Pearson Education.
3. Helen Sharp, Yvonne Rogers, Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, Second Edition, Wiley, 2007.
4. Ben Shneiderman, Maxine Cohen, the user interface-Strategies for Effective Human-Computer Interaction, Fifth Edition, Pearson Education, 2008.