

Course:	B.Sc.	Part: III	Core: I	Semester	I
Major:	Computer Science	C PROGRAMMING		Credit	6
				Hours	6

Scope & Objective : To impart the features and syntax of C programming language and to train the students to write good programs in C.

Unit 1 Features of C – Structure of a C Programs – C tokens – Data types – Operators and Expression – Simple I/O Statements – Formatted I/O.

Unit 2 Control structures – if else – go to – looping structures – while – do...while – for statements – switch & case statement – continue and break.

Unit 3 Arrays and manipulations – One and Two dimensional arrays – character strings – String manipulations – Functions – user defined functions – parameters and parameter passing – Scope of variables – Recursion.

Unit 4 Structures and Unions – Pointers – Declarations – Accessing through pointers – pointers and strings – Pointers and □functions – Pointers and structures.

Unit 5 Files – Text file – Sequential files – I/O Operations – Random Access files – pre – processor – macros – include directories – Compiler control directvies.

Text Book:

1. Programming in C, 7th Edition, Balagurusamy, E, Tata McGraw Hill Publishing Company, New Delhi, 2016.

Reference Book:

1. Programming with C, Ravichandran, New Age International Company, New Delhi, 2009.

Course:	B.Sc.	Part: III	Core: II-P	Semester	I
Major:	Computer Science	Major Practical – I: C AND DATA STRUCTURES LAB		Credit	4
				Hours	2 / 4

Scope & Objective : To train the structured programming of C with fundamental programs and to programme the elementary data structures using C.

C Programming Lab (I Semester)

- 1 Simple Expression Evaluation
- 2 Solving Quadratic Equations using IF and Switch Statements
- 3 Problems using looping structures
- 4 Problems using single dimensional array
- 5 Matrix Manipulations
- 6 String Manipulation
- 7 Simple Programs using User Defined Functions
- 8 Problems working with pointers
- 9 Problems using Structures
- 10 Working with Text File, Sequential file and Random Access File
- 11 Problems using command line arguments

Data Structures Lab (II Semester)

- 1 Performing Linear Search
- 2 Binary Search
- 3 Implementation of Stack and Queue using arrays
- 4 Polynomial Addition using Linked Lists
- 5 Binary Tree traversals using recursion
- 6 Sort – Insertion Sort, Quick Sort and Merge Sort

Reference Books:

1. Programming in C, 7th Edition, E.Balagurusamy, Tata McGraw Hill Publishing Company, New Delhi, 2016.
2. Programming with C, Ravichandran, New Age International Company, New Delhi, 2009.
3. Data Structures, Seymour Lipschutz, Tata McGraw Hill Publishing Company Limited, Schaum's Outlines, New Delhi.
4. An Introduction to Data Structures with Applications, Trembley, J.P. and Sorenson P.G., McGraw Hill International Student Edition, New York.
5. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Addison Wesley, New Delhi, 1987.

Note : Practical examination will be conducted at the end of II Semester

Course:	B.Sc.	Part: IV	Skill Based Elective: I	Semester	I
Major:	Computer Science	FUNDAMENTALS OF COMPUTER SCIENCE		Credit	2
				Hours	2

Scope & Objective : To impart the introductory concepts of computer system and programming concepts.

Unit 1 Introduction to Computers: Evolution of Computers, Generation of Computers, Classification of Computers Analog, Digital and Hybrid Computers.

Unit 2 Classification of Computer: Super Computers, Mainframe Computers, Personal Computers (Different Types) and Terminals (Different Types), Characteristics of Computers, Block Diagram of a Digital Computer.

Unit 3 Introduction to Number system: Decimal, Binary, and Hexadecimal, Number system conversion: decimal to binary, binary to decimal – binary 1's complement and 2's complement 3 bit binary negative numbers – floating Point numbers: Mantissa and Exponential format – ASCII code.

Unit 4 Memory: Memory Hierarchy, Primary Memory – Volatile and non – volatile memory, RAM and ROM, Input / Output Devices: Input Devices – Keyboard, Mouse, Output Devices – VDU, Printers.

Unit 5 Introduction to Programming Concepts: Types of Programming Languages, Software, Application software and System Software, Structured Programming, Algorithms, Procedures and Flowchart with simple examples.

Text Book:

1. Fundamentals of Computers, 2nd Edition, Rajaraman, V, Prentice Hall India Limited.

Reference Book :

1. Introduction to Information Technology, 2nd Ed., Turban, Rainer and Potter, Willey Student edition, New Delhi, 2012.

Course:	B.Sc.	Part: III	Core: III	Semester	II
Major:	Computer Science	DATA STRUCTURES		Credit	6
				Hours	6

Scope & Objective : To teach the primitive data structures and exposure to development of algorithms related to data structures.

