

*Seventh / Eighth
Semester*

BTCS-403 Computer Networks

Internal Marks: 40
External Marks: 60
Total Marks: 100

L	T	P
3	1	0

Unit-I Introduction

Introduction, Network Topologies, Wired Vs wireless Networks, LAN, MAN, WAN, Internet, Intranet & Extranet, Connection-Oriented and Connectionless Services, Need of Protocols, TCP/IP reference Model, comparison of OSI & TCP/IP. Bridges, Hubs and Switches, Virtual LANs

Unit-II Network Protocols

ALOHA, Carrier Sense Multiple Access Protocols, ARP, RARP, Framing, One-Bit Sliding Window Protocol, Protocol Using Go Back N, Protocol Using Selective Repeat, High-Level Data Link Control (HDLC)

Unit-III Congestion Control in Data Networks

Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Effects of Congestion, Load Shedding, Jitter Control, Congestion Control in Packet-Switching Networks

Unit-IV Routing Algorithms

The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts, Routing in Ad Hoc Networks, Node Lookup in Peer-to-Peer Networks

Unit-V Internetwork Protocols

Internet Protocol & IP Addresses, Principles of Internetworking, Internet Protocol Operation, IPv6, Virtual Private Networks and IP Security

Reference Books:

1. William Stallings “Computer Networking with Internet Protocols And Technology”, Pearson Education.
2. Andrew S. Tanenbaum “Computer Networks”, PHI
3. Keneth C. Mansfield, Jr. James L. Antonakos “An Introduction to Computer Networking”, PHI.
4. Behrouz A. Forouzan “Data Communications and Networking”, McGraw Hill

BTEC-701 Embedded Systems

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I: Arm Processor Architecture

Architecture, Registers, Interrupts & Vector Table, I/O Ports, ARM Processor family, JTAG, I₂C bus

Unit-II: Arm Programming Instructions

Instruction Set: Data processing instructions, Addressing modes, Load Store Instructions, PSR (Program Status Register) Instructions, Conditional Instructions, Interrupt Instructions

Unit-III: C Programming

Integrated Development Environment (IDE) for C/C++ Programming, C/C++ Programs using Function Calls, Pointers, Structures, Integers & Floating Point Arithmetic, Assembly Code using Instruction Scheduling, Register Allocation, Conditional Execution & Loops

Unit-IV: Interfacing Peripherals

Interfacing: ADC & DAC, Sensors, Memory, LCD Display, Stepper Motor, DC Motor, SD-MMC Card, Biometric & RFID, ZIGBEE, GSM Interfaces, Debugging Tools

References Books:

1. Andrew N. Sloss, Dominic Symes, Chris Wright, John Rayfield, "ARM System Developer's Guide Designing and Optimizing System Software", Elsevier 2008.
2. Brooks, Cole, "Embedded Microcontroller Systems, Real Time Interfacing", Thomson Learning 1999
3. Steve Furber, "ARM system on Chip Architecture", Addison Wesley
4. Trevor Martin, "The Insider's Guide to The Philips ARM7 - Based Microcontrollers, An Engineer's Introduction To The LPC2100 Series" Hitex Ltd.
5. ARM Architecture Reference Manual
6. Website www.arm.com

BTEC-702 Optical Communication

Internal Marks: 40
External Marks: 60
Total Marks: 100

L	T	P
3	1	0

Unit-I Introduction

Need of Fiber Optic Communications, Evolution of Light wave Systems, Basic Concepts; Analog & Digital Signals, Channel Multiplexing, Modulation Formats, Optical Communication Systems, Light wave System Components; Optical Fibers as a Communication Channel, Optical Transmitters, Optical Receivers.

