

B.Sc COMPUTER SCIENCE

Ist Semester Syllabus

Sr. No.	Course Code	Subjects	MM
1.	<i>Course I</i>	<i>English Language and Professional Communication – I</i>	50
2.	<i>Course II</i>	<i>Applied Mathematics – I</i>	100
3.	<i>Course III</i>	<i>Applied Physics</i>	100
4.	<i>Course IV</i>	<i>Computer Fundamentals, MS Windows and MS Office Tools</i>	100
5.	<i>Course V</i>	<i>Lab-I Applied Physics Experiments</i>	50
6.	<i>Course VI</i>	<i>Lab-II Computer Fundamentals, MS Windows and MS Office Tools Exercise</i>	100

Course I English Language and professional Communication – I

UNIT 1

Introduction to Technical Communication

Nature of Technical Communication: Origin and Scope, Features and General Writing, Significance, Style objective, Style features as compared to Literary Composition.

Reports: Types, Significance, Structure and Formats of Reports.

Writing of Reports: Project, Thesis, Dissertation.

UNIT 2

Technical Papers and Proposals

Technical Papers and Scientific Article Writing: Elements, Methods and Technical Objective.

Technical Proposal: Nature, Kinds and Writing Tips

UNIT 3

Pre-Requisites

Vocabulary Building : Homophones (Words similar in sound but different in meaning); Word formation; One Word substitute; New and select Vocabulary Building (about 400 words).

Functional Grammar : Patterns and Correct usage (Parts of Speech), Syntax Concord, Preposition, Articles.

UNIT 4

Requisites of Good Sentence and Paragraph Writing

Requisites of Good Sentence Writing and Paragraph Writing, Unity, Coherence and Emphasis;

Development of Paragraph Inductive Order, Deductive Order, Spatial, Linear and Chronological Orders

UNIT 5

Language learning

A Non Detailed text Study of the following value-oriented Essays:

A.L. Basham	The Heritage of India
S. Radhakrishnan	The Gandhian Outlook
J.B. Priestley	Making Writing Simple
Virginia Woolf	How should one read a book?

Text Books & References

M. Ashraf Rizvi	Professional Communication, TMH, New Delhi
Singh R.P (ed)	An Anthology of English Essays; OUP, New Delhi
Sethi & Dhamija	A course in Phonetics & Spoken English; Prentice Hall, New Delhi
Seely John	Writing Report: OUP, New Delhi

UNIT 1**MATRICES**

Elementary row and column transformation, Rank of Matrix, Linear dependence, Consistency of linear system of equations, Characteristic equation, Caley-Hamilton Theorem, Eigen values and eigen vectors, Complex and unitary matrices

UNIT 2**Differential Calculus - I**

Leibnitz theorem, Partial Differentiation, Eulers theorem, Change of Variables. Taylor's Expansion of functions of two variables

UNIT 3**Differential Calculus - II**

Jacobian, Extrema of functions of two variables. Lagrange's method of undetermined multipliers (Simple Application)

UNIT 4**Multiple Integrals**

Double and triple integral, Change of order, Change of variables, Beta and Gamma functions

UNIT 5**Vector Calculus**

Point Function, Gradient; Divergence and Curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Greens, Stokes and Gauss divergence theorem.

Text Books & References

B.V. Ramana	Engineering Mathematics (TMH, New Delhi)
H.K. Daas	Introduction to Engineering Mathematics (S. Chand, New Delhi)
Vashishtha & Vashishtha	Engineering Mathematics Volume 1 (Pragati Prakashan, Meerut)
Erwin Kreyszig	Advanced Engineering Mathematics

Course III Applied Physics

UNIT 1

Interference of Light and Diffraction

Interference of Light: Coherent Sources, Conditions of Interference, Fresnel's Biprism Experiment, Interference in Thin Films – Wedge Shaped Film, Newton's Rings.

Diffraction: Single Slit and n-Slit Diffraction, Diffraction Grating, Rayleigh's Criterion of Resolution, Resolving Power of Telescope, Microscope and Grating.

UNIT 2

Polarization and Lasers

Polarization : Phenomenon of Double Refraction, Ordinary and Extra-Ordinary Rays, Nicol Prism, Production and analysis of plane, Circularly and Elliptically Polarized Light, Optical activity, Specific Rotation, Polarimeter.

UNIT 3

Special Theory of Relativity

Inertial and Non-Inertial Frames, Michelson-Morley Experiments, Einstein's Postulates of Special Theory of Relativity, Galilean and Lorentz Transformation, Length Contraction and Time Dilation, Addition of Velocities, Mass Energy Equivalence and Variation of Mass with Velocity.

UNIT 4

Steady State Analysis of A.C. Circuits

Sinusoidal and phasor representation of voltage and current, single phase A.C. Circuit, behavior of resistance, inductance and capacitance and their combination in series and parallel, power factor, series and parallel resonance, band width and quality factor.

UNIT 5

D.C. Network Theory and Measuring Instruments

D.C. Network Theory: Circuit theory concepts – Mesh and node analysis. Network theorems – Superposition theorem, Thevenin's theorem. Maximum power transfer theorem.

Measuring Instruments: Construction and principle of operation of voltage and current measuring instruments; energy meters.

Text Books & References

A.K. Ghatak	Optics
R. Resnick	Introduction to Special Theory of Relativity
D.P. Kothari & I.J. Nagrath	Theory and Problem of Basis Electrical Engineering (PHI, New Delhi)
S.K. Srivastava & R.A. Yadav	Engineering Physics (New Age Int., Publishers)
C.L. Wadhawa	Basic Electrical Engineering (New Age Int., Publishers)

UNIT 1

Basics of a Computer System

Overview of Computer System as an integrated system, The Processor, Memory, I/O devices, Storage, A brief history of Computers, evolution of Computer Systems, Characteristics of a computer system, Merits and demerits of a computer system, Block diagram of a computer system, The working of a computer system.

