

# INFORMATION TECHNOLOGY

2<sup>nd</sup> Year

## 201 MATHEMATICS III

### FIRST TERM:

- 1. Ordinary Differential Equations and some Special Function:** Series solutions ordinary differential equations, Legendre and Bessel function and their properties.  
8 Lectures
- 2. Partial Differential Equations:** Second order linear and quasi-linear partial differential equations, elliptic, parabolic and hyperbolic types, boundary and initial conditions solutions of Dirichlet and Neumann problems for Laplace equation and of heat conduction problems by Fourier method, D'Alembert solution of 1-D wave equation and solution of Cauchy problem.  
8 Lectures
- 3. Functions of a Complex Variable:** Review of complex numbers, formulae of Euler and De Moivre, analytic functions, Cauchy Riemann conditions elementary complex functions and analytic function in terms of a power series, Laurent series, residue theorem, contour integration.  
8 Lectures

### SECOND TERM:

**Probability and Statistics:** Axiomatic definition of probability, laws of probabilities classical occupancy problem with illustrations, conditional, probability

multiplication law, independence of events, Bayes rule, discrete and continuous random variables-cumulative distribution functions, probability mass function, probability density function, mathematical expectation, mean, variance, moment generating function and characteristic function, standard probability models-binomial, Poisson, exponential, Weibull, normal and log normal, sampling and sampling distribution  $z$ ,  $t$ , Chi-square and  $F$ , estimation of parameters, use of  $t$ , Chi-square and  $F$  in test significance. 24 Lectures

### BOOKS RECOMMENDED:

#### TEXT BOOKS:

1. Advance Engineering Mathematics by E. Kreyszig, Wiley eastern Pvt. Ltd. (India)

#### REFERENCE BOOKS:

1. Advance Engineering Mathematics by C.R. Wysle
2. Mathematics of Physics and Modern Engineering by Sckolonikoff & Redhelfer
3. Advance Mathematics for Engineers and Physicists by L.A. Pipes

## 202 COMPUTATIONAL TECHNIQUES

### FIRST TERM:

1. **Types of Computer:** Digital, analog and hybrid, organization of a digital computer system-CPU memory, I/O devices, representation of numbers-integer and floating point arithmetic, round off errors and their propagation.
2. **Introduction to computer languages:** Assembly language, higher languages compilers, problem solving using computers algorithm, flow chart, examples, FORTRAN programming, constant and variables, arithmetic expression I/O statements, specification statement, control statements, subscribed variables, logical expression, function and subroutines, examples of programming should include numerical as well as non-numeric matrix operations, searching, sorting etc.
3. **Iterative Techniques for solution of equation:** Simple iteration scheme, Newton-Raphson method, secant method, their rates of convergence, order of errors, etc. roots of polynomial equation, Gaussian elimination, Gauss-Siedel iteration, matrix inversion by Gaussian method, computation of determinant, polynomial approximation.

### SECOND TERM:

Lagrangian interpolation of polynomial, Aitkin's methods, method, Newton's forward difference formula, curve fitting (least square), Trapezoidal method,

Simpson's Rule, order of errors in integrations, solutions of initial value problems, Euler's methods, and 4th order Runge Kutta (algorithm only).

## COMPUTATIONAL LABORATORY

### FIRST TERM:

Familiarization with PC and DOS, preparing ASC II files using editors/word processors, system utilities, compiling and running, programme development in FORTRAN, number theoretic problems, series summation, matrix and vector operation, non-numeric data processing, searching and sorting.

### SECOND TERM:

Numerical techniques finding roots of a function, quadrature, integration and solution of differential equations, interpolation and curve fitting solution of linear simultaneous equations and matrix inversions

### TEXT BOOKS:

1. Computer Programming & Numerical Methods (For Engineers) by Swami Saran, P.K. Swami and K.K. Singh, Sarita Publishers, Meerut
2. Computer Oriented Numerical Methods by V. Rajaram, Prentice Hall of India

### REFERENCE BOOKS:

1. Elementary Numerical Analysis by S.D. Conte
2. Introductory Methods of Numerical Analysis by S.S. Shastri
3. Numerical Methods in Engineering by M.G. Salve
4. Computing for Engineering by R. T. Fennes

## 203 BASIC ELECTRONICS

### FIRST TERM:

P-n junction, Depletion layer, Barrier potential, forward and reverse bias, breakdown voltage, piv Characteristics of p-n junction diode knee voltage, load line and opt ideal p-n junction diode, junction capacitance, zener diode