Unit-II Optical Fibers

Geometrical-Optics Description; Step-Index Fibers, Graded Index Fibers, Wave Propagation; Maxwell's Equations, Fiber Modes, Single-Mode-Fibers, Dispersion in Single-Mode Fibers; Group Velocity Dispersion, Material Dispersion, Wave guide Dispersion, Higher-order Dispersion, Polarization-Mode Dispersion, Dispersion-Induced Limitations; Basic Propagation Equation, Chirped Gaussian Pulses, Limitations on the Bit Rate, Fiber Bandwidth, Fiber Losses; Attenuation Coefficient, Material Absorption, Rayleigh Scattering, wave guide Imperfections, Nonlinear Optical effects; Stimulated Light Scattering, Nonlinear Phase Modulation, Four Wave Mixing, Fiber Manufacturing; Design Issues, Fabrication Methods, Cables and Connectors

Unit-III Optical Transmitters

Basic Concepts; Emission and Absorption Rates, p-n Junctions, Non radiative Recombination, Semi conductor Materials, Light Emitting Diodes; Power-current Characteristics, LED spectrum, Modulation Response, LED Structures, Semi Conductor Lasers; DFB Lasers, Coupled Cavity semiconductor Lasers, Tunable Semiconductor Lasers, Vertical Cavity Semiconductor Lasers, Laser Characteristics, Small & Large Signal Modulation, Spectral Line width, Source Fiber Coupling.

Unit-IV Optical Receivers

Basic concepts, p-n Photo Diodes, p-i-n Photo Diodes, Avalanche Photo Diode, MSM Photo detector, Receiver Design, Receiver Noise; Noise mechanism, Receiver sensitivity; Bit error rate, Minimum Receiver Power, Sensitivity Degradation, Receiver Performance.

Unit-V Light Wave Systems

System Architecture, Loss limited Light wave systems, Dispersion limited Light wave systems, Power Budget, Long Haul systems, Sources of Power Penalty; Model Noise, Dispersive Pulse Broadening, Mode Partition Noise, Frequency Chirping, Reflection Feedback Noise

Unit-VI Multi channel Systems

WDM Light wave systems, Optical TDM Systems, Subscriber Multiplexing, Code Division Multiplexing.

Reference Books:

1. Senior J. Optical Fiber Communications, Principles & Practice, PHI.
2. Keiser G., Optical Fiber Communication Mc graw-hill.
3. Govind P. Agrawal, Fiber Optics Communication Systems John Wiley & Sons (Asia) Pvt. Ltd.
4. Djafar K. Mynbeav, "Fiber-Optics Communications Technology" Pearson.

BTEC-703 Lab Wireless and Optical Systems & Networks

Internal Marks: 30

External Marks: 20

Total Marks: 50

L	T	P
0	0	2

1. Study and measurement of attenuation and loss in optical fiber.
2. Study and measurement of bending loss in optical fiber.
3. Study and measurement of numerical aperture of optical fiber.
4. Measurement of optical power using optical power meter.
5. To Study the transmission of TDM signal through optical fiber.
6. To determine the bit rate of the optical fiber link.
7. Study of various multiplexing techniques.
8. To determine the BER of wireless system using M-ARY (BPSK,QPSK,8PSK,16PSK) technique.
9. To determine the BER of wireless system using QAM technique

BTEC-704 Embedded Systems Lab

Internal Marks: 30

External Marks: 20

Total Marks: 50

L	T	P
0	0	2

List of Experiments

1. Study of ARM7 & ARM9 Bit Processor Architecture and Pin Diagram.
2. Study of Interrupt structure in ARM Processors
3. Write ARM Processor program to Flash LED
4. Interfacing of an LCD Display
5. Write a program to interface an ADC
6. Write a program to generate a Ramp waveform using DAC interface
7. Write a program to control a Stepper Motor
8. Write a program to control the speed of DC motor
9. Interface relays and write a program to control them
10. Interface ZIGBEE with ARM to control more external devices
11. Interfacing of Biometric information recorder
12. Interfacing RFID module with ARM Microcontroller

BTEC 908 CMOS Based Design

Internal Marks: 40
External Marks: 60
Total Marks: 100

L T P
3 1 0

Unit-I Introduction to MOS Device

MOS Transistor, MOS models MOS Transistor under static conditions, threshold voltage-Resistive operation, saturation region, channel length modulation, body effect, DC transfer characteristics, Tristate inverters, velocity saturation, Hot carrier effect, drain current V_s voltage charts, sub threshold conduction, MOS structure capacitance, CMOS logic, fabrication and layout, stick diagrams

Unit-II CMOS Processing

CMOS technologies, wafer formation photolithography channel formation, isolation, gate oxide, gate source, drain formation, contacts and metallization, layout design rules, design rule checking,

Unit-III Circuit Characterization & Performance Estimation

Delay estimation, transistor sizing, power dissipation, Sheet resistance, area capacitance, design margin, reliability, Scaling models, scaling factor for device parameters, Advantages and Limitations of scaling.

