

B.Tech COMPUTER SCIENCE ENGINEERING (AKU Syllabus) SEMESTER-III

CS 1X01 OBJECT ORIENTED PROGRAMMING

L- T- P : 3-0-3 Credit : 5

- 1. Introduction to C++ :** Object Oriented Technology, Advantages of OOP, Input- output in C++, Tokens, Keywords, Identifiers, Data Types C++, Derives data types. The void data type, Type Modifiers, Typecasting, Constant, Operator, Precedence of Operators, Strings. **Lecture : 3**
- 2. Control Structures :** Decision making statements like if-else, Nested if-else, goto, break, continue, switch case, Loop statement like for loop, nested for loop, while loop, do-while loop. **Lecture : 3**
- 3. Functions :** Parts of Function, User- defined Functions, Value- Returning Functions, void Functions, Value Parameters, Function overloading, Virtual Functions. **Lecture : 3**
- 4. Classes and Data Abstraction :** Structure in C++, Class, Build- in Operations on Classes, Assignment Operator and Classes, Class Scope, Reference parameters and Class Objects (Variables), Member functions, Accessor and Mutator Functions, Constructors, default Constructor, Destructors. **Lecture : 15**
- 5. Overloading & Templates :** Operator Overloading, Function Overloading, Function Templates, Class Templates. **Lecture : 5**
- 6. Inheritance :** Single and Multiple Inheritance, virtual Base class, Abstract Class, Pointer and Inheritance, Overloading Member Function. **Lecture : 5**
- 7. Pointers and Arrays :** Void Pointers, Pointer to Class, Pointer to Object, The this Pointer, Void Pointer, Arrays. **Lecture : 6**
- 8. Exception Handling :** The keywords try, throw and catch. Creating own Exception Classes, Exception Handling Techniques (Terminate the Program, Fix the Error and Continue, Log the Error and Continue), Stack Unwinding. **Lec : 5**

MA 1x03 MATHEMATICS – III

L-T-P: 3-1-0 Credit : 4

- 1. ORDINARY DIFFERENTIAL EQUATIONS & SPECIAL FUNCTIONS :** Series solution of differential equations (Frobenius method), Bessel's equation, Its solution, Bessel's function of first & second kind, Recurrence formula, Legendre's equation, Its solution, Legendre polynomials, Rodrigue's formula, Orthogonality of Legendre polynomial. **Lecture : 10**
- 2. PARTIAL DIFFERENTIAL EQUATION :** Basic concept, 1st & 2nd order linear & quasi – linear partial differential equation, Classification of second order P.D.E., Boundary and initial conditions, wave equations, Separation of variables, use of fourier series, D'Alembert's solution of wave equation, Heat equation, Solution by fourier series. **Lecture : 10**
- 3. COMPLEX ANALYSIS - I :** Function of complex variables – limit, continuity, differentiability and analyticity of functions Cauchy-Riemann equations, Laplace's equation, harmonic function, Cauchy's integral theorem, Cauchy's integral formula, Taylor's and Laurent series, Residues and its applications to evaluating real integrals. **Lecture : 10**
- 4. PROBABILITY & STATISTICS :** Theorems on probability, including Baye's rule, Random variable – cumulative distribution function, Probability mass function, probability density function, Mathematical expectation, mean variance, moment, generating function & characteristics function, standard probability models Binomials, Poisson exponential, Weibull, normal and lognormal, sampling & sampling distribution, Chi- square and F distributions, large and small sample tests of significance. **Lecture : 12**

Text Books :

1. Advanced Engineering Mathematics by R.K.Jain & S.R.K. Iyengar
2. Higher engineering mathematics by B.S. Grewal
3. Fundamentals of mathematical statistics by V.K.Kapoor & S.C. Gupta- sultan & sons

References :

1. Advance Engineering Mathematics by E.Kreyszig 8th edition , John Wiley & sons
2. Complex variable and applications by Churchill & Brown –McGraw hill
3. Elements of Partial Differential equation by I.N.Sneddon - McGraw Hill
4. Introduction to Probability & Statistics for engineering by S.M.Ross – John Wiley and Sons, New York

EC 1x01 BASIC ELECTRONICS**L-T-P : 3-1-2 Credit : 5**

1. PN junction diode : Depletion layer, barrier potential, forward and reverse bias, break down voltage, PIV characteristics of PN junction diode, knee voltage, ideal PN junction diode, junction capacitance, break down diode(zener diode). Photo diode and light emitting diode. **Lecture : 10**

2. Rectifiers and filters : Half wave and full wave rectifiers(centre tap and bridge), regulation ripple factor, R-C ,L-C and Pi filters. Clipping and clamping circuit, voltage multiplier. **Lecture : 8**

3. BJT introduction : Basic theory and operation of PNP and NPN transistors, characteristics of C-B,C-E,C-C configuration.