Data Representation

Number Systems: Binary, Octal, Decimal and Hexadecimal numbers, Conversion of the numbers from one system to another, Binary Arithmetic, Binary addition and subtraction using signed magnitude, 1's complement and 2's complement. Binary multiplication and division, Alphanumeric codes for character representation . ASCII, BCD and EBCDIC codes, Units of memory measurement.

UNIT 2

Central Processing Unit (CPU)

Function of CPU, General register organization, Need for stack organization, Instruction format, Addressing modes, Instruction pipelining, The Pentium PC processor, AMD processors.

Input-Output Organization: Peripheral device, Keyboard, Monitor, Video display adapter, Video display modes, Video resolution, Printers, Dot matrix printers, Ink Jet printers, Laser printers, mouse, Input-Output interface, Asynchronous data transfer, Modes of transfer, Direct memory access (DMA), I.O processor

UNIT 3

DOS & Windows OS

Role of the Operating System, Difference between the DOS and the MS-Windows user interface, To distinguish between the DOS command driven interface and the MS-Windows GUI/WIMP interface, MS-Windows basics, the password dialog box, the MS-Windows desktop, changing background, Screen saver, Settings and Appearance, The Taskbar, Responding the Taskbar, changing the taskbar properties, MS-Windows standard icons. My Computer, Network Neighborhood, Inbox Recycle Bin, My Briefcase, MS-Windows navigation, Different parts of windows, Minimize, maximize, restore, and close a window, Moving and Sizing Windows, Operating multiple windows, Proportional Scrollbars, the File, Edit Menu options in Windows, The start menu, Running Programs, Opening previously opened documents, Finding files and folders, using MS-Windows help, managing files in MS-Windows. Using My Computer as well as explores. File naming conventions and long files names. The explorer two pane view. Expanding and contracting the tree in the left pane. Sorting the files in the explorer. The explorer menus and toolbars, Navigating the MS-Windows Hierarchy. Moving, Copying, Renaming, Deleting and Recovering files. Using undo and redo features, Operations with multiple files, creating new folders, creating shortcuts on Desktop – of files, folders and drives. Checking the properties of a drive.

UNIT 4

Introduction to MS-Office

MS-Office common features, The MS-Office interface, creating a new file, opening an existing file, deleting and renaming documents, print preview and printing documents, the insertion points, making corrections, spell check, Selecting, Moving and Copying Values, Fonts and Format. Applying fonts and font styles, Creating Numbering and Bullets. Finding and replacing spellings, Grammar, Page formatting, print previewing and text, Creating Headers and Footers, Constructing tables in MS-Word, Mail-Merge.

UNIT 5

Introduction to MS-Excel

Entering and Editing cell entries, Working with numbers, Changing the worksheet layout, Formatting texts, Borders and Color, Printing the MS-Excel, Using functions and references,

Text Books & References

V. Rajaraman.

Fundamentals of Computers (PHI, New Delhi)

Peter Norton.

Introduction of Computers (TMH, New Delhi)

List of Experiments

1. To determine the wavelength of Sodium light by Newton's ring.
2. To determine the wavelength of Sodium light with the help of Fresnel's biprism.
3. To determine the specific rotation of cane sugar solution using polarimeter.
4. To determine the refractive index of the material of a prism by spectrometer.
5. To determine the wavelength of special lines using the plane transmission grating.
6. To determine the resolving power of telescope.
7. To determine the wavelength of Laser light by diffraction of a single slit.
8. To calibrate the given ammeter and voltmeter by potentiometer.
9. To determine the inductance of a Solenoid using AC circuit.
10. To verify the maximum power transfer theorem.

**Course VI Lab-II Computer Fundamentals, MS-Windows and MS-Office
Tools Exercise**

List of Practicals

1. Practice of all Internal and External DOS commands
2. Write simple batch program
3. Giving exposure to windows environment
4. File and program management in windows
5. Introduction to text editing and word processing
6. Exposure to advance feature supported by some editors
7. Exposure to the features of MS-Excel
8. Net Surfing
9. Creation and usage of Email account.
10. Exposure to MS-PowerPoint

B.Sc COMPUTER SCIENCE

IIst Semester Syllabus

<i>Sr. No.</i>	<i>Course Code</i>	<i>Subjects</i>	<i>MM</i>
7.	<i>Course I</i>	<i>English Language and Professional Communication – II</i>	50
8.	<i>Course II</i>	<i>Applied Mathematics – II</i>	100
9.	<i>Course III</i>	<i>Basic Electronics</i>	100
10.	<i>Course IV</i>	<i>Programming in C</i>	100
11.	<i>Course V</i>	<i>Lab-III Basic Electronics Lab</i>	50
12.	<i>Course VI</i>	<i>Lab-IV Computer lab, Exercise based on C programming</i>	100

Course I English Language and professional Communication – I

UNIT 1

Principle and features of Business Correspondence

Letter writing skills, letter writing process, form and structure, business letter format, style and tone.

Resumes and Job Applications

Bio-data making, Resumes making and Job Applications.

UNIT 2

Business Letters

Sales and credit letters, letters to enquiry, Quotation, Order, Claim, Complaint and Adjustment.

UNIT 3

Acquaintance with the style of great Writers of the World

O, Henry	The Gift of the Magi
R.N. Tagore	The Renunciation
Ruskin Bond	The eyes are not here
Ernest Hemingway	The capital of the world

UNIT 4

Dimensions of Spoken English

Phonetics: Stress, primary and secondary stress, Phonemes, Allophones, Phonetic Transcription, Stress, Information, Rhythm.