Unit 1 Introduction: Elementary data organization, Data Structure definition, Data structure operations, Algorithms complexity and time – space tradeoffs. Mathematical Notation and functions, Algorithmic Notation, Control Structures Strings: Introduction, strings, String operations, Pattern matching algorithms.

Unit 2 Arrays: Introduction, Linear arrays, Representation of linear array in memory, Array operations, Multidimensional arrays, Parallel arrays, Sparse matrix. – Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Operations in a linked list, Header linked list, Two – way linked list, Garbage collection, Applications of linked lists.

Unit 3 Stack: primitive operation on stack, algorithms for push and pop. Representation of Stack as Linked List and array, Stacks applications: polish notation, recursion. Introduction to queues, Primitive Operations on the Queues, Priority queue, Representation of Queues as Linked List and array, Applications of queue.

Unit 4 Trees – Basic Terminology, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees: – In order, Pre order & post order, Applications of Binary tree, Tree traversals.

Unit 5 Sorting and searching: Introduction – Insertion sort, Selection Sort – Merge – sort, Radix sort, Searching and data Modification – Linear search, Binary search – Hashing.

Text Book:

1. Data Structures, Seymour Lipschutz, Tata McGraw Hill Publishing Company Limited, Schaum's Outlines, New Delhi.

Reference Books:

1. An Introduction to Data Structures with Applications, Trembley, J.P. and Sorenson P.G., McGraw Hill International Student Edition, New York.
2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Addison Wesley, New Delhi, 1987.

Course:	B.Sc.	Part: III	Core: IV	Semester	III
Major:	Computer Science	DATA BASE SYSTEMS		Credit	4
				Hours	4

Scope & Objective : To understand the primary concepts and organization of a database and to impart basic knowledge on relational database.

Unit 1 An overview of Database Management: Introduction – Database system – Database – Data independence – Architecture – Database Administrator – Database Management System – Entity Relationship model – Components – Examples.

Unit 2 An introduction to Relational Databases: The Relational Model – Domains – Relation Values – Relation Variables, Relational Algebra – Overview of original Algebra – Closure revisited – Syntax – Semantics – Examples – Additional Operators – Grouping and Ungrouping – Relational Comparison, Relational Calculus – Tuple calculus – Domain Calculus.

Unit 3 Integrity: Constraint Type – Attribute Constraints – Relvar Constraints – Database Constraints – Keys, Normalization: Introduction – Non loss Decomposition and Functional Dependencies – First, Second and Third Normal form – Dependency Preservation – BOYCE/CODD Normal form – Fourth Normal form – Fifth Normal form.

- Unit 4 Manipulation in Database Management Systems: Table – Components – Create Table – Viewing Data in Table – Select – Where – Distinct – Order by – Creating a Table from a Table – Inserting data into a table from another table – Delete – Update – Modify Structure – Computation on Table Data – Arithmetic operators – Logical operators – Between – Like – In – dual – Aggregate function.
- Unit 5 Data Constraints: Types – Primary key – Foreign key – Column level – Null value – Unique – check – Defining different constraints on a table – Constraints in alter table – Default, Grouping Data from Table – Date format, Sub Queries, Join – Equi-join – Self Join, Set operations – Union – Intersect and Minus, Create Index – view.

Text Books:

1. An Introduction to Database Systems, Seventh Edition, C.J. Date, Pearson Education, 2002.
UNITS: 1, 2, 3.
2. SQL, PL/SQL – The Programming Language of SQL, Third Edition, Ivan Bayross, BPB Publications, New Delhi, 2008.
UNITS: 4, 5.

Reference Books:

1. Database Management Systems, Alexis Leon & Mathews Leon, Vikas Publishing House Ltd., New Delhi, 1999.
2. Fundamentals of Database systems, Elmasri & Navathe, Addison & Wesley, New Delhi.

Course:	B.Sc.	Part: III	Core: V-P	Semester	III
Major:	Computer Science	Major Practical – II: SQL AND VB PROGRAMMING LAB		Credit	4
				Hours	2 / 4

Scope & Objective : To learn the DDL and DML SQL statements on tables with some features of relational database system concepts and to outline Graphical User Interface event-driven programming with Visual Basic.