Rectifiers and fitters-half wave, centre tap full wave and bridge rectifier, percentage of regulation, piv, ripple factor, C, RC, LC and PI filter, voltage double, clipping and clamping ckt voltage regulation

BJT- Introduction, basic theory of operation of PNP and NPN transistor, V-I characteristics, CB, CE and CC configuration, junction FET-introduction, theory of operation, JEFT parameters JEFT-amplifiers

MOSFET- Introduction, theory of operation MOSFET parameters application. Graphical analysis of BJT and FET circuits, linear models of BJT and PET Pulse and large signal models of BJT and FET

## **SECOND TERM:**

Basic BJT and FET Amplifiers

Introductory idea of multistage and feedback amplifiers

Biasing, base bias, emitter feedback bias, collector feedback bias, voltage divider bias, load line and operating point

Integrated ckt-ideal op-amp, analysis of principle of integration simple op-amp, ckt-intro to digital integrated circuits light source –LED.

Photo detectors- Photo diode and photo transistors, thyristors-introduction to thyristors family, SCR characteristics and ratings

TRIAC- Theory of operation, characteristics and rating voltage control By SCR and TRIAC

UJT- Introduction, basic theory of operation, characteristics and structure, complementary and programmable UJT relaxation oscillator.

## **204 NETWORK THEORY**

### **FIRST TERM:**

1. Linear time invariant first order circuits
2. Linear time invariant second order circuits
3. Response to an arbitrary input
4. Coupling elements and coupled circuits
5. Network graphs, Tellegen's theorem, loop and cutset analysis

### **SECOND TERM:**

1. State equations
2. Natural frequencies
3. Network functions
4. Two-port networks
5. Definition of positive real function, testing of driving point function

6. Synthesis of one port L-C, R-C and R-L network
7. Two port synthesis and filter design

**TEXT BOOKS:**

1. Basic circuit theory by Douser and Kuh, Mc Graw Hill
2. Network theory and filter design by Aatre, Wiley Eastern
3. Network Analysis by Van Valkenburg

**REFERENCE BOOKS:**

1. Electrical Network Theory by Balbiani and Bickert, John Wiley and Sons
2. Modern Network Synthesis by Van Valkenburg, Wiley Eastern
3. Circuit Theory by TSKV Iyer, Tata Mc Graw

**IT- 205 DISCRETE MATHEMATICS AND MATHEMATICAL LOGIC**

**First Term:**

1. Analysis of linear time invariant. (.LIT):-

Discrete time system-Introduction, Properties of discrete time sequences, linear convolution

Discrete time system response, Introduction to Z-transform, its properties and methods to find its inverse, Response of LTI discrete time system using Z-transform,

2. Discrete Fourier Transform (DFT):-

Introduction, DFT properties, errors and their minimization, discrete convolution and correlation,

**Second Term:**

3. Fast Fourier Transform (FFT):-

Matrix formulation, Signal flow graph, dual nodes. WP determination, Unscrambling of FFT, Its computation, flow chart and Computer Program

4. State Equation: Discrete time system, discretization of continuous time state equations.

**Text:**

1. Signals and Systems by I.J. Nagrath and S.N. Sharan, TMH Edn.
2. Fast Fourier Transform and Application by E. Oran Brigham, PHI Edn.
3. Signals and Systems by Allan W. Oppenheim and Allan S. Will Sky, PHI Edn

**IT- 206 INTRODUCTIONS TO COMPUTER AND COMPUTER ARCHITECTURE**

**First Term:**

1. Introduction to Computer System, Computer Interconnected structure, internal and external memory, I/O operating system, CPU, Computer Arithmetic. Instruction sets, CPU structures & function

**Second Term:**

1. Control Unit: Micro operation, Control of CPU, Hardware implementation
2. Micro programmed Control: Basic concept, microstructure sequencing, microinstruction execution, Bit slice Architecture.

**Text:**

1. Computer Organization and Structure by W. Stalling, Maxwell McMillan Publication (International And.)
2. Digital Computer Design by V. Rajaram & T. Radha Krishnan. PHI Edn

**IT- 207 (a) Operating System**

**(b) Java Structure & Programming**

**Contents to be set up by respective faculty member**

**IT- 208 INTRODUCTION TO INFORMATION TECHNOLOGY**

**First Term:**

1. Organization of computers, I/O devices. CD-Rom technology, date representation, Programming languages, Operating System, Disk Operating System (DOS), Unix/ Xenix, Window 95/98 and introduction to latest version, Data base Management system.