UNIT 5

Listening

Listening process, hearing and listening, listening with a purpose, barriers to listening, listening comprehension, effective listening strategies, comprehension of speech, reproduction of response, technique of taking notes

Text Books & References

M. Ashraf Rizvi	Professional Communication, TMH, New Delhi
Singh R.P (ed)	An Anthology of English Short Stories; OUP, New Delhi
Sethi & Dhamija	A course in Phonetics & Spoken English; Prentice Hall, New Delhi

Course II Applied Mathematics - II

UNIT 1

Differential Equations

Ordinary differential equations of first order, Exact differential equations, Linear differential equations of first order, Linear differential equations of nth order with constant coefficients, Complementary functions and particular integrals.

UNIT 2

Series Solutions and Special Functions

Series solutions of ODE second order with variable coefficients with special emphasis to differential equations of Legendre, and Bessel. Legendre polynomials, Bessel functions and their properties.

UNIT 3

Laplace Transformation

Laplace transformation, Existence theorem, Laplace transformation of derivatives and integrals, Inverse Laplace transformation, unit Step function, Dirac delta function, Laplace transformation of periodic functions, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

UNIT 4

Frontier Series

Periodic functions, trigonometric series, Frontier series of period 2π , Eulers formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series.

UNIT 5

Partial Differential Equations

Introduction to PDE, Method of separation of variables for solving partial differential equations, Wave equation up to 2-D, Laplace equation in 2-D and 1-D Heat Conduction equation.

Text Books & References

B.V. Ramana

H.K. Daas

Vashishtha & Vashishtha

Erwin Kreyszig

Engineering Mathematics (TMH, New Delhi)

Introduction to Engineering Mathematics (S. Chand, New Delhi)

Engineering Mathematics Volume 1 (Pragati Prakashan, Meerut)

Advanced Engineering Mathematics

Course III Basic Electronics

UNIT 1

Semiconductor materials and properties

Group-IV materials, Covalent bond, electron-hole concepts, Basic concepts of energy bands in materials, concept of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptors, impurities.

Junction Diode

p-n junction, depletion layer, I-V characteristics, diode resistance, capacitance, diode ratings (average current, repetitive peak current, non-repetitive current, peak inverse voltage)

UNIT 2

Diode Application

Rectifiers (half wave and full wave), calculation of transformer utilization factor and diode ratings, filter (C-filter) calculation of ripple factors and load regulation clipping circuits, clamping circuits, voltage multipliers.

Breakdown Diode

Breakdown mechanisms *(Zener and avalanche), breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator.

UNIT 3

Bipolar Junction Translator

Basic construction translator action, CB, CE and CC configurations, input/output characteristics, Biasing of translator fixed bias, emitter bias, potential driver bias, comparison of biasing circuits.

Translator Amplifier

Graphical analysis of CE amplifies, concept voltage gain, current gain, h-parameter model (low frequency), computation of A_i , A_v , R_i , R_o of single transistor in CE and CC amplifier configurations.

UNIT 4

Field Effect Transistor

JFET : Basic construction, transistor action, concept of pinch off, maximum drain saturation current, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed, self-biasing.

MOSFET: depletion and enhancement type MOSFET – construction, operation and characteristics, computation of A_i , A_v , R_i , R_o of single FET amplifiers using all the configurations.

UNIT 5

Operation Amplifiers

Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators.

Text Books & References

Boylestad & Nashelsky Electronic Devices & Circuit Theory (PHI, New Delhi)

Chattopadhyay & Rakshit Electronics: Fundamentals & Applications (New Age, Int. Publishers)

M. Morris Mano Computer System Architecture (Pearson Education Inc.)

J.B. Gupta Basic Electronics (Kataria & Sons, Delhi)

Course IV Programming in C

UNIT 1

Introduction to C

Overview of Programming, program control flow, Importance of C, Structure of C functions, Data types, standard Input-Output Functions, Conditional statements, loop constructs. Logical Operators, for loop construct, formatted Input-Output functions, Control of loop, execution. One Dimensional Arrays.

UNIT 2

Operators, Arrays, Functions

Operators, Two-dimensional arrays, Two-dimensional arrays of strings, the C preprocessor parameter of a Function Call by value, Call by reference, Data storage types, standard String – handling functions, Standard string to Numeric conversion functions, Standard Library functions for formatting data in memory, User-Defined functions, Nesting of functions, Recursion.

UNIT 3

Structure and Unions

Basics of Structure variables, Array of structures, Structures within structures, Structures and functions, unions, Bit Fields.

UNIT 4

Pointers

Pointers and addresses, Pointers and function arguments, pointer expressions, pointers and arrays, Pointers and character strings, pointers and functions, pointers and structures and pointers Arrays: Pointers to Pointers.

UNIT 5

File Management in C

High level I/O functions, Defining and opening a file, closing a file, Input/ Output operations on file, errors handling during I/O operations, Random access to files, command line arguments,

Text Books & References

B.W. Kernighan & D.M. Ritchie C programming language (PHI, New Delhi)
E. Balagurusamy Programming in ANSI C (TMH, New Delhi)
Y.P Kantekal Let us C (BHP, publications, New Delhi)

Course V Lab-III Basics Electronics Lab

List of Experiments

1. Study of p-n junction diode characteristics
2. Study of Zener diode characteristics
3. Study of half wave rectifier with and without capacitor filter and determine ripple factor.
4. Study of full wave rectifier with and without capacitor filter and determine ripple factor.
5. Study of biasing of transistor in CB, CE and CC configuration.
6. Study of CB, CE and CC characteristics of a transistor
7. Study of common emitter transistor amplifier.
8. To study the characteristics of JFET
9. To study the characteristics of MOSFET.
10. To study the various logic gates.
11. To study the application of Operation amplifier.
12. To study the frequency response of R-C coupled amplifier.

