BCA101 Mathematics

Trigonometry and Complex Numbers:
Trigonometry: Trigonometry Functions, Functions of angles of any magnitude, Compound and multiple angles, Inverse circular functions. Complex Numbers: Modules, Argument of complex number, Polar form, vector form, Complex conjugate, Algebraic operations, De-Moivre's theorem, Roots of a complex number.

Matrices and Determinants:
Definition of different types of matrix, Algebraic operations, Symmetric & skew symmetric matrix, Transpose of matrix, Orthogonal matrices, Rank of matrix, Determinant of a square matrix, Inverse of a square matrix, Solution of Linear Equations by Cramer's Rule and Gauss-Elimination method, Eigen values & Eigen vectors of a square matrix.

Differential Calculus:
Limit, Continuity and differentiability of functions, Differentiation Rules, Differentiation of functions (Algebraic, Trigonometric, Logarithmic, Exponential and Inverse trigonometric functions), Tangent and normal lines, Condition of tangency, Extreme values of functions.

Integral Calculus:
Indefinite integrals, Basic formulae, Integration by parts, Integration by substitution, Definite integrals, Properties of definite integrals, Evaluation of double integration & triple integration, Application of definite integral to find Area and Volume.

Vector Calculus:
Vectors in a plane, Linear dependence and independence of vectors, Vectors in space, Dot and cross-product of vectors, Gradient of vectors, Divergence of vectors, Curl of vectors, Physical interpretation of gradient, Divergence and curl of vectors.

References:

1. Advanced Engineering Mathematics- Erwin Kreyszig
2. Calculus: Volume I- Aposto
3. Elementary Engineering Mathematics, B S Grewal
4. Higher Engineering Mathematics, B S Grewal

BCA102 Computer Fundamentals

Introduction:
Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive)I/O Devices (Scanners, Plotters, LCD, Plasma Display). Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication.

Algorithm and Flowcharts Algorithm:
Definition, Characteristics, Advantages and disadvantages, Examples Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples.

Operating System and Services in O.S.:
Dos – History, Files and Directories, Internal and External Commands, Batch Files, Types of O.S. Windows Operating Environment Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

Editors and Word Processors:
Basic Concepts, Examples: MS-Word, Introduction to desktop publishing Spreadsheets and Database packages Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Reference:

1. Fundamental of Computers – By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers – By P.K. Sinha
3 MS-Office 2000(For Windows) – By Steve Sagman

BCA103 Programming in C

Introduction:
History, Structures of 'C' Programming, Function as building blocks. Language Fundamentals Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments.

Operators:
Types of operators, Precedence and Associatively, Expression, Statement and types of statements Build in Operators and function Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files, Preprocessor directives: #include, #define.

Control structures
Decision making structures: If, If-else, Nested If-else, Switch; Loop Control structures: While, Dowhile, for, Nested for loop; Other statements: break, continue, goto, exit.

Simple Arithmetic Problems
Addition / Multiplication of integers, Determining if a number is +ve / -ve / even / odd, Maximum of 2 numbers, 3 numbers, Sum of first *n* numbers, given *n* numbers, Integer division, Digit reversing, Table generation for *n*, Factorial, sine series, cosine series, Pascal Triangle, Prime number, Factors of a number, Other problems such as Perfect number, GCD numbers, Swapping, etc.

Functions: Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes, Recursion.

References:

1. Programming in C-Balguruswamy
2. The C programming Lang., Pearson Ecl - Dennis Ritchie
3. Structured programming approach using C- Forouzah & Ceilber Thomson learning publication

BCA104 Basic Electronics

Semiconductors and PN Junction Diode
Properties of semiconductors, Intrinsic and extrinsic semiconductors, P and N type of impurities and doping, Charge densities and potential barrier, Draft and diffusion currents, PN junction working and characteristics, It's applications as – Rectifier: Half wave, Full wave, Bridge Rectifier and their calculation for ripple, Efficiency and PIV; Clipper, Clamper and voltage doublers, Zener and Avalanche breakdown diodes, Tunnel diode, Varacter diode, Thermister.

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Bipolar Transistor
Transistor action with simple bias conditions, Working and basic characteristics, CB, CE & CC configuration of transistor amplifiers, Analysis for CB and CE basic amplifiers- Determination of Q-point, dc load line and calculations for gains and impedances, Effect of load and ac load line.

Transistor biasing
Biasing circuits for CB and CE configurations, Leakage currents in CB & CE and it's effect, Thermal stabilization & Stability factor, Different biasing arrangements for CE- their advantages and drawbacks, Transistor thermal power dissipation and rating.

Equivalent Circuits of Transistor
Transistor as four port device, Impedance, Z-parameters and circuits representation, Admittance Y parameters and circuit representation, h-parameters and circuit representation; Analysis of CB and CE circuits using h-parameters for gains and impedances.

Field Effect Transistors
Basic configuration of JFET, Biasing, Principle of operation and basic characteristics, Basics of MOSFET.

References:

1. Electronic Devices and Circuits, Allen Motersheid
2. Integrated Electronics, Jacob Millman
3. Electronic Devices and Circuit Theory, L Boylestad and Nashelsky
4. Handbook of Electronics, Gupta and Kumar

BCA105 Communication Skills

Introduction to Communication:
Means of Communication: Meaning and Definition – Process – Functions – Objectives – Importance – Essentials of good communication – Communication barriers, 7C's of Communication.

Types of Communication:
Oral Communication: Meaning, nature and scope – Principle of effective oral communication – Techniques of effective speech – Media of oral communication (Face-to-face conversation – Teleconferences – Press Conference – Demonstration – Radio Recording – Dictaphone – Meetings – Rumour – Demonstration and Dramatisation – Public address system – Grapevine – Group Discussion – Oral report – Closed circuit TV). The art of listening – Principles of good listening.

Written Communication: Purpose of writing, Clarity in Writing, Pricinciple of Effective writing, Writing Techniques, Electronic Writing Process. Business Letters & Reports: Need and functions of business letters – Planning & layout of business letter – Kinds of business letters – Essentials of effective correspondence, Purpose, Kind and Objective of Reports, Writing Reports. Drafting of business letters: Enquiries and replies – Placing and fulfilling orders – Complaints and follow-up Sales letters –Circular letters Application for employment and resume.

Information Technology for Communication:
Word Processor – Telex – Facsimile(Fax) – E-mail – Voice mail –Internet – Multimedia – Teleconferencing – Mobile Phone Conversation – Video Conferencing –SMS – Telephone Answering Machine – Advantages and limitations of these types. Topics Prescribed for workshop/skill lab Group Discussion, Mock Interview, Decision Making in a Group