**Second Term:**

1. Structural query language, data communication, Networks and Network mechanisms, Advanced networking concepts, Client' Server computing and databases, IT applications, Multimedia and virtual reading, Internet and Intranet, specialized databases.

**Text:**

1. Information Technology by S. Jaiswal, Galgotia Publication Pvt. Ltd., ND
2. Information Technology by D.R Curtis & others. TMH, ND

# INFORMATION TECHNOLOGY

3<sup>rd</sup>Year

## EE 301 Introductions to Microprocessor

First Term:-

- 8085 Architecture
- \* Introduction, Pin function, Internal Organization,
- 8085 Programming
- \* Introduction, Programming model, Instructional timings.
- 8085 Interrupts:
- 8085 Interfacing with memory:

Second Term:

- 8085 Interfacing with I/O
- \* I/O ports, Data transfer schemes, supporting chips.
- 8085 Application:
- \* Introduction, System Design examples, Development aid
- Introduction to 8086
- Architecture, Introduction set

Text Books:

Introduction to Microprocessors, by A.P. Mathur

Reference Books:

Microprocessor Architecture programming and Application with the 8085/8080 A  
By R.S. Gaonkar

## EE 302 Instrumentation - I

First Term:-

1. System of Unit: Fundamentals and derived unit, system International (S.I) units, Dimension.
2. Potentiometer: D.C Potentiometer. A.C. potentiometers, Co-ordinate and polar types and their application
3. Measuring Instruments: Operation and construction of galvanometer, (D.C. and A.C.) Ammeters and voltmeter (Moving iron, moving coil and thermal) and wattmeter (Dynamometer and induction types) Induction type energy meter, testing and compensation, Frequency-meter (Electrical resonance type), signal phase and power factor meters, mugger and multi meters
4. Instruments transformers: - current and potential transformers, Ratio and phase angle errors.
5. Measurement of resistances: - Measurement of low resistance by Kelvin double bridge and potentiometer method, Measurement of high resistance by loss of charge method.
6. High voltage measurement: - Surge and impulse test and oil testing set.

Second Term:-

7. Measurement of Inductance and capacitance :- A.C. bridges, Maxwell wine Anderson and shearing bridges General equation and vector diagram under balanced conditions, Errors and precaution in bridge measurement, Wagner's earth connection and shielding of bridge measurement, Wagner's earth connection and shielding of bridge elements.

8. Magnetic measurement: - Ballistic galvanometer flux meters. Measurement of flux by Ballistic galvanometer and flux meters, Determination of B-H curve and hysteresis loop, Separation of hysteresis and current losses by Lloyd fisher square
9. Electronic Instruments: C.R.O. and its uses in measurement of frequency and phase angle. Determination, B-H curve and measurement of die electric D.C & A.C. voltmeter. Differential voltmeter A/D and D/A convertors, Digital Voltmeters and multi meter.
10. Measurement of No-electrical Quantities: - Primary sending elements, classification and selection transducers.  
Displacement transducers, strain gauges Temperature transducers and photoelectric transducers, Measurement of strain, temperature and pressure

Text Books:-

1. Electrical Measurement and Measuring Instruments- Rajendra Prasad, Khanna Publisher, Delhi.  
Electric Instrumentation and Measurement Technique – W., D. cooper 7 A.D Helfrick, Prentice Hall, India.

### **EE 304 Signals and System**

First terms:-

1. SIGNALS & THEIR REPRESENTATION:-  
Basic Continuous time Signals  
Basic discrete time signals  
Linear time invariant Signals  
Random Signals
2. INTRODUCTION TO LINEAR SYSTEM:-  
Introduction  
Linear system from a physical view point  
Linear system from a mathematical view point
3. FOURIER SERIES & TRANSFORMS:-  
Fourier series expansions  
Symmetry conditions  
Exponential form of Fourier series  
Fourier Integral & Fourier Transform  
Analysis by Fourier Methods  
Gibb's Phenomena  
Concept of phase & Frequency spectrum
4. LAPLACE TRANSFORM:-  
Introduction  
Conversion from F- transform to L transform  
L- Transform of some important functions  
The gate function  
L- Transform of periodic function  
L- Transform of operations
5. INVERSE LAPLACE TRANSFORMATION  
Introduction  
Heaviside's expansion Theorem  
Analysis of system response  
Initial & Final value Theorem  
The convolution integral