Course VI Lab-II Computer Lab. Exercise based on C Programming

Lab, exercise based on the theory course, with reference to the text book

(programming in ANSE C – E. Balagurusamy)

B.Sc COMPUTER SCIENCE

IIIst Semester Syllabus

Sr. No.	Course Code	Subjects	MM
13.	Course I	<i>Discrete Structures</i>	100
14.	Course II	<i>Switching Theory and Logic Design</i>	100
15.	Course III	<i>Data Structure using C</i>	100
16.	Course IV	<i>Lab-V Switching Theory and logic design</i>	100
17.	Course V	<i>Lab-VI Computer Lab, Data Structure using C</i>	100

Course I Discrete Structure

UNIT 1

Set Theory: Definition of Sets, countable and uncountable sets, Venn Diagram, proofs of so general identities on sets.

Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation.

Function: Definition, types of functions, one to one, into, onto function, inverse function, composition of functions, recursively defined functions

Theorem proving techniques: mathematical induction (simple and strong), pigeonhole principle, prove by contradiction

UNIT 2

Algebraic Structures: Definition, properties, types, Semi Groups, Monoid, Groups, Abelian group, properties of groups, subgroup, cyclic groups, cosets, factor groups, permutation groups, Normal subgroup, Homomorphism and Isomorphism of Groups, examples and standard results.

Rings and Fields: Definition and standard results.

UNIT 3

Posets, Hasse Diagram and Lattices: Introduction, orders set, Hasse diagram of partially, ordered set, Isomorphic ordered set, well ordered set, properties of Lattices, bounded I and complemented lattices.

Boolean Algebra: Basic definitions, sum of products and products of sums, form in Boolean Algebra, Logic Gates and Karnaugh maps.

Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal.

UNIT 4

Propositional logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

UNIT 5

Combinatorics & Graphs: Recurrence Relation, Generating function, simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Text Books & References

P.K. Mittal
Liptschutz

Discrete Mathematics, Cyber Tech Pub, New Delhi
Discrete Mathematics, McGraw Hill

Course II Switching Theory and Logic Design

UNIT 1

Introduction

Characteristics of digital system, types of Digital circuits, Number System, Direct Conversion between bases Negative numbers & BCD and their arithmetic, Boolean Algebra, Minimization.

Boolean Function: Map & Tabular method and multiple output circuits, error detecting & correcting codes, Hamming & cyclic codes.

UNIT 2

Combinational Logic Circuits

Design Procedure, Address, Subtractors & code conversion, Multiplexers/Demultiplexers, encoders/decoders, decimal adders & amplitude comparators, ROM as decoder, PLA & PAL.

UNIT 3

Sequential Logic Circuits: Flip-Flops and th conversions, Analysis and synthesis of synchronous sequential circuits excitation table, state table & state diagram. Design of synchronous counters, shift registers and their application.

Algorithm State machine: ASM chart, Timing considerations, Control implementation Design with Multiplexers, PLA control.

Asynchronous Sequential Circuits: Analysis Procedure Reduction of state & flow table, Race free state assignment.

UNIT 4

Logic Families

Diode, BJT & MOS as switching element concept of transfer characteristics, Input characteristics and output characteristics of logic gates, Fan-in, Fan-out, Noise margin, circuit concept and comparison of various logic families: TTL, IIL, ECL, NMOS, CMOS Tri-state logic, open collector output, Interfacing between logic families, packing density, power consumption & gate delay.

UNIT 5

Hazard and Fault Detection

Static and Dynamic Hazard: Gate delay, Generation of spikes, Determination of hazard in combinational circuits, Fault detection methods, Fault Table & Path sensitizing methods.

Text Books & References

Moris Mano Computer System Architecture, PHI
S. Salivahanan & Digital Circuits and Design,
S. Arivazhagan Vikas Publishing House, New Delhi
V.K. Puri Digital Electronic, TMH, New Delhi

Course III Data Structures using C

UNIT 1

Introduction: Basic terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time Space trade-off.

Array : Array, Definition, Representation and Analysis Single Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as parameters, Ordered List, Sparse Matrices and Vectors.

Stacks: Array Representation and implementation of stack, Operations on Stack; Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of Stack, Conversion of Infix to Postfix Expressions, Evaluation of postfix expression using stack.

Recursion: Recursive definition and process, recursion in C, example of recursion, Tower of Hanoi problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

UNIT 2

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and priority Queues.

Linked list: Representation and implementation of singly linked lists, Two-way Header List, Traversing and Searching of linked list. Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array Polynomial representation and addition, Generalized linked list, Garbage Collection and Comparison.

UNIT 3

Trees: Basic terminologies, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary Trees, Threaded Binary Trees, traversing Threaded Binary trees, Huffman algorithm.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash table, Hash Functions, Collision Resolution Strategies, Hash table implementation.

UNIT 4

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, To Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for internal sorting .

Binary Search Trees: Binary search Tree (BST), Insertion and Deletion in BST, Complexity of search Algorithm, Path Length, AVL, Trees, B-trees

UNIT 5

Graphs: Terminology and Representation, Graphs and multi-graphs, Directed Graphs, Sequential Representation of Graphs, Adjacency Matrices, traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index files, B. Tree index files, Indexing and Hashing Components

Text Books & References

R. Kruse et al Data Structure and Program Design in C. Pearson, New Delhi

Balooja Data Structure using C

Course IV Lab-V Switching Theory and Logic Design

List of Experiments

11. Bread-board implementation of various Flip-flops.
12. Bread-board implementation of computers & shift registers.
13. Determination of Delay time and NAND, NOR, Ex-OR, AND & OR Gates.
14. Transfer characteristics of TTL inverters and TTL Schmitt Trigger inverter.
15. Transfer characteristics of CMOS inverters series and CD40 series and estimation of Gate delay of CD40 series CMOS inverter.
16. Monoshot multivibrators using 555 and CMOS inverter and quartz crystal.
17. Clock circuit realization using 555 and CMOS inverter and quartz crystal.
18. Adder/Subtractor operation using IC7483 4-bit/8-bit.
19. Demultiplexer / Decoder operation using IC – 74138.
20. Modulo- N counter using programmable counter 74190.