SQL Lab (III Semester)

- 1 Data Definition Language: Create, Alter, Drop, Rename, Truncate
- 2 Constraints: Not Null, Unique Key, Primary Key, Foreign Key, Check, Dropping a Constraint, Enabling & Disabling
- 3 Data Manipulation Language: Insert, Update, Delete, Select
- 4 SQL SELECT Statements: Selecting All Columns, Selecting Specific Columns, Column Alias, Concatenation Operator, Arithmetic Operators, Comparison Conditions, Logical Conditions, ORDER BY Clause
- 5 Functions: Single Row Functions, Character Functions, Number Functions, Date Functions, Conversion Functions, General Functions, Multiple Row Functions, Group Function Sub query: Sub query, Types of Sub query, Group Function, Having Clause
- 6 Joins : Equijoins, Non – Equijoins, Joining Three Tables, Self Joins, Left Outer Joins, Right Outer Joins, Full Outer Joins, Cross Joins, Natural Joins Other Concepts: View, Index

VB Programming Lab (IV Semester)

- 1 Simple programs using Input box and Message Box
- 2 Usage of text box, label and buttons
- 3 Usage of Functions and Procedures
- 4 Usage Timer Control

- 5 Manipulation of various String Functions
- 6 Manipulations of various Numeric Functions
- 7 Usage of Image Control
- 8 Usage of Picture control
- 9 Usage of list and combo box
- 10 Usage of File, Directory and Drive list box
- 11 Database connectivity

Reference Books:

1. An Introduction to Database Systems, Seventh Edition, C.J. Date, Pearson Education, 2002.
2. SQL, PL/SQL – The Programming Language of SQL, Third Edition, Ivan Bayross, BPB Publications, New Delhi, 2008.
3. Computer Programming Concepts and Visual Basic, David I. Schneider, Pearson Custom Publishing.
4. Visual Basic, Byron S. Gottfried, Tata McGraw Hill, Schaum's outlines.

Note : Practical examination will be conducted at the end of IV Semester

Course:	B.Sc.	Part: III	Major Elective: I	Semester	III
Major:	Computer Science	INTRODUCTION TO COMPUTER ORGANIZATION		Credits	4
				Hours	4

Scope & Objective : To understand the basic concepts of number systems, Boolean algebra, Gates and other related topics and to realize the method in building blocks of a computer system.

Unit 1 Number Systems: Decimal, Binary, Octal & Hexadecimal numbers – Number conversions. Signed Binary Number – Binary Arithmetic – Codes: Classification of Codes – Tables for BCD 8421, 2421, XS3, and Gray Codes.

Unit 2 Boolean Algebra and Logic Gates: Fundamental concepts – Boolean Constants and Variables – Logic gates – Truth Tables – Types of Gates – Basic Laws of Boolean algebra – Boolean Theorems – De Morgan's theorems – Boolean Expression for Logic Circuits – Implementing Circuits from Boolean Expressions – Standard Representation for Logical Functions – Minterm and Maxterm – Simplification of Boolean expressions using Laws and Theorems – Karnaugh's Map Representation and Simplification up to four variables for SOP and POS – SOP and POS with Don't Care Condition.

Unit 3 Combinational Logic Circuits: Design Procedure – Adders: Half Adder, Full Adder – Subtractor: Half Subtractor, Full Subtractor. Multiplexer: Concept and 4:1 multiplexer – Demultiplexer: Concept and 1:4 demultiplexer. Sequential Logic Circuits: Introduction – Basic Flip Flops: Clocked SR, JK, Type D and Type T – Characteristics of Flip Flop.

- Unit 4 Shift Registers – Binary Counters – Encoder – Decoder.
Memory: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Properties of Memory (From Text Book – 1).
- Unit 5 Computer Architecture: Instruction Formats – Data Transfer and Manipulation Instructions and data – Addressing modes.

Text Books:

1. Digital Electronics, G.K. Kharate, Oxford University Press, 2010.
UNITS: 1, 2, 3.
2. Computer System Architecture, M. Morris Mano, PHI, New Delhi, 1999.
UNITS: 4, 5.

Reference Book:

1. Digital Computer Fundamentals, Second Edition, Thomas C. Bartee, McGraw Hill International Publications, 1986.

Course:	B.Sc.	Part: IV	Skill Based Elective: II	Semester	III
Major:	Computer Science	DOCUMENTATION AND SPREADSHEET		Credit	2
				Hours	2

Scope & Objective : To make the students to understand the operation of Word processing and Spread sheet.

Unit 1 Introduction to Documentation – Opening, Saving and Printing Document – Tool Bars – Editing: Clip – board, Delete, Cut – Copy – Paste, Undo/ Redo operations – Document Views – Ruler & Gridlines – Zoom.

Unit 2 Common Formatting Functions: Font Properties – Alignment – High – lighting text – Bullets and Numbering – Indentation – Formatting Paragraph – Find & Replace.