The super position integral  
Inverse L- transformations of some irrational functions

Second Term:-

6. SAMPLED-DATA SYSTEM & THE Z-TRANSFORMATIONS:-

Introduction  
The Z- transformations  
Z—transformations of some important functions  
The shifting Theorem  
The initial & final value Theorem  
Introductions to difference equations  
Pulse transfer functions

7. MATHEMATICAL MODELLING OF PHYSICAL SYSTEM:-

System response & transfer function  
Block diagram representations  
Rule for block diagram transformations  
Signal flow graph  
Mason's gain formula & its applications

8. STATE VARIABLE REPRESENTATION:-

Concept of state, state variable & state model, Different between state variable & phase variable, state model for linear continuous time system, Transition and resolvent matrix, Solution of state equations.  
Eigen Value & vectors

9. RANDOM SIGNALS:-

Introduction  
Properties  
Correlation of signal (Auto- correlation & cross- Correlation), Gaussian probability density function-  
Gaussian noise, white noise

10. NOISE:-

Introduction & Type of Noise  
Noise figure, S/N ratio, Calculation of noise figure

BOOKS-TEXT/REFERENCE

1. Analysis of linear system- By D.K. Cheng.
2. Circuit & System Analysis- By A. Papoulis
3. Signal & linear system- By Gabel & Roberts.
4. Communication system – By Hawkins
5. Signals and Systems – By Oppenheim and Will Sky Prentice Hall
6. Control System Engineering – By Nagrath & Gopal

**EC 301 Communication system**

First Term:-

- ❖ Review of signals and system. Fourier Transforms.
- ❖ Introduction to communication system
- ❖ Generation & Demodulation of AM signals including DSB-SC SSB-VSB
- ❖ Frequency Division Multiplexing (FDM)
- ❖ Super –heterodyne & communication receivers.
- ❖ Generation and Demodulation of FM/PM signals
- ❖ Noise in AM / FM system (briefly)



Second Term:-

- ❖ Pulse Modulation System , Sampling theory
- ❖ Generation & demodulation of PAM PWM & PPM
- ❖ Time division multiplexing (TDM)
- ❖ Antenna Transmission line & wave Propagation (an introduction)
- ❖ Application :- (System description in brief)
  - AM/FM/Radio broadcasting & reception system
  - TV Broadcasting & reception system including colour TV
  - Line communication (Telegraphy)
  - Telephony system including PBX & electronic exchanges
  - Microwave communication links
  - Satellite communication system
  - Radar, Navigation & civil aviation communication systems
  - Power on line carrier communication system.

Text:-

1. Communication System by Kennedy
2. Electronics Communication by Rowdy Coleen, PHI
3. Telecommunication Principal Circuit and System by S.Ramabhadram Khanna Publications.

### **IT- 301 Computer Networking**

First Term:-

Networking and its concepts, Advantage and disadvantages of networking , networking topology and mechanism , Circuit switching , data communication Interface (FDDI), Transmission media , multiplexing, error detection, Ethernet ( Gigabit Ethernet), High speed networking, relay, ISDN, Type of networks- LAN, its types and protocol, physical layer, Lan Hardwares, LAN extenders, bridge routers, LAN, Software, digitization of network, Wireless Lan Technology, Virtual private network.

Second Term:-

Metropolitans Area Network (Man) and Wide Area Network (Wan), Integrated server network , ATM and Sonnet/ SDE, Networking and Internetworking devices, An overview on TCP/IP, Networking layer, Transport layer, Application layer services, upper OSI layer.

Text:

1. Data communication and Networking by S. Jaiswal, Galgotia Publication Pvt. Ltd., ND
2. 'O' level, elective I Module MI.1 Information Technology by V.K. Jain, BPB Publication, ND

### **IT- 302 Neural Networking And Application**

First Term:-

Introduction, learning Process, Signal layer perceptions, Multi layer perceptions, Radial basis functions network, support vector machine.

Second Term:-

Committee machines, Principal component analysis, Neuro dynamics & programming, dynamically reverent networks

Text:

1. Neural Networks By Somen Hawkins, Addison Wesley Longman Pvt. Ltd., ND
2. Neural Networks and genetic algorithm By Donikar Andrej Stella Nigel, Springer Verlag Publications
3. Neural Networks modeling & control of dynamic system By M. Niggard, Springer Verlag Publication

### **IT- 303 Elective I**

#### **EL 1 ELECTRONIC BANKING AND COMMERCE**

First Term: - Electronic Commerce and its application, Data Communication. PUS and networking, Advanced networking concept, Technologies in E- Commerce system.