Course V Lab-VI Data Structure using C

List of Practicals

11. Write a program in C for the addition of two matrices.
12. Write a program in C for the multiplication of two matrices.
13. To sort a list using bubble sort.
14. Write a program for finding a number in an Array.
15. To implement circular queue.
16. Deletion of duplicate from one dimensional array.
17. Create a link list and make it display.
18. Multiplication of two numbers with recursion.
19. Write a program for stack implementation using push and pop.
20. Write a program for queue implementation.
21. Write a program for traversing a binary tree.
22. Write a program for students database.

B.Sc COMPUTER SCIENCE

IV – Semester Syllabus

<i>Sr.No.</i>	<i>Course code</i>	<i>Subjects</i>	<i>MM</i>
<i>18.</i>	<i>Course I</i>	<i>Computer oriented numerical techniques</i>	<i>100</i>
<i>19</i>	<i>Course II</i>	<i>Computer organization</i>	<i>100</i>
<i>20</i>	<i>Course III</i>	<i>Oop through C++</i>	<i>100</i>
<i>21</i>	<i>Course IV</i>	<i>Lab- V I I computer oriented numerical techniques and computer organization</i>	<i>100</i>
<i>22</i>	<i>Course V</i>	<i>Lab-vii programming in C++</i>	<i>100</i>

Course I Computer Oriented Numerical Techniques

UNIT - I

INTRODUCTION: Numbers and their accuracy, errors and their Computation , general error formula , error in a series approximation, mathematical preliminaries, computer arithmetic, **Solution of Algebraic and Transcendental equation** : Bisection method, iteration method , methods of false position, newton-Raphson method, Muller's method, rate of convergence of iterative methods ,Polynomial equation, Ramunujan's method.

UNIT -II

Interpolation: Finite Differences, Differences Tables, Polynomial Interpolation : Newton's Forward And Backward Formula, Gauss Forward And Backward Central Difference Formula, Interpolation With Unequal Intervals: Langrange' S Interpolation, Newton Divided Difference Formula.

UNIT-III

Numerical Differentiation And Integration : Intro Duction , Numerical Differentiation Using Newton's Forward Or Backward Difference Formula .

Numerical Integration : Trapezoidal Rule, Simpson's 1/3 And 1/8 Rule.

Unit-IV

Solution Of Differential Equations : Picard's Method, Euler's Method , Taylor's Method , Runge-Kutta Methods, Milne's Predictor Corrector Method.

Unit-V

Statistical Methods: Measure Of Central Tendency , Measure Of Dispersion, Skewness, Correlation And Regression Analysis.

Random Variable , Mathematical Expectation, Simple Probability Distribution Like Binomial , Poisson And Normal.

Tests Of Significance Based On T, Chi-Square And F Tests. Curve Fiting By Method Of Least Squares, Fitting Of Straight Line , Second Degree Curve And Exponential Curve.

Text Books And References:

Sanjeev Kumar & Vijay Computer Based Numerical Techniques, Ram Prasad & Sons, Agra.

Shankar Verma

Sastry S.S. Introductory Methods Of Numerical Analysis,

Rajaraman V. Computer Oriented Numerical Methods

B.S. Gerawal Numerical Method In Engg. & Sci. , Khanna Pub. Delhi

K.K.Sharma Statistics For Management Studies.

COURSE II COMPUTER ORGANIZATION

UNIT - I

Resister Transfer Language , Bus And Memory Transfer, Bus Architecture, Bus Arbitration , Arithmetic Logic , Shift Micro-Operation , Arithmetic Logic Shift Unit , Design Of Fast Address , Arithmetic Algorithms (Addition Substraction , Booth Multiplication),IEEE Stander For Floating Point Numbers.

UNIT- II

Control Design: Hardwired And Micro Programmed (Contral Unit). Fundamental Concepts (Register Transfers, Performing Of Arithmetic Or Logical Operations, Fetching A Word From Memory , Storing A Word In Memory), Execution Of A Complete Instruction , Multiple-Bus Organization , Hardwired Control, Micro Programmed Control (Microinstruction , Micro – Program Sequencing, Wide-Branch Addressing , Microinstruction With Next-Address Field , Perfecting Microinstruction).

UNIT-III

Processor Organization: General Register Organization , Stack Organization, Addressing Mode , Instruction Format , Data Transfer & Manipulations, Program Control Control , Reduced Instruction Set Computer.

UNIT-IV

Input-Output Organization: I/O Interface, Modes Of Transfer , Interrupts & Interrupt Handling, Direct Memory ACESS, Input-Output Processor, Serial Communication.

UNIT-V

Memory Organization: Memory Hierarchy , Main Memory (RAM And ROM Chips), Organization Of 2d And 2 D, Auxiliary Memory , Cache Memory , Virtual Memory, Memory Management Hardware.

Text Book & Reference

- 1.Computer System Architecture M. Mano (PHI)
- 2.Computer Organization P. Raja(Umesh Pub. Delhi)
- 3.Computer Organization Stallings (PHI)

Course III OOP Through C++

UNIT-I

Principles Of Object-Oriented Programming: Procedure_Oriented Programing , Object Oriented Programming , Basic Concepts And Benefits.

Beginning With C++ : What Is C++ ? Programs , Input Operators , Cascading Of I/O Operates, Classes And Structure Of A C++ Program, Creating A Source File , Compiling And Linking , Differences Between ANSI-C And C++.