Unit 3 Inserting: Blank Page & Page Break, Picture, ClipArt, WordArt and Special symbols. Table: Inserting Rows and Columns – Merging – Cell Alignment – Auto fit – Table Borders. Page Layout: Orientation – Margins: Top, Left, Gutter – Header & Footer – Review: Spelling & Grammar.

Unit 4 Introduction to Spreadsheet – Spread sheet terminology – Opening, Saving and Closing Workbook – Entering Data in Spreadsheet – Copying the Data – Formatting the Data – Editing the Worksheet. Calculation in a worksheet – Functions, Formulae and Copying formulae.

- Unit 5 Built-in functions of MS – Excel.
- Date & Time: DATE, MONTH, NOW and TIME.
- Text: BAHTTEXT, CONCATENATE, DOLLAR, LEFT, RIGHT, LOWER, UPPER, PROPER, VALUE and TRIM.
- Mathematical: ABS, INT/ROUND/TRUNC, FLOOR/CEILING, POWER, SIGN, SQRT, RAND, SUM, SIN/COS/TAN and DEGREES/RADIANS.
- Statistics: AVERAGE/ MEDIAN/MODE, COUNT and MAX/MIN.
- Engineering: BIN2DEC/ BIN2HEX/ BIN2OCT, DEC2BIN/ DEC2HEX/ DEC2OCT, HEX2BIN/ HEX2DEC/ HEX2OCT and OCT2BIN/ OCT2DEC/ OCT2HEX.
- Working with Charts, Types of Charts, Inserting Charts, Simple Formatting of Charts.

Text Book :

1. “Step-by-Step in Excel 2010”, Joyce Cox, Joan Lambert and Curtisfrye, PHJ Publications, New Delhi, 2003.

Reference Book :

1. DTP Course Kit, Vikas Gupta, Dreamtech Press, 2009.

Course:	B.Sc.	Part: III	Core: VI	Semester	IV
Major:	Computer Science	VISUAL BASIC PROGRAMMING		Credit	6
				Hours	6

Scope & Objective : To introduce the concept of graphical user interfaces and get acquainted with the features of Visual Basic that makes it a powerful tool in developing GUI applications.

Unit 1 Visual basic – events and event procedures – object related concepts – the visual basic program development process – program components—environment – opening – saving and running a VB project – Visual basic fundamentals – numeric constants – string constants – variables – data types and data declaration operators and expressions – hierarchy of operations – displaying output – the print statement – library functions – Numeric Functions – Sqr, Int, Round – String Functions – Format Function – msgbox function and input box function.

Unit 2 Procedures – modules and procedures – sub procedures – event procedures – function procedures – scope. Decisions: Relational And Logical Operators – If Blocks – Select Case Blocks. Repetition – Do Loops – EOF Function – Counters And Accumulators – Flags – Nested Loops – For ... Next Loops.

Unit 3 Arrays – Creating And Accessing Arrays – Using Arrays – :Ordered Arrays – Passing Arrays Between Procedures – Control Arrays – Control Array Event Procedures – Creating Control Arrays At Runtime Two – Dimensional Arrays.
Sequential Files: Creating A Sequential File – Adding Items To A Sequential File – Random – Access Files: – User Defined Data Types: Fixed Length String – Records – Random – Access Files.

- Unit 4 Controls And Objects – List Boxes And Combo Boxes – Driv, Directory And File List Box Nine Elementary Controls – Frame Control – Check Box Control – The Option Button Control – The Horizontal And Vertical Scrollbars – The Timer Control – Shape Control – Line Control – Image Control.
- Unit 5 Menus and Dialog boxes – building Drop – down menus—accessing a menu from the keyboard – menu enhancements – submenus – popup menus – dialog boxes – Database Management – An Introduction To Databases – The Data Control – Validation Event – Relational Databases And SQL – Primary and foreign keys – SQL – SQL requests – find methods – Using the Data – Bound List box and Combo box Controls – Creating a database with Visual data manager.

Text Books:

1. Computer Programming Concepts and Visual Basic, David I. Schneider, Pearson Custom Publishing.
UNITS: 2, 3, 4, 5.
2. Visual Basic, Byron S. Gottfried, Tata McGraw Hill, Schaum’s outlines
UNIT 1 : 1.1 – 1.4.1.7 – 1.11, 2.1—2.62.11 – 2.12, 5.7, 5.8
UNIT 2 : 7.1 – 7.5
UNIT 3 : 5.1 – 5.6

Reference Book:

1. VB 6 from the ground up, Gary Cornell, TMH Edition, New Delhi.

Course:	B.Sc.	Part: IV	Non-Major Elective: I	Semester	IV
Major:	Computer Science	FUNDAMENTALS OF INFORMATION TECHNOLOGY		Credits	2
				Hours	2

Scope & Objective : To explore the concepts of information Technology and communication via computers.