Second Term: - EDL Security and legal aspects, Electronic commerce identification tools Security issues and Electronic payment system, Information Technology Plan for ERP system.

Text: -

1. E Commerce- By Jaiswal Galgotia Publishing Pvt. Ltd. ND
2. Trends in E – Commerce- By Lamosdorf, Springer- Verlag

### **IT- 304 Elective II**

#### **EL 2 INFORMATION THEORY**

First Term: -

1. Random Process: - Description of random process, ensemble average & correlation function. Stationary and ergodic processes, Gaussian Process
2. Random signals: - Signal power and time average. Power spectrum superposition & modulation, filtered random signals
3. Noise: - Thermal noise and available power, White noise and filtered noise. Noise equivalent bandwidth, System measurements using white noise
4. Signal Transmission with noise: - Additive noise and signal to noise ratio (SNR), Analog baseband transmission. Pulse detection and matched filters.

Second Term:-

1. Information measure, Entropy and information rate, coding for a discrete memory loss sources with memory.
2. Information Transmission on discrete Channel: - Mutual Information, Discrete channel capacity, coding for binary symmetric channel.
3. Continuous channels & system comparison: - Continuous information Continuous channel and its capacity, Ideal communication system, Systems Comparison

Text: - 1. Communication System by A. Bruce Carlson, Mc Graw Hill (3<sup>rd</sup> Edition)  
2. Communication System by Simon Hawkins, Wiley Eastern Edn.

## INFORMATION TECHNOLOGY

4<sup>th</sup>Year

### IT – 401 Satellite Communication

#### First Term:

Satellite Orbit, Kepler's Law, Synchronous, sub synchronous and non-synchronous type satellite, characteristic of radio system, Method of Modulation, Noise consideration, Remote Area communication through satellite, Insat system and their characteristics,

#### Second Term:

Attitude control, Satellite station keeping, Limits of visibility, Frequency plan and polarization, Transponders, uplink and downlink, power budget calculation, multiple access method, brief introduction of digital communication by satellite.

Text:-

1. Electronics Communication by Rowdy and Cullen, PHI, ND
2. Telecommunication, Principle, Circuit and System by Ramphadram, Khanna Publishers.
3. Digital Communication by Satellite by Spiker, PHI (1994 Edn.)

### IT-402 Information Protection and Security

#### First Term:

Introduction, Cryptography, Conventional encryption and message confident ability, Public key cryptography and authentication

#### Second Term:

Network Security application, Authentication application, Mail Security, IP security, Web security. Network management security, System Security: - Intruders and Viruses, Fire walls.

Text:

1. Network Security Essentials, Application and Standard By William Stalling, Addition Wesley Longman, ND
2. Internet Security Protocols By Vyles Black, Addition Wesley Longman, ND
3. Information Security  
By Dawda, Springer - Verlog (1998 Edn)

### IT-403 DIGITAL SIGNAL PROCESSING

#### FIRST TERM:

Discus time signals and system, Stability and consality of linear ship invariant system, Z-transform, Flow graph and representation of digital filters, Effect of quantization of parameters, Digital filter design.

#### SECOND TERM:

FIR filter: - Design based on analog filters, input invariance and bilinear transformation approach, Computer aided design,

FIR filters: - Design windows, Computer aided design; Computation of DRT and FFT algorithm, Effect of finite register length in digital signal processing

TEXT BOOK:

Digital Signal Processing By Alan V. Oppenheim and Ronald W. Schafer, Prentice Hall of India

### **IT - 404 MULTIMEDIA SYSTEMS**

FIRST TERM:

Introduction, Production and evaluation, Hardware involved operating system and software text. Graphics, Digital Audio, Digital Video and animation product designer

SECOND TERM:

Multimedia and the Internet, The multimedia development team, the multimedia development process  
Internet :- Internet organization and its versions, Internet Application, Getting information on internet, Internet service providers, its types & protocol, Network and network interface concepts, Addressing in Internet, Management of Internet, Brief Introduction to service providers.