Unit-IV Design of Combinational Logic

Static CMOS design, complementary CMOS, static properties, complementary CMOS design, Power consumption in CMOS logic gates, dynamic or glitching transitions, Design to reduce switching activity, Radioed logic, DC VSL, pass transistor logic, Differential pass transistor logic, sizing of level restorer, sizing in pass transistor, Dynamic CMOS design, Domino logic, optimization of Domino logic, NPCMOS, Designing logic for reduced supply voltages

Reference Books:

1. Nail H.E. Weste, David Harris, Ayan Banerjee, "CMOS VLSI DESIGN", Pearson Education.
2. Kang and Leblebici "CMOS Digital integrated circuits", TMH 2003.
3. Wayne Wolf, "Modern VLSI Design ", 2nd Edition, Prentice Hall, 1998.
4. Weste & Harris, "CMOS VLSI Design: A Circuits and Systems Perspective", 3rd ed, Addison Wesley, 2005.

BTEC 909 Biomedical Signal Processing

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction to Biomedical Signals

Tasks in Biomedical Signal Processing, Computer Aided Diagnosis, Examples of Biomedical signals: ECG, EEG, EMG etc., Review of linear systems, Fourier Transform and Time Frequency Analysis (Wavelet) of biomedical signals, Processing of Random & Stochastic signals, spectral estimation, Properties and effects of noise in biomedical instruments, Filtering in biomedical instruments

Unit-II Cardio-logical Signal Processing

Pre-processing, QRS Detection Methods, Rhythm analysis, Arrhythmia Detection Algorithms, Automated ECG Analysis, ECG Pattern Recognition, Heart rate variability analysis.

Unit-III Adaptive Noise Canceling

Principles of Adaptive Noise Canceling, Adaptive Noise Canceling with the LMS adaptation, Algorithm, Noise Canceling Method to Enhance ECG Monitoring, Fetal ECG Monitoring.

Unit-IV Neurological Signal Processing

Modeling of EEG Signals, Detection of spikes and spindles, Detection of Alpha, Beta and Gamma Waves, Auto Regressive (A.R.) modeling of seizure EEG, Sleep Stage analysis, Inverse Filtering, Least squares and polynomial modeling.

Reference Books:

1. D.C.Reddy, "Biomedical Signal Processing: Principles and techniques", Tata McGraw Hill, New Delhi, 2005.
2. Willis J Tompkins, Biomedical Signal Processing, Prentice Hall, 1993
3. R. Rangayan, "Biomedical Signal Analysis", Wiley 2002.
4. Bruce, "Biomedical Signal Processing & Signal Modeling," Wiley, 2001.
5. K. Najarian and R. Splinter, "Biomedical Signal and Image Processing", Second Edition, The CRC Press,

BTEC 910 Satellite Communication

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction to Satellite Communication

Origin, Brief History, Current state and advantages of Satellite Communication, Active & Passive satellite, Orbital aspects of Satellite Communication, Angle of Evaluation, Propagation Delay, Orbital Spacing, System Performance

Unit-II Satellite Link Design

Link design equation, system noise temperature, C/N & G/T ratio, atmospheric & econospheric effects on link design, complete link design, interference effects on complete link design, earth station parameters, Earth space propagation effects, Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Ionospheric scintillation, Telemetry, Tracking and command of satellites.

Unit-III Satellite Multiple Access System

FDMA techniques, SCPC & CSSB systems, TDMA frame structure, burst structure, frame efficiency, super-frame, frame acquisition & synchronization, TDMA vs FDMA, burst time plan, beam hopping, satellite switched, Erlang call congestion formula, DA-FDMA, DA-TDMA.