Biasing : Base bias, emitter feedback bias, voltage divider bias, load line, operating point. Incremental analysis using h model. **Lecture : 12**

4. FET : introduction, operation, JFET parameters, JFET characteristics, JFET amplifiers.

MOS FET : Introduction, operation , MOSFET parameters . **Lecture : 4**

5. Feedback amplifiers. Lecture : 2

6. Integrated circuit : Characteristics of ideal, operational amplifiers. Application as inverting, non inverting amplifiers. Summer, difference, differentiator, integrator. **Lecture : 4**

7. Principle and application of SCR and UJT. **Lecture : 2**

Text Books :

1. Electronic devices and circuit theory by Boylestad and Nashelsky, Pearson

2. Electronic principle by Albert Malvino & Davis J Bates, TMH

3. Art of electronics by Paul H Horowitz, Oxford

Reference :

1. Introduction to electronic circuit design by Spencer, Pearson.

2. Device electronics for integrated circuits by Muller And Kamins With Masun Chan, Wiley student edition

3. Principles of electronics by V K Mehta and Rohit Mehta, Chand.

4. Electronic circuit and system by R J Smith. Wiley.

Basic Electronic Lab :

1. Introduction to DMM(digital multi meter)

2. Introduction to passive components(resistance, capacitance and inductors)

3. Introduction to cathode ray oscilloscope(CRO) - time period measurement., study of different wave forms, measurement of frequency of sinusoidal waveforms by Lissajou's figure.

4. Introduction to connectors- multi-strand wires and single strand wires and bread boards.

5. Study of output characteristics of diode, BJT,FET,UJT & SCR.

6. Application of diodes, BJT, FET, UJT & SCR-Clipping & clamping, rectification, RC coupled CE and CS FET amplifiers, relaxation oscillators

7. Application of μA 741- inverting amplifiers, summer amplifiers, difference amplifiers, integrator and differentiators.

Text Book : Lab manual by Maheshwari, PHI

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MA 1x04 NUMERICAL METHOD & COMPUTATIONAL TECHNIQUE

L-T-P : 3-1-0 Credit : 4

1. Introduction to computer language : Machine language, assembly language, higher level language, compilers, problem solving using computer algorithm, flow chart, examples. **Lecture : 5**

2. C/C++ Programming : Constant & variables, arithmetic expression, I/O statement, specification statement, control statements, subscripted variables, logical expression, function and subroutines, examples of programming should include numerical as well as non numeric applications, matrix operations, searching , sorting etc. **Lecture : 15**

3. Iterative Techniques for solution of equations :

i. Solution of non linear equation - Simple iteration scheme, Bisection method, Regula-falsi method, Newton - Raphson method, Secant method, their rates of convergence, order of errors etc. **Lecture : 5**

ii. Solution of linear equation – Gaussian elimination, matrix inversion by Gaussian method, computation of determinants, Jacobi and Gauss Seidel iteration method. **Lecture : 4**

4. Polynomial approximation : Interpolation, several form of interpolating polynomials like Lagrangian interpolation of polynomial and Newtons forward and backward difference formula, curve fitting(least square) . **Lecture : 6**

5. Numerical integration : Trapezoidal method, Simpson's rule, order of errors in integration. **Lecture : 4**

6. Solution of initial value problem : Euler's method, Runge-Kutta second order and fourth order methods, solution of boundary value problem - Finite difference method.

Text Books:

1. Numerical methods for scientific and engineering computations by M.K. Jain, S.R.K. Iyengar, and R.K.Jain, New Age International Publishers, New Delhi.
2. Introductory Method of Numerical Analysis by S.S. Sastry, Prentice Hall of India Pvt. Ltd.

Reference Books

1. Numerical Analysis in Engineering by Rama B. Bhat, S. Chakravarty, Narosa Publishing House.
2. Advanced Engineering Mathematics by E.Kreyszig, 8th edition by John Wiley & Sons, New York.

EC 1x02 DIGITAL ELECTRONICS**L-T-P : 3-1-2 Credit : 5**

1. Digital Principle : Analog vs Digital, Number system, Computer Codes, Digital Signals, Waveforms Positive and Negative logic, Logic Gate : basic, universal and others, Truth Table, Logic functions, IC Chips, Timing Diagram, Electrical analogy. **Lecture : 4**

2. Boolean laws and theorems : Logic functions, conversion of logic functions into truth table and vice versa. SOP and POS forms of representation, min terms and max terms, simplification of logic functions by theorems and Karnaugh's map, don't care conditions, design of special purpose computers and related practical problems. **Lecture : 5**

3. Analysis and synthesis of combinational logic circuits : Adder and substructures (look ahead adders), Multiplexers, de multiplexers, Encoders, decoders, code convertors, magnitude comparators, parity generators and checkers. **Lecture : 6**

4. Integrated circuit logic families : RTL, DTL, TTL, CMOS, IIL/I2L (integrated injection logic & emitter coupled logic). **Lecture : 4**

5. Sequential circuit blocks and latches, flip flops- race around condition, master slave and edge triggered, SR, JK, D & T Flip Flop, shift registers, counters- synchronous and asynchronous: design of ripple counter. **Lecture : 10**

6. Timing circuit : multi vibrators, mono stable and astable timer: LM555. **Lec : 4**

7. Use of building blocks in designing larger systems such as digital to analog converters(DAC) weighted resistors and $r-2r$, analog to digital(ADC)- comparator, counter and succession. **Lecture : 5**

8. Memories : static and dynamic RAMs, ROM, EPROM, EEPROM. **Lecture : 4**

Text Books :

1. Digital systems - Principles and Applications by Tocci, Widmar and Jain, Pearson
2. Digital fundamentals by Floyd And Jain, Pearson

Reference books :

1. Fundamentals of VHDL design by Stephen Brown and Zovenkeo Vraseseic, TMH
2. Introduction To Logic Design With Cd Rom by Alan B Marcovity, TMH,
3. Fundamentals Of Digital Logic With Verilog Design by Stephen Brown, TMH
4. Modern digital electronics by R.P Jain, TMH