Unit 1 Introduction to Computers: Introduction – importance of computers – characteristics of computers.

Unit 2 Classification of digital computers – Anatomy of digital Computers.

Unit 3 Input Devices – Output Devices – Programming Languages Operating Systems.

Unit 4 Computer Networks: Types of Networks – Network topology.

Unit 5 Internet and World Wide Web.

Text Book:

1. Fundamentals of Information Technology, Alexis Leon & Mathews.

Reference Book:

1. Using Information Technology – A Practical introduction to computers and communication, 3rd Ed., Stacey Sawyer, Brian K Williams, Sarah E Hutchinson, TMH, 1999.

Course:	B.Sc.	Part: III	Core: VII	Semester	V
Major:	Computer Science	FUNDAMENTALS OF MICROPROCESSORS		Credits	5
				Hours	6

Scope & Objective : To impart an in depth knowledge of the architecture and programming of the 8-bit microprocessor 8085 and to study how to interface the peripherals. To develop assembly language programs in 8085.

Unit 1 Evolution of microprocessors – single chip microcomputers – Microprocessors applications – Programming Digital computers – Memory – Buses – Memory addressing capacity of CPU – Microcomputers – Processor architecture – Intel 8085 – Instruction cycle – Timing diagram.

Unit 2 Instruction set of Intel 8085 – instruction and data formats – Addressing modes – Status flags – Intel 8085 instructions – Programming of microprocessors – Assembly language – Assemblers – Stacks and subroutines – MACRO – microprogramming.

Unit 3 Assembly language programming – Simple examples – Addition and Subtraction of binary and decimal numbers – Complement – Shift – Masking – Finding the largest and smallest numbers in an array – Arranging a series of numbers – Sum of a series of numbers – Multiplication – Division – Multi byte addition and Subtraction.

- Unit 4 Peripheral devices and interfacing – Address space partitioning – Memory and I/O devices – I/O ports – Programmable peripheral interface – Programmable counter/interval timer – A/D converter and D/A converter.
- Unit 5 Microprocessor applications – Delay subroutines – Delay subroutine using Register pair – Interfacing of 7 segment displays – Water level indicator – Microprocessor based traffic control.

Text Book:

1. Fundamental of Microprocessors and Microcomputers, Fourth Revised Edition, Badri Ram, 1993.

Reference Book:

1. Microprocessor Architecture, programming and applications with the 8085/8080A, Ramesh, S. Gaonkar, Wiley Eastern, 1990.

Course:	B.Sc.	Part: III	Core: VIII	Semester	V
Major:	Computer Science	SOFTWARE ENGINEERING		Credits	4
				Hours	6

Scope & Objective : To introduce the main concepts of Software Engineering and the various phases involved in Software Development.

Unit 1 Introduction to software Engineering: Definitions – Size factors – Quality and Productivity Factors – Planning a Software Project: Problem definition – Developing a Solution Strategy – Planning the Development Process – Team Structure and Project Structure.

Unit 2 Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Software Requirements Definition: Software Requirements Specification – Formal Specification Techniques.

Unit 3 Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Structured Coding Techniques – Coding Style – Documentation and Guidelines.

Unit 4 Verification and Validation Techniques: Quality Assurance Walkthroughs and Inspection – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing.

Unit 5 Software Maintenance: Enhancing Maintainability during development – Managerial Aspects of Software Maintenance – Configuration Management – Source code Metrics.

Text Book:

1. Software Engineering Concepts, Richard Fairley, Tata McGraw – Hill International Editions, New Delhi, 2007 (Reprint).

UNIT – Chapters

1 – 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4

2 – 3.1, 3.2, 4.1, 4.2

3 – 5.1, 5.2, 5.3, 5.4, 6.1, 6.2, 6.4

4 – 8.1, 8.2, 8.3, 8.4, 8.5, 8.6

5 – 9.1, 9.2, 9.3, 9.4

Reference Book:

1. Software Engineering – A Practitioner's Approach, Roger S. Pressman, McGraw Hill International Editions, Singapore, 2005.

Course:	B.Sc.	Part: III	Core: IX	Semester	V
Major:	Computer Science	DISCRETE MATHEMATICS		Credits	4
				Hours	6

Scope & Objective : To bootstrap the mathematical knowledge of set theory, relations, propositional and predicate calculus. The Graph theory introduces graphs and trees.

Unit 1 Set theory: Introduction – Sets – Notations – descriptions of sets – Subsets – Venn diagram – Euler diagrams – Operations on Sets – Properties of set Operations – Verification of the basic laws by Venn diagrams – Principles of duality.