Unit-IV Satellite Services

INTELSAT, INSAT Series, VSAT, Weather forecasting, Remote sensing, LANDSAT, Satellite Navigation, Mobile satellite Service.

Unit-V Laser & Satellite Communication

Link analysis, optical satellite link Tx & Rx, Satellite, beam acquisition, tracking & pointing, cable channel frequency, head end equation, distribution of signal, n/w specifications and architecture, optical fibre CATV system.

Reference Books:

1. Trimothy Pratt, Charles W. Bostian, "Satellite Communications", John Wiley & Sons, 1986.
2. Dr. D.C. Aggarwal, "Satellite Communications", Khanna Publishers, 2001.
3. Dennis Roddy, "Satellite Communications", McGraw Hill, 1996.

BTEC-911 Artificial Intelligence Techniques & Applications

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I: Introduction

Approaches to intelligent control, Architecture of intelligent control, Linguistic reasoning, Rule-base, Knowledge representation.

Unit-II: Artificial Neural Networks

Biological neuron, Artificial Neural Network, Mathematical Models, McCulloch Neural Model, Perceptron, Adaline and Madaline, Learning & Training in ANN, Hopfield Neural Network, Self-Organizing Networks, Recurrent Networks, Associative memories

Unit-III: Fuzzy Logic System

Crisp Vs Fuzzy set theory, Membership functions, Fuzzy set operations, Fuzzy rules, Mamdani and Sugeno fuzzy inference systems, Defuzzification methods

Unit-IV: Artificial Neural Networks

Introduction and biological background of GA, String Encoding of chromosomes, Selection methods, Single & multi-point crossover operation, Mutation, Adjustment of strategy parameters such as Population size, Mutation & Crossover probabilities

Unit-V: Tools & Applications

MATLAB Toolboxes: Fuzzy Logic Toolbox, Neural Network Toolbox, FLS for Antilock Breaking System (ABS), GA in route planning for Travelling Sales Person, Time-Series forecasting using ANN

Reference Books:

1. Jacek M. Zurada – Introduction to Artificial Neural Systems
2. S N Sivanandam, S N Deepa – Principles of Soft Computing, Wiley Publications
3. John Yen, Reza Langari – Fuzzy Logic Intelligence, Control, and Information

BTEC 912 Speech & Image Processing

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction to Image Processing

Historical background, visual perception, image formation, Elements of Storage, sampling & Quantization, Relationships between pixels-neighbors of pixel, connectivity labeling of connected components, Relations, equivalence and Transitive closure, Distance measures, Arithmetic/ Logic operation, Imaging Geometry Basic and perspective transformation stereo imaging, application of image Processing.

Unit-II Image Enhancement

Spatial and frequency domain methods point processing, intensity transformation, Histogram processing image subtraction and Averaging spatial filtering, LP, HP and homo-morphic felling, generation of spatial marks, Color image processing.

Unit-III Image Compression

Redundancy models, error free compression, Lossy compression, Image compression standards.

Unit-IV Image Segmentation

Detection of Discontinuity, Edge detection, Boundary detection, Thresholding, Regional oriented segmentation, use of motion in segmentation.

Unit-V Speech Processing

Review of human speech and Acoustic theory, nature of sound, harmonics, resonance measurement, virtual display. Music theory, pitch, duration, intervals, rhythm. Human speech production, the vocal tract, the Larynx, the source filter. Speech signal processing-the phasor mode, Fourier transfer, DFT, FFT. The hardware use of FIR & IIR filters. Software, Elements of speech Synthesis-speech Recognition-speech in the computer-human interface.

Reference Books:

1. Digital Image Processing - by Rafael Gonzalez and Richard E. Woods, Pearson Education Society.
2. Digital Image Processing - by Kenneth R Castleman, Pearson Education Society.
3. A. K. Jain, "Fundamental of Digital Image Processing", PHI
4. Speech and Audio Processing for multimedia PC's - by Iain Murray

BTEC 913 Human Resource Management

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction to Human Resource

Definition, Role and Functions of Human Resource Management, Concept and Significance of HR, Changing role of HR managers, HR functions and Global Environment, role of a HR Manager.