UNIT-II

Tokens, Expressions And Control Structures:

Introduction; Tokens; Keywords; Identifiers; Basic Data Types; User- Defined Data Types; Derived Data Types; Symbolic Constants; Types Compatibility; Declaration Of Variables; Dynamic Initialization Of Variables; Operators In C++; Scope Resolution Operators; Member De-Referencing Operators; Memory Management Operators; Manipulators; Type Case Operator ; Expressions And Implicit Conversions; Operator Overloading; Operator Precedence; Control Structures.

Functions In C++ :

Introduction; The Main Function; Function Prototyping; Call By References; Inline Function; Default Arguments; Const Arguments; Function Overloading; Friend And Virtual Functions.

UNIT-III

Classes And Objects:

Introduction; C Structure Revisited; Specifying A Class; Defining Member Functions; A C++ Program With Class; Making An Outside Function Inline; Nesting Of Member Functions; Private Member Functions; Arrays Within A Class; Memory Allocation For Objects; Static Data Members; Static Member Functions; Arrays Of Objects; Objects As Function Arguments; Friendly Functions; Returning Objects; Const Member Functions; Pointers To Members.

Constructors And Destructors:

Introduction; Constructors; Parameterized Constructors ; Multiple Constructors In A Class; Constructors With Default Arguments ; Dynamic Initialization Of Objects; Copy Constructor; Dynamic Constructors; Constructing Two- Dimensional Arrays; Destructors.

Operator Overloading And Type Conversion:

Introduction; Defining Operator Overloading; Overloading Unary Operators; Overloading Binary Operators; Overloading Binary Operators Using Friends; Manipulation Of Strings Using Operators; Rules For Overloading Operators; Type Conversion.

UNIT-IV

Inheritance Extending Classes:

Introduction; Defining Derived Classes; Single Inheritance; Making A Private Member Inheritable; Multilevel Inheritance; Multiple Inheritance; Hierarchical Inheritance; Hybrid Inheritance; Virtual Base Classes; Abstract Classes; Constructs In Derived Classes;

Member Classes:

Nesting Of Classes, Pointers,

Virtual Functions And Polymorphism:

Introduction: Pointers To Objects; This Pointers To Derived Classes; Virtual Functions; Pure Virtual Function.

UNIT-V

Managing Console I/O Operations:

Introduction; C++ Stream Classes; Unformatted I/O Operations; Formatted Console I/O Operations; Managing Output With Manipulators.

Working With Files:

Introduction; Classes For File Stream Operations; Opening And Closing A File; Detecting End-Of-File; More About Open() : File Modes; File: Random Access; Error Handling During File Operations; Command-Line Arguments.

Text Books & References:

- | | |
|-------------------|---|
| E. Balagurusamy | Object Oriented Programming With C++, Tmh |
| Bjarne Stroustrup | C++ Programming Language, Addison Wesley |
| Robert Lafore | Turbo C++ , Galgotia |

Course IV

Lab -VII Computer Oriented Numerical Techniques And Computer organization

List of Practical:

(a) Write Programs In 'C' Language:

1. To Deduce Error Involved In Polynomial Equation.
2. To Find Out The Root Of The Algebraic And Transcendental Equations Using Bisection, Regula-False, Newton-Raphson And Iterative Methods.
3. To Implement Newton's Forward And Backward Interpolation Formula.
4. To Implement Gauss Forward And Backward Interpolation Formula.
5. To Implement Newton's Divided Difference And Lagranges Interpolation Formula.
6. To Implement Numerical Differentiations.
7. To Implement Numerical Integration Using Trapezoidal, Simpson 1/3 And Simpson 3/8 Rule.
8. To Implement Least Square Method For Curve Fitting.
9. To Draw Frequency Chart Like Histogram , Frequency Curve And Pie-Chart Etc.
10. To Estimate Regression Equation From Sampled Data And Evaluate Values Of Standard Deviation And Regression Coefficient.
- 11.

(b) Computer Organization

1. Bread Board Implementation Of Flip-Flops.
2. Experiments With Clocked Flip-Flop.
3. Design Of Counters.
4. Bread Board Implementation Of Counters & Shift Registers.
5. Implementation Of Arithmetic Algorithms.
6. Bread Board Implementation Of Adder/Subtractor (Half,Full)
7. Bread Board Implementation Of Binary Adder.
8. Bread Board Implementation Of Seven Segment Display.

Course V Lab-VII Programming In C++

Lab.Exercise Based On The Theory Course, With Refernce To The Text Book (Object Oriented Programming With C++ - E. Balagurusamy)

B.Sc. COMPUTER SCIENCE

V- Semester Syllabus

Sr. No.	Course Code	Subjects	MM
23.	Course I	<i>Data Base Management System</i>	100
24.	Course II	<i>System Software</i>	100
25.	Course III	<i>Web Designing with JAVA Programming</i>	100
26.	Course IV	<i>Lab-IX Computer lab. DBMS</i>	100
27.	Course V	<i>Lab-X Computer lab. JAVA Programming</i>	100

Course-I Database Management System

Unit-I

Introduction: An over view of database management system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall database Structure.

Data Modelling using the Entity Relationship Model:

ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of super key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagram to tables, extended ER model, relationships of higher degree.

Unit-II

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantage of SQL, SQL data types and literals, Types of SQL commands, SQL operations and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, Insert, Update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL.

Unit-III

Data Base Design & Normalization:

Functional dependencies, normal forms, first. Second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approach to database design.

Unit-IV

Transaction Processing Concepts: Transaction System, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recover from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit-V

Concurrency Control Techniques: Concurrency control, locking techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recover with concurrent transactions.