TEXT:

1. Multimedia Technology & Application by David Hillman, Galgotia Publishing Pvt. Ltd
2. Multimedia Technology & Application by Chow, Springer (1997 Edn.)

REF.: 'O' level, Elective I - Module M 1.1 by V. K. Jain, BPB Publication

### **IT- 405 BROADBAND SYSTEM - TO BE FRAMED BY TEACHER CONCERNED.**

REF.:-

1. Satellite system for personal and broadband communication By Lutz, E. Werner, M. Springer Verlag Publication. (Zero Edn.)

### **ELECTIVES III, IV AND V**

#### **EL-7 MANAGEMENT INFORMATION SYSTEM (MIS)**

FIRST TERM:-

Evolution by management information system (MIS), Concept of information system, structure of MIS, Data processing, Flow charting

SECOND TERM:-

Foundation of MIS, Information Technology, A managerial overview, Business application of Information Technology, Managing information Technology

TEXT:

1. Management Information system and Computer application by P. Mohan, Himalaya Publishing House, ND
2. Management Information System by James A. Obrien, Galgotia Publishing Pvt. Ltd.

### **EL-8 ADVANCE MICROPROCESSOR**

FIRST TERM:

8086 Architecture, 8086 programming, 8086 interfacing with memory and peripherals, Introduction to 186/286/ 386/ 486 (with emphases on fechin)

SECOND TERM:

Bit inter processor, Rise processor, Troubleshooting and development aids. Application of inter processor

TEXT:

1. Microprocessor: comprehensive studies by Naresh Grover, Dhanpat Rai & Co.

REFERENCE:

2. Introduction to Microprocessors by A.R Mathur
3. Introduction to Microprocessor by B. Ram.

### **EL-9 COMPUTER HARDWARE (I/O DEVICES AND MACHINE HARDWARE)**

FIRST TERM:

External devices, I/O requirements, Modes of control, Modes of transfer, Direct memory access (DMA), Brief description of I/O devices.

Interfacing I/O devices :- Peripheral I/O instructions, input interfacing, I/O interfacing using decoders, interfacing output delays, Hardware aspect of input device interface, memory mapped I/O safety control using memory mapped I/O, Testing and troubleshooting I/O interface circuits.

SECOND TERM:

Computer system; Organisation, Bus organisation, instruction

Control Logic Design :- Control organisation, Hard wired control with examples (Two examples), Micro programme control, processor unit control, PLA control, Micro programme Sequencer, Micro program med CPU organisation.

Computer Design: - System configuration, Computer instruction, Timing and control, Execution of instructions, design of computer registers, design of computer control.

TEXT:

1. Computer Hardware Organisation by M.E. Sloan, Galgotia Publication Pvt. Ltd

2. Digital logic and Computer design By M. Morris Mano, PHI
3. Microprocessor Architecture programming and application By Ramesh S. Gaonkar, Penram International Publishing, Mumbai.

### **EL-10 WIRELESS MOBILE COMMUNICATION:**

#### **FIRST TERM:**

Introduction to wireless Cellular digital PCS- Mobile radio, Speech coding for wireless system, application, Radio propagation and cellular Engineering concept, digital modulation-demodulation (Modem) technique.

#### **SECOND TERM:**

Coding, Error correction and detection, spread spectrum system, Diversity technique for mobile / wireless radio systems, personal mobile Satellite communication, Cellular and wireless communication Engineering.

#### **TEXT:**

1. Wireless Mobile Communication by K. Feher, PH I, ND

### **EL-11 VIDEO CONFERENCING TECHNOLOGY**

To be framed by teacher concerned.

### **EL-12 FINANCIAL INFORMATION SYSTEM**

To be framed by teacher concerned.

### **EL-13 PARALLEL COMPUTING**

#### **FIRST TERM:**

Introduction, Fundamental decomposition, System Composition, Operating Principles

#### **SECOND TERM:**

Transient objects, class ensembles, system abstractions, discussion

#### **TEXT:**

1. The Logic design of Parallel operating System by Wolfgang Schroder - Preikschof, Prentice Hall Publication
2. Parallel and Real Time System by Sharda, Springer Verlag Publication

### **EL-14 DATA ACQUISITION SYSTEM**

#### **FIRST TERM:**

Introduction, Resolution and accuracy, number of channels and sampling rate, Radio metric conversion, logarithmic compression, Signal channel data acquisition system, Preamplifiers and filtering, multi-

channel data acquisition system, multiplexing of outputs of sample and hold, multiplexing after A/D conversion, multiplexing low level data, Present trend in data acquisition system.