Unit 2 Relations: Cartesian product of two sets – Relations – Representation of a relation – Operations on relations – Equivalence relations – Functions: Functions and operators – one – to – one – onto functions – special type of functions.

Unit 3 Mathematical Logic: Logical statement of Proposition – Types of Propositions – The Propositional Calculus – The Negation of a Proposition – Disjunction – Conjunction – Tautologies and Contradictions – Logical Equivalence – The Algebra of Propositions – Conditional Propositions – Converse, Inverse and Contra positive Propositions – The Negation of a Conditional Proposition – Biconditional Propositions – Arguments.

- Unit 4 Graph Theory: Introduction – Definition – Applications of graphs – finite and infinite graphs – incidence and degree – Isolated Vertex, Pendant Vertex and Null graph. Paths and Circuits: Isomorphism – Subgraphs – walk, path, and circuit – connected, disconnected graphs – components – Euler graphs – operations on graphs – more on Euler graphs – Hamiltonian paths and circuits.
- Unit 5 Tree and Fundamental Circuits: Trees – some properties of trees – pendant vertices in a tree – Distance and centre in a tree – Rooted and binary trees – Spanning trees – Fundamental circuits – finding all spanning trees of a graph – Cut – sets – Some properties of a cut – set – All cut – sets in a graph – Fundamental Circuits and cut – sets.

Text Books:

1. Discrete Mathematics, Dr. N. Sridharan, N. Chandrasekaran, The National Publishing Company 2000.
UNIT –1: Pages 1.1 – 1.24
UNIT – 2: Pages 2.1 – 2.28, 3.1 – 3.10
2. Discrete Mathematics, 3rd Edition, Vatsa, B.S., Wishwar Prakashan, A Division of Wiley Eastern Ltd., (1988), New Delhi – 110 002.
UNIT – 3: Section 1.1 – 1.18
3. Graphs theory with application to Engineering and Computer Science, Narsingh Deo, Prentice Hall of India, New Delhi (1993)
UNIT – 4: Pages 1 – 9, 14 – 17, 19 – 34
UNIT – 5: Pages 39 – 52, 55 – 75.

Reference Books:

1. Modern Algebra, Arumugan and A.T. Issac, New Gamma Publication (1992), New Gamma Publication, 1992.
2. Discrete Mathematics, M.K. Venkataraman, The National Publishing Company, 2004.

Course:	B.Sc.	Part: III	Core: X-P	Semester	V
Major:	Computer Science	Major Practical – III: DIGITAL ELECTRONICS AND MICROPROCESSOR LAB		Credits	4
				Hours	4

Scope & Objective : To study the functions of Basic gates and Arithmetic operations using ICs and to programme pseudo codes on 8-bit microprocessor 8085 in the form of assembly language programs.

Digital Electronics Lab (V Semester)

- 1 Study of Basic Gates AND, OR, NOT using ICs
- 2 Study of Logic Gates NAND, NOR, XOR using ICs
- 3 Half Adder and the Full Adder circuits using ICs
- 4 Karnaugh's Map Reduction Method
- 5 Half Subtractor and the Full Subtractor circuits using ICs
- 6 Universal properties of NAND & NOR gates
- 7 Proving De Morgan's Laws using ICs

Microprocessor Lab (V Semester)

- 1 Add, Subtract, Multiply, and Divide the list of 8 – Bit numbers
- 2 Perform 16 bit addition of hexadecimal numbers
- 3 Find the Smallest and Largest elements from the given list
- 4 Perform Multi-byte Addition and Subtraction
- 5 Copy one block of elements to another block
- 6 Sort a given list of numbers in ascending order
- 7 Add and subtract two 8-bit BCD numbers
- 8 Perform multiplication by successive addition
- 9 Perform division by successive Subtraction

Reference Books:

1. Digital Electronics, G.K. Kharate, Oxford University Press, 2010.
2. Digital Computer Fundamentals, Second Edition, Thomas C. Bartee, McGraw Hill International Publications, 1986.
3. Computer System Architecture, M. Morris Mano, PHI, New Delhi, 1999.
4. Fundamental of Microprocessors and Microcomputers, Fourth Revised Edition, Badri Ram, 1993.
5. Microprocessor Architecture, programming and applications with the 8085/8080A, Ramesh, S. Gaonkar, Wiley Eastern, 1990.

Course:	B.Sc.	Part: III	Major Elective: II	Semester	V
Major:	Computer Science	WEB DESIGN USING HTML		Credits	4
				Hours	4

Scope & Objective : To introduce the basic concepts of HTML and to design web pages using the different tags.