Text Books & References

Date C.J.	An Introduction to Database Systems, Pearson Education
Korth et.al	Data base concepts, Mc Graw Hill
Elmasri & Navathe	Fundamentals of Database systems, Pearson Education
Bipin C.Desai	Introduction to Database Systems, Galgotia

Course-II System Software

Unit-I

Introduction of system software, type of system software, operating system concepts, type of operating systems, multiprogramming, Time-Sharing system, Multiprocessing System, Process concepts, Inter Process Communication, Process States, Context Switching & dispatcher.

Unit-II

Language Processors: Introduction, Language Processing Activities, Fundamentals of Language, Processing & Language Specifications, Language Processor Development Tools.
Data Structure For Language Processing: Search Data structures, Allocation Data Structures, Scanning & Planning.

Unit-III

Assemblers: Elements of Assembly Language Programming, A simple Assembly Scheme, Pass Structure of Assemblers, Design of a two Pass Assembler, A single pass Assembler for IBM PC.
Macros and Macro Processors: Macro Definition and Call, Macro Expansion, Nested Macro calls, Advanced Macro Facilities, Design of a Macro Processors.
Linkers: Relocation of linking concepts, Design of a linker, Self-Relocating Programs, A linker for MS-DOS, Linking for overlays, Loaders.
Software tools: Software tools for program Development, Editors, Debug Monitors, Programming Environments and User interfaces.

Unit-IV

Data Structures: Introduction, Implementation, Recursion, Call & Return Statements, Storage, Classes, Static, Automatic, External Control & Based Storage, Implementation, Block Structure, Nom local Go To's, Interrupts, Pointers.

Text Books & References:

Dhamdhare D.M
John Donovan

System programming & Operating System, TMH
System programming, TMH

Course-III Web Designing with JAVA Programming

Unit-I

Explanation of statement. "Java: A simple, object-oriented network-savvy, interpreted, robust, secure, architecture-neutral, portable, high performance, multithreaded dynamic language" Explanation (at the overview level) of the following terms: Plug-ins, Java API's, jdk, J2SE, J2ME, JVM, Java Hotspot, JRE, Hotjava, JAR, AWT, Swing, Applets, Servlets, JSP, Java Beans, EJB, RMI, JDBC, JMI, Java 2D, Java 3D, DND, Java IDL, Java Collections, RSA Signatures, X.509 Certificates, JPDA.

Differentiate between jdk 1.0, jdk 1.1, jdk 1.2, J2SE, J2EE, J2ME and J2SE v 1.3. Overview of main improvements and additions in each version. Information about deprecated classes and methods till the Java 2 platform. Support or refute the statement: "Since jdk 1.1, there have not been many enhancements in the Java language specification, but there improvements have taken place in the Java API's".

Differences between:

Java and C

Java and C++

Java Language and Java Platform.

Review of the Java language.

Java keywords and identifier naming conventions. Java primitive types. Their constants, variables, final variables, operators, expressions, assignments, statements and blocks. Type conversions and promotion rules between primitive types. The Java reference types. Strings, arrays and classes. Differences in creating, copying and comparing primitive types and reference types.

Java classes and objects. Difference between the two. Variable default values. Method signature. Class methods and variables, instance methods and variables. Object constructor methods. Method and constructor overloading. The this' keyword. The finalize() method. Using objects as parameters.

Methods returning an object type: Access control. Public, private and protected instance variables. Public, private, protected, static, abstract, final, native and synchronized methods. Nested and inner classes. Subclasses and inheritance. Subclass constructors, default constructor and constructor chaining. Superclass variable referencing a subclass object. Using superclass members. Overriding superclass methods. Preventing method overriding and class inheritance. Abstract classes.

Java Garbage collection. Java packages Defining a package and giving it a unique name. Access control and protection in packages. Importing packages in programs. Java interfaces. Defining, implementing, accessing, applying and accessing interfaces. Java strings. String handling methods in String class. Java one and multidimensional arrays. Object literal syntax for creating strings and arrays. Exception handling in Java. Java input/output.

Unit-II

Java, Lang package. Simple type wrappers. Number, double, short, int, long, character, boolean, process and void. The Maths class.

Java Utility and Collection Classes Java.util package. The collections framework (Interfaces in the collections Framework, traversing collections with iterators, general purpose implementations, arrays as

collections, algorithms, wrappers as implementations, extending the abstract implementations, legacy collections framework classes, traversing collections with enumeration's).

Unit-III

JFC, Swing APIcomponents, JComponent class, Windows dialog and panels, Layout manager (Border, flow, grid, grid-bag, card and box layouts. Tabbed panes, split panes, positioning the components), labels, buttons, and check boxes, Event listeners and adapters. Menus, toolbars and actions.

Unit-IV

Java Beans: Java Beans component model. Bean development environments. Using the Sun Bean Box. Creating a Java Bean class. Exploring indexed, bound and constrained properties. Adding custom event types. Creating Java Bean class with events. Supplying additional Java Bean information. Providing a custom property editor. Creating a Java Bean class with Bean Info class. Creating a Java Bean class that uses the Bean Context API. EJB overview.

Unit-V

What is web-design? Web Design Pyramid, Building Web-sites, User perspective, Content focus, Evaluation of a web-site. The Web Design Process: Basic Web Process Model, Goals & Problems, Audience and User Profiling. The site plan, Design, implementation & Testing, Release & beyond. Designing For Users: Usability, Knowing the users, User characteristics, Response & Reaction time, GUI conventions, Web conventions, Accessibility, Usability.

Text Books & References:

E. Balagurusamy Programming with JAVA
H.M.Deitel & P.J.Deitel JAVA: How to Program, Pearson Education
H.Schildt. JAVA 2: The Complete Reference Book, TMII
SSI Press JAVA Hand Book
Thomas Powell Web-Design-The Complete Reference, TMH

Course-IV Lab IX lab DBMS

Unit-I

List of Practical:

The Queries to be implemented on DBMS by using SQL.