**SECOND TERM:**

Signal Conditioning: -Excitation system, amplifiers, Sample and hold circuits, multiplexers-TDM and FDM, MSI, ICS as multiplexer, Design of high order multiplexer using low order multiplexer ICS, AND conversion, address decoders, Example of such ICS. Telemetry: -AC telemetry, modulation in telemetry, pulse and radio telemetry, signal recovery, signal averaging, signal correlation, Signal coding, Data Processing, Display and recording technique in biomedical systems. Role of telemetry in Biomedical System

**TEXT:**

1. Instrumentation, Devices and Systems by C.S. Ranjan, G.R. Saran and V.S. Mani, TMH
2. Electronic Measurement and Instrumentation by Rajendra Prasad, Khanna Publishers
3. Biomedical Electronics and Instrumentation by Venkata Ram, Galgotia publication Pvt. Ltd

## **EL-15 DIGITAL COMMUNICATION**

**FIRST TERM:**

Introduction to Telecommunication, Power Spectral density of digital modulation, scalar and vector communication over discrete memory less channel, Coherent communication with wave forms, Non-coherent communication with waveform, partially coherent communication with waveform.

**SECOND TERM:**

Differentially coherent communication with waveform, Double differentially coherent communication with waveform, communication over band limited channel Demodulation and detection of other digital modulation, coded digital communication, black-coded digital communication, convolution – coded digital communication.

**TEXT:**

1. Digital Communication Techniques: Signal Design and Detection by Marvin Simon and Sami Hinedi, Prentice Hall Publication

## **EL-16 ARTIFICIAL INTELLIGENCE**

**FIRST TERM:**

- (i) Overview of Artificial Intelligence (AI):- What is AI? It's Importance, Early work and related fields.
- (ii) Knowledge: General Concepts, Definition and importance of knowledge, Knowledge based systems, representation of knowledge, knowledge organization and manipulation, its acquisition
- (iii) Lisp and other Programming Languages : Introduction to Lisp, Syntax and numeric function, basic list manipulation functions in LISR Functions, predicates and conditionals, I/O and local variables, Interaction and recursion properly List and arrays, Prolog and other Programming Language.
- (iv) Dealing with Inconsistency and Uncertainties: Introduction, Truth maintenance systems, default reasoning and closed world assumption, Predicate completion and circum-scription, Model and temporal logics, Furry logic and natural language computations
- (v) Probabilistic Reasoning: Introduction, Bayesian Probabilistic interference, possible world representation, Dumpster- Shafer theory, Ad-hoc methods

### **Second Term:-**

- (vi) Structural Knowledge: Graph, Frames and related structure: Introduction, Associative networks, Frame Structures, Conceptual dependences and scripts.
- (vii) Object oriented representations: - Introduction, overview of oriented systems, objects, class, Messages and methods, Simulation examples using DOS program, object oriented language and systems.
- (viii) Search and control strategies: - Introduction, Preliminary concepts, Examples of search problems, Uniformed or blind search, Informed search, searching AND-OR graphs.
- (ix) Matching Techniques: - Introduction, Structures used in matching, Measures for matching, Matching Line patterns, Partial matching, Fuzzy matching algorithms.
- (x) Natural Language processing: - Introduction, Overview of linguistics, Grammars and language, Basic parsing techniques, Semantic analysis and representation structures, Natural Language generation and systems.
- (xi) Pattern Recognition: - Introduction, the recognition and classification process, learning classification pattern, recognition and understanding speech.

### Reference:

Introduction to Artificial Intelligence and system by Dan W. Patterson, PHI Publication

## **EL-17 Data Structure in C++**

First term

**Arrays:** - Abstract data types and C++ class. The array as abstract data type, The Polynomial abstract



data type, Sparse Matrices; representation of arrays, the string abstract data type

**Stacks & queues:** - Templates in C++ , the stack abstract data type, the queue abstract data type, multiples stacks and queues.

### **Second Term**

**Trees:** - Binary trees, binary tree traversed as tree iterates, additional binary tree operations, threaded binary trees, binary search trees, selection trees.

**Graph:**-The graph abstract data type, elementary graph operations, minimum cost spanning trees, shortest path and transitive closures.

### **Text:-**

Fundamentals of data structure in C++ by Ellis Horowitz Galgotia Publication Pvt. Ltd. 2001.