Unit-II Human Resources Planning

Need and Process for Human Resource Planning, Methods of Recruitment, Planning Process, Planning at different levels, Recruitment and selection processes, Sources of Recruitment, Restructuring strategies, Placement and Induction, Retention of Employees, , Employment Exchanges (Compulsory Notification of vacancies).

Unit-III Training and Development

Principles of Training, Employee Development, Need for skill up gradation, Assessment of training needs, Retraining and Redeployment methods and techniques of training employees and executives, performance appraisal systems Career Development & Planning.

Unit-IV Job analysis, Design and Satisfaction

Job Analysis: Job Description & Job Description, Job Specification, Job satisfaction and its importance; Motivation, Factors affecting motivation, introduction to Motivation Theory; Workers ' Participation, Quality of work life.

Unit-V Industrial Relations

Factors influencing industrial relations, State Interventions and Legal Framework, Role of Trade unions, Collective Bargaining, Worker's participation in management.

Reference Books:

1. T.N.Chhabra- Human Resource Management (Dhanpat Rai & Co.).
2. Gary Dessler, Human Resource Management (8th ed.), Pearson Education, Delhi
3. Biswajeet Patanayak, Human Resource Management, PHI, New Delhi
4. A Minappa and M. S. Saiyada - Personnel Management (Tata Mc. Graw-Hill)

BTEC 914 Computer organization and Architecture

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction

Organization and Architecture, Structure and Function, Brief History of Computers, Designing for Performance, Performance metrics; MIPS, MFLOPS, Computer Components and Functions, Interconnection Structures, Bus Interconnection, Point-To-Point Interconnect, PCI Express, Flynn's classification of computers (SISD, MISD, MIMD).

Unit-II Internal and Cache Memory

Computer Memory System Overview, Cache Memory Principles, Elements of Cache Design, Pentium 4 Cache Organization, Semiconductor Main Memory, Advanced Dram Organization

Unit-III Basic non pipelined CPU Architecture and Operating System

CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage), microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining. Operating System Overview, Scheduling, Memory Management, Pentium Memory Management.

Unit-IV Parallel Processing and Multi-core Computer

Multiple Processor Organizations, Symmetric Multiprocessors, Cache Coherence and the MESI Protocol, Multithreading and Chip Multiprocessors, Clusters, Non-uniform Memory Access, Vector Computation, Multi-core Computers, Hardware and Software Performance Issues, Multi-core Organization, Intel x86 Multi-core Organization.

Reference Books:

1. William Stallings, Computer Organization and Architecture, 9/E, Pearson, Delhi.
2. Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.
3. Chaudhuri P. Pal, "Computer Organisation & Design", PHI,
4. Mano, M.M., "Computer System Architecture", PHI.

BTIT 504 Cyber Law & IPR

Internal Marks: 40

External Marks: 60

Total Marks: 100

L	T	P
3	1	0

Unit-I Basics of Computer & Internet Technology

Internet, ISP & domain name; Network Security; Encryption Techniques and Algorithms; Digital Signatures

Unit-II Introduction to Cyber World

Introduction to Cyberspace and Cyber Law; Different Components of cyber Laws; Cyber Law and Netizens.

Unit-III E-Commerce

Introduction to E-Commerce; Different E-Commerce Models; E-Commerce Trends and Prospects; E-Commerce and Taxation; Legal Aspects of E-Commerce.

Unit IV- Intellectual Property Rights

IPR Regime in the Digital Society; Copyright and Patents; International Treaties and Conventions; Business Software Patents; Domain Name Disputes and Resolution.

Unit V- IT ACT 2000

Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority; Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act.

Unit VI- Project Work

Candidates will be required to work on a project. At the end of the course students will make a presentation and submit the project report.