1. Write the queries for Data Definition and Data Manipulation language.
2. Write SQL queries using Logical operators (=,<,>,etc)
3. Write SQL queries using SQL operators (Between.... AND, IN(List), Like, ISNULL and also withNegating expressions.
4. Write SQL query using character, number, date and group functions.
5. Write SQL queries for Relational Algebra (UNION, INTERSECT, and MINUS, etc.)
6. Write SQL queries for extracting data from more than one table (Equi-Join, Non-Equi-Join, Outer f
0,1
7. Write SQL queries for sub queries, nested queries.
8. Write programs using of PL/SQL.
9. Concepts for ROLL BACK, COMMIT & CHECK POINTS.
10. Create VIEWS, CURSORS, and TRIGGRS & write ASSERTIONS.
11. Create FORMS and |REPORT .

Course-V Lab-X Computer lab. JAVA Programming

LabExercise based on the theory course with reference to the text book
(Programming with JAVA – E Balagurusamy)

B.Sc. COMPUTER SCIENCE

VI Semester Syllabus

Sr. No.	Course Code	Subjects	MM
28.	Course I	<i>System Analysis and Design</i>	100
29.	Course II	<i>Computer Network</i>	100
30.	Course III	<i>Project/ Industrial Training</i>	100
31.	Course IV	<i>Lab-XI System Analysis and Design</i>	100
32.	Course V	<i>Lab-XII Computer Network</i>	100

Course-I System Analysis and Design

Unit-I

What is System? The general systems approach to problem solving. The three approaches to software systems development. The Structured approach, the Object Oriented Approach and the Information Engineering Approach.

Software Development Life Cycle Models Waterfall Model, Prototyping Model, RAD Mod Incremental Model, Spiral Model, Concurrent Development Model, Component Based Model, Formal Methods Model and Fourth Generation Techniques. Their features, strengths, weaknesses and differences between them.

Fact finding techniques. Sampling documents, forms and files. Site visits, Observation of Work environment. Questionnaire formulation. Interviewing techniques. Project Feasibility Study. Operational, technical, economic, organizational and cultural feasibility. Defining project costs and project benefits. Cost/Benefit Analysis for a project – Net present value, payback period and return on investment computations.

Unit-II

Investigating System Requirements. Functional and Technical Requirements, The sources of system requirements, identifying system requirements, structured walkthroughs. Modeling System Requirements. The purpose, type and overview of models. Modeling system requirements for events. Modeling system requirement for objects, tools, devices, organizational units, and locations.

Data Modeling Data entities attributes and relationships. The Entity-Relationship diagram. Process Modeling. Developing Data Flow Diagrams. Level of abstraction. Context diagram. Top level DFD. DFD fragments. The event-partitioned system model. Decomposing processes. Physical and Logical DED. Evaluating DFD quality, Documenting DFD components. The concept of data dictionary. Process, data flow, data store, data elements descriptions.

Representing Process Logic. Building decision tables, decision trees, structured English, tight English and pseudo code. Their usage and differences.

Unit-III

The process of moving from analysis to design. Application Architecture Design. Determining the Automation system boundary. Software Design Designing the system flowchart and the systemLevel structure chart Transaction analysis and transform analysis.

Designing Databases and DBMS Designing Relational DBMS. Normal forms up to 3rd normal form. Understanding of 4th and 5th normal forms. Representing entities, relationships, enforcing integrity constraints and business rules. Designing system inputs outputs and controls. Designing the user interface design guidelines Dialog design. Designing Windows forms.

Unit-IV

Object Oriented Requirements Specifications and Analysis. The Unified Modeling Language. The Case diagrams, class diagrams, object diagrams The system activities Collaboration and sequence diagrams States, state transitions and state chart diagrams Activity diagrams. Component diagrams and deployment diagrams.

Unit-V

E-COMMERCE: Introduction, The Scope of E-Commerce, Definition, E-Commerce & Trade Cycle, Electronic Markets, Electronic Data Interchange (EDI), E-Commerce in Perspective. The Value Chain, Supply Chains, Porter's Value Chain Model, Inter Organizational Value chains.

Competitive Advantage, Competitive Strategy, Porter's Model, First Mover Advantage, Sustainable Competitive Advantage, Competitive Advantage using E-Commerce, Strategic Implications of IT.

Text Books and References:

Sommerville Software Engineering, Addison Wesley
D. Ghezzi et al Fundamentals of Software Engineering, PHI
P. Jalota Software Engineering, Narosa
Roger S. Pressman Software Engineering- A Practitioner's Approach,
McGraw Hill
Whitten & Bentley System Analysis and Design Methods, TMH
David Whitley E-Commerce Strategy, Technologies and Applications (Mc Graw Hill)

Course-II Computer Network

Unit-I

Introduction of Networking, distributed systems, goals of Networks, Its uses and application, connection oriented and connectionless communication, Peer to Peer Communication, ISO-OSI model of Networking, various model and Channels for the data communication.

Unit-II

Network structure, Different type of topology, communication channel characteristics, Different type of Networks like LAN, WAN and MAN.

Unit-III

Introduction of physical layer, digital communication, analog communication, simplex, half duplex, Modulation and demodulation, frequency division, Transmission serial and parallel, ATM and ARPANET.

Unit-IV

Introduction of data link layer, various protocols for data link layer, MAC-layer, HDLC and CSMA/CD.

Unit-V

The TCP/IP reference model, FTP, URL, Telnet, IEEE standards for communication, search engines, Web services, HTTP, DNS use as application layer.

Text Books & References:

A.S. Tanenbaum Computer Networks (PHI)

Madhulika Jain, Vineeta Jain Computer Networks (BPB Publication)

& Satish Jain

D.E. Comer Internet working with TCP/IP, Vol. I (PHI)