Unit 1 Introduction To HTML: Designing A Home Page – HTML Document – Anchor Tag – Hyperlinks – Head and Body Sections – Header Section – Title – Links – Colourful Pages – Body Section – Heading – Horizontal Rule – Paragraph – Tabs – Images and Pictures.

Unit 2 Lists and Their Types – Table Handling – Frames – Forms and Their Elements – Drop Down List.

Unit 3 Check Boxes – Radio Button – Text Field – Text Area – Password, Hidden, Submit and Reset Buttons.

Unit 4 DHTML and Style Sheets – Defining Styles – Elements of Styles – Linking A Style Sheet to AHTML Document.

Unit 5 Inline Styles – External Style Sheets – Internal Style Sheets – Multiple Styles – Web Page Designing.

Text Books:

1. Programming the World Wide Web, Third Edition, Robert .W. Sebesta, Pearson Education, 2007.
2. Xavier, C, World Wide Web design with HTML, Tata McGraw Hill, New Delhi, 2000.

Reference Book

1. Web enabled commercial application development using HTML, DHTML, Java script, Perl CGI, 2nd revised edition, Ivan Bayross, BPB Publishing, 2002.

Course:	B.Sc.	Part: IV	Non-Major Elective: II	Semester	V
Major:	Computer Science	FUNDAMENTALS OF WEB DESIGNING		Credits	2
				Hours	2

Scope & Objective : To introduce the basic concepts of HTML and to design web pages using few tags.

Unit 1 Introduction to internet – networking – internet – email – protocols.

Unit 2 Introduction To HTML: Designing A Home Page – HTML Document – Anchor Tag – Hyperlinks – Head and Body Sections – Header Section – Title – Links – Colourful Pages.

Unit 3 Design of Body Section – Heading – Alignment – Horizontal Rule – Paragraph – Tabs – Images and Pictures.

Unit 4 Ordered and Unordered Lists: List – Unordered Lists – headings in list – ordered lists – nested lists.

Unit 5 Table Handling: Tables – width of the table and cells – Row span and column span – colouring cells – Frames and Frameset.

Text Books:

1. World Wide Web design with HTML, C. Xavier, Tata McGraw Hill, New Delhi, 2000.

Reference Book

1. Web enabled commercial application development using HTML, DHTML, Java script, Perl CGI, 2nd revised edition, Ivan Bayross, BPB publishing, 2002.

Course:	B.Sc.	Part: IV	SSD	Semester	V
Major:	Computer Science	SOFT SKILL DEVELOPMENT		Credits	2
				Hours	2

Scope & Objective : Today's world is all about relationship, communication and presenting oneself, one's ideas and the company in the most positive and impactful way. This course intends to enable students to achieve excellence in both personal and professional life.

Unit 1 Know thyself / Understanding self: Introduction to soft skills discovery – Developing positive attitude – Improving perceptions – Forming Values.

Unit 2 Interpersonal skills / Understanding others: Developing Interpersonal relationship – team building – Group dynamics – Networking – Improved work relationship.

Unit 3 Communication skills / Communicating with others: Art of listening – Art of reading – Art of Speaking – Art of writing – Email – Email Etiquette.

Unit 4 Corporate Skills / Working with others: Developing Body language – Practising etiquette and mannerism – Time management – Stress Management.

Unit 5 Selling self / Job Hunting: Writing resume /CV – Interview skills – Group Discussion – Mock interview – Mock GD – Goal setting – Career Planning.

Text Books :

1. A Book on development of Soft Skills: A road map to success, Meena K, V Ayothi, PR Publishers & Distributors, Trichy, 2013.
2. Soft Skills – Know yourself & Know the world, Alex K, S Chand and Co, New Delhi, 2012.

Reference Books :

1. Developing the Leader within you, John C. Maxwell, Thomas Nelson Iac Publisher, Nashville, 2005.
2. Good to Great, Jim C Collins, William Collins Publishers, United States, 2001.
3. The 7-habits of highly effective people, Stephen R. Covey, Free Press Publishers, United States, 1989.
4. Emotional Intelligence, Goleman and Daniel, Poantam Books, New York, 1996.
5. You can win, Shiv Khera, 2nd Ed, Mac Millan Publishers, India, 2000.
6. Principle centered Leadership, Stephen R. Covey, Simon and Schuster Publishers- Export Edition, New York, 2003.

Course:	B.Sc.	Part: III	Core: XI	Semester	VI
Major:	Computer Science	JAVA PROGRAMMING		Credits :	5
				Hours	6

Scope & Objective : To introduce the concepts of OOPS, to familiarize the features of Java that supports platform independency and to learn applet programming.