Reference Books:

1. Nandan Kamath, "A Guide to Cyber Laws & IT Act 2000 with Rules & Notification".
2. Law and practice of intellectual property in India by Vikas Vashishth
3. Intellectual property- patents, copyrights, trademarks and allied rights by Cornish W R
4. Keith Merrill & Deepti Chopra (IK Inter.), Cyber Cops, Cyber Criminals & Internet

Vakul Sharma (Mc Millian), Handbook of Cyber Laws

BTEC-915 Electromagnetic Interference & Compatibility

Internal Marks : 40	L	T	P
External Marks : 60	3	1	0
Total Marks : 100			

Unit-I Overview of EMI/EMC:

Electromagnetic environment, History, Concepts and definitions, Overview of EMI/EMC, Natural and Nuclear sources of EMI, conducted and radiated EMI, Transient EMI, Time domain Vs Frequency domain EMI, Units of measurement parameters.

Unit-II EMI Coupling Principles:

Electromagnetic emissions, noise from relays and switches, Nonlinearities in circuits, passive inter-modulation, cross talk in transmission lines, transients in power supply lines, Conducted, Radiated and Transient Coupling, Common Impedance Ground Coupling, Radiated Common Mode and Ground Loop Coupling, Radiated Differential Mode Coupling, Cable to Cable Coupling, Power Mains and Power Supply coupling.

Unit-III Radiated and Conducted Interference Measurements:

EMI Test Instruments/ Systems, Anechoic chamber, TEM cell, GH TEM Cell, characterization of conduction currents/voltages, conducted EM noise on power lines, conducted EMI from equipment, Immunity to conducted EMI, detectors and measurements, EMI Shielded Chamber, Open Area Test Site, TEM Cell, Sensors/ Injectors/ Couplers, Test beds for ESD and EFT.

Unit-IV EMI Control Techniques:

Principles and types of grounding, shielding and bonding, characterization of filters, power lines filter design shielding, Isolation Transformer, Transient Suppressors, Cable Routing, Signal Control, Component Selection and Mounting, PCB Traces Cross Talk, Impedance Control, Power Distribution Decoupling, Zoning, Motherboard Designs and Propagation Delay Performance Models.

Reference Books:

1. V.P.Kodali, "Engineering EMC Principles, Measurements and Technologies", IEEE Press, 1996.
2. Henry W.Ott, "Noise Reduction Techniques in Electronic Systems", John Wiley and Sons, New York, 1988.
3. C.R.Paul, "Introduction to Electromagnetic Compatibility", John Wiley and Sons, Inc, 1992
4. Bernhard Keiser, "Principles of Electromagnetic Compatibility", Artech house, 3rd Ed, 1986.

BTECH-916 Neural Networks And Fuzzy Logic

Internal Marks: 40

External Marks: 60

Total Marks: 100

L	T	P
3	1	0

Unit-I: Introduction To Neural Networks

Human brain and Biological Neuron, Artificial Neural Network, ANN Terminology, McCulloch-Pitts Neural Model, Activation functions, Topology, Feedforward Neural Networks, ANN Learning: Supervised, Un-supervised, Competitive learning, Reinforcement learning, Knowledge representation.

Unit-II: Hopfield Neural Model

Learning Laws:- Hebb's rule, Delta rule, Widrow & Hoff LMS learning rule, Correlation learning rule, Instar and Outstar learning rules, Back-propagation Neural Networks, K-means clustering algorithm, Kohonen's feature maps, Associative Memories

Unit-III: Radial Basis Neural Networks

Function Neural Networks, Basic learning laws in RBF Nets, Recurrent Networks, Recurrent Back-propagation, Counter-Propagation Networks, CMAC Networks, ART Networks.

Unit-IV: Fuzzy Logic Sets & System

Introduction to Fuzzy Logic, Fuzzy Vs Crisp set, Linguistic variables, Membership functions, Fuzzy set operations, IF-THEN fuzzy rules, Mamdani & Sugeno inference techniques, Defuzzification techniques, Fuzzy Logic System: Block diagram, Implementation, Useful tools Fuzzy logic controller Vs PID controller, Antilock Braking System (ABS).

Reference Books:

1. Timothy J. Ross, Fuzzy Logic with Engineering Applications, Wiley publications.
2. Yagna Narayanan – Artificial Neural Networks
3. Bart Kosko – Neural Networks & Fuzzy logic
4. Simon Haykin – Neural Networks

BTEC 917 Robotics

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction

Definition and Need for Robots, Robot Anatomy, Co-ordinate Systems, Work Envelope, types and classification, Specifications, Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load, Robot Parts and Their Functions, Different Applications

Unit-II Sensors

Principles and Applications and need of a sensor, Principles, Position of sensors, Piezo-Electric Sensor, LVDT, Resolvers, Optical Encoders, Pneumatic Position Sensors, Range Sensors, Triangulation Principle, Structured, Lighting Approach, Time of Flight Range Finders, Laser Range Meters, Proximity Sensors, Inductive, Hall Effect, Capacitive, Ultrasonic and Optical Proximity Sensors, Touch Sensors, (Binary Sensors, Analog Sensors), Wrist Sensors, Compliance Sensors, Slip Sensors,

Unit-III Drive Systems & Grippers for Robot

Drives systems (Mechanical, Electrical, Pneumatic Drives, Hydraulic), D.C.Servo Motors, Stepper Motor, A.C. Servo Motors, Comparison of all Drives, End Effectors, Grippers (Mechanical, Pneumatic, Hydraulic, Magnetic, Vacuum Grippers), Two Fingere and Three Fingere Grippers, Internal Grippers and External Grippers, Selection and Design Considerations

Unit-IV Machine Vision

Camera, Frame Grabber, Sensing and Digitizing Image Data, Signal Conversion, Image Storage, Lighting Techniques, Image Processing and Analysis, Data Reduction, Edge detection, Segmentation Feature Extraction, Object Recognition, Other Algorithms, Applications, Inspection, Identification, Visual Serving and Navigation.

Unit-V Robot Kinematics & Programming

Forward Kinematics, Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two, Three Degrees of Freedom (In 2 Dimensional), Four Degrees of Freedom (In 3 Dimensional), Deviations and Problems Teach Pendant Programming, Lead through programming, Robot programming Languages, VAL Programming, Motion Commands, Sensor Commands, End effector commands.

Reference Books:

1. M.P.Groover, "Industrial Robotics – Technology, Programming and Applications", McGraw-Hill, 2001.
2. Ghosal, A., Robotics: Fundamental Concepts and Analysis, Oxford University Press, 2nd reprint, 2008.
3. Yoram Koren, "Robotics for Engineers", McGraw-Hill Book Co., 1992.
4. Fu, K., Gonzalez, R. and Lee, C.S. G., Robotics: Control, Sensing, Vision and Intelligence, McGraw- Hill, 1987.

BTEC 918 Operation Research

Internal Marks: 40
External Marks: 60
Total Marks: 100

L T P
3 1 0

Unit-I Introduction to Operations Research

Definition, scope, objectives, phases, models and limitations of Operations Research, Linear Programming Problem, Formulation of LPP, Graphical solution of LPP, Simplex method, slack, surplus and artificial variables, Concept of duality, big-M method two phase method, dual simplex method, degeneracy and unbound solutions, procedure for resolving degenerate cases.

Unit-II Transportation Problem

Formulation of transportation model, Optimality Methods, Unbalanced transportation problem, Basic feasible solution, Northwest corner rule, least cost method, Vogel's approximation method, Applications of Transportation problems, Assignment Problem, Formulation, unbalanced assignment problem, Traveling salesman problem, Optimality test, the stepping stone method, MODI method.

Unit-III Sequencing Models

Johnsons algorithm, Processing n Jobs through 2 Machines, Processing n Jobs through 3 Machines, Processing 2 Jobs through m machines, Processing n Jobs through m Machines, Graphical solutions priority rules.

Unit-IV Dynamic programming

Characteristics of dynamic programming, Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems.

Unit-V Games Theory

Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle. Rectangular games without saddle point – mixed strategy for 2 X 2 games.

Reference Books:

1. Operations Research and Introduction, Taha H. A. – Pearson Education edition.
2. P. Sankara Iyer, Operations Research, Tata McGraw-Hill, 2008.
3. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.
4. Operations Research, S. D. Sharma –Kedarnath Ramnath & Co 2002.

BTEC 919 Mobile Computing

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction

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

Unit II Mobile Network & Transport Layer

Mobile IP Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, Dynamic Host Configuration Protocol (DHCP), Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Unit III Wireless Networking

Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit III Mobile Ad hoc Networks

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment, Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

Reference Books:

1. J. Schiller, Mobile Communications, Addison-Wesley, second edition, 2004.
2. Raj Pandya, Mobile & Personal Communication Systems and Service, PHI.
3. Asoke k Talukder , Roopa R Yavagal, Mobile Computing , Technology, Application & Service Creation. Tata Mc Graw Hill
4. Stojmenovic and Cacute, “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2002.

BTEC 920 Wireless Sensor Network

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Introduction to Wireless Sensor Networks

Constraints and Challenges of sensor networks, Emerging technologies for wireless sensor networks, Node architecture, Hardware components overview, Energy consumption of Sensor nodes, Dynamic energy and power management on System level, some examples of Sensor nodes, Optimization goals and figures of merit, QOS, Energy Efficiency, scalability, robustness Advantages of sensor networks, Sensor network applications.

Unit-II Topology Control

Location driven, Geographic Adaptive Fidelity (GAF), Geographic Random Forwarding (GeRaF), GEAR, Connectivity driven, SPAN, ASCENT.

Unit-III WSN Sensors

Physical Layer Design, Transceiver Design, MAC Protocols for WSN, Low Duty Cycle Protocols & Wakeup Concepts, S-MAC, Mediation Device Protocol, Wakeup Radio Concepts, Address & Name Management, Assignment of MAC Addresses, Routing Protocols, Energy Efficient Routing, Geographic Routing.

Unit-IV WSN Platforms & Tools

Sensor Node Hardware, Berkeley Motes, Programming Challenges, Node-level software platforms, Node level Simulators, State-centric programming.

Reference Books:

1. Holger Karl & Andreas Willig, "Protocols & Architectures for Wireless Sensor Networks", John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
3. Walteneus Dargie and Christian Poellabauer, "Fundamentals of Wireless Sensor Networks – Theory and Practice", John Wiley and Sons, first edition, 2010.
4. Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley and Sons, 2007.

BTEC 921 Numerical Methods

Internal Marks: 40

External Marks: 60

Total Marks: 100

L T P

3 1 0

Unit-I Errors in Numerical Calculation

Numbers and their accuracy, Mathematical preliminaries, Errors and their computation, General error formula, Error in a series approximation. Zeroes of transcendental and polynomial equation using Bisection method, Regula-falsi method and Newton-Raphson method, Rate of convergence of above methods.

Unit-II Solution of Equations

Linear interpolation methods, Newton's method, Statement of Fixed Point Theorem, Fixed point iteration, Gaussian elimination and Gauss-Jordan methods, Gauss Jacobi and Gauss-Seidel methods, Inverse of a matrix by Gauss Jordan method.

Unit-III Interpolation

Interpolation: Finite differences, difference tables, Newton's forward and backward interpolation, Lagrange's and Newton's divided difference formula for unequal intervals, Numerical differentiation, Numerical integration: Newton-Cotes formula, Trapezoidal, Simpson's one third and three-eighths rules,

Unit-IV Numerical Solution of Ordinary Differential Equations

Single step methods: Taylor series method – Euler and modified Euler methods – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's predictor and corrector methods.

Reference Books:

1. Gerald, C.F, and Wheatley, P.O, "Applied Numerical Analysis", Sixth Edition, Pearson Education Asia, New Delhi, 2002.
2. Balagurusamy, E., "Numerical Methods", Tata McGraw-Hill Pub. Co. Ltd, Delhi, 1999.
3. S. S. Sastry, Introductory Methods of Numerical Analysis, 3rd ed. PHI, Delhi (2002).
4. B. S. Grewal, Numerical Methods in Engineering and Science, Khanna Publishers, Delhi.