Unit 1 OOP and Java : Objects and classes – Encapsulation – Inheritance – Polymorphism – Java Language and features – Creating and Executing a Java Application – The Primaries : Character set – Tokens – Constants and data types – Variables – Operators – Expressions – Strings – I/O statements – Control statements: if statement – switch statement – while statement – do..While statement – for statement.

Unit 2 One and two dimensional arrays – Methods – Method overloading – Classes and Objects: General form of a class – Creation of objects – Usage of constructors – 'this' keyword – constructor overloading – copy constructors – static data members – static methods – 'finalize()' method – String class – String Buffer class.

Unit 3 Inheritance and Polymorphism: Inheriting the variables in a class – Inheriting the methods in a class – Inheritance and Constructors – Abstract classes – Final classes – Interfaces : Structure of an interface – Implementation of an interface inheritance – Packages: creating packages – accessing package – using a package – adding a class to a package – hiding classes.

- Unit 4 Managing errors and exceptions – types of errors – exceptions – syntax of exception handling code – multiple catch statement – using finally statement – throwing our own exceptions.
- Applets: Introduction – building applet code – applet life cycle – creating an executable applet – applet tag – adding applet to the HTML file – running the applet – Passing parameters to the applet – displaying numerical value – getting input from the user – Graphics programming – the graphics class – lines and rectangles – circles and ellipses – drawing arcs – drawing polygons – line graphs – drawing bar charts.
- Unit 5 AWT – Events – Listeners – Event handling methods – Inheritance hierarchy of control classes – Labels – Buttons – Checkbox – Radio Buttons – Choice control – List Control – Scrollbars.

Text Books:

1. Programming with Java, C.Muthu, Vijay Nicole, Imprints Pvt. Ltd., 2004.
UNIT: 1, 2, 5.
UNIT: 3: Inheritance and Interfaces.
2. Programming with Java - A Primer, E.Balagurusamy, Tata Mcgraw Hill.
UNIT: 3: Packages
UNIT: 4: Exception Handling, Applets and Graphics.

Reference Book:

1. Java 2 Complete Reference, Herbert Schildt, TMH, Fourth Edn. 2002.

Course:	B.Sc.	Part: III	Core: XII	Semester	VI
Major:	Computer Science	COMPUTER GRAPHICS		Credits	6
				Hours	6

Scope & Objective : To offer knowledge on basics to graphical techniques, raster graphics, two dimensional and three dimensional graphics.

Unit 1 Computer – Aided Design – Presentation Graphics – Computer – Art – Entertainment – Education and Training – Visualization Image Processing – Graphical User Interface – Video Display Devices – Raster – Scan Systems – Random – Scan Systems – Graphics Monitors and Workstations – Input Devices – Hard Copy Devices – Graphics Software.

Unit 2 Output primitives: Point and Lines – Line – Drawing Algorithms – Circle – Generating Algorithms – Attributes of Output Primitives: Line Attributes – Curve Attributes – Colour and Gray Scale levels – Area – Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Concepts of Antialiasing.

Unit 3 Two Dimensional Transformations: Basic Transformation Matrix Representations and Homogeneous Co – ordinates – Composite Transformations – Other Transformations. The Viewing Pipeline – Window – to – Viewport Coordinate Transformation – Clipping Operations – Point Clipping – Line Clipping: Cohen – Sutherland Line clipping algorithm.

- Unit 4 Polygon clipping: Sutherland – Hodgeman polygon clipping algorithm – Curve Clipping – Text Clipping – Exterior Clipping.
The User Dialogue – Logical Classification of Input Devices – Locator Devices – Stroke Devices – String Devices – Valuator Devices – Choice Devices – Pick Devices – Interactive Picture – Construction Techniques.
- Unit 5 Three Dimensional Concepts: Three – Dimensional Cartesian Coordinate Systems – Three – dimensional Display Methods – Three Dimensional Graphics Packages – Three Dimensional Transformations: Translation, Scaling, Reflections and Shears.

Text Book:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, PHI, New Delhi.

Reference Books:

1. Principles of Interactive Computer Graphics, William M.Newman and Robert F.Sproul, TMH, New Delhi.
2. Interactive Computer Graphics Data Structures Algorithms and Languages, Giloi W.K., PHI.

Course:	B.Sc.	Part: III	Core: XIII	Semester	VI
Major:	Computer Science	PRINCIPLES OF OPERATING SYSTEMS		Credits	4
				Hours	5

Scope & Objective : To gain essential knowledge on the terminologies of Operating Systems and its resources.

Unit 1 Operating systems – Evolution – Importance – Functions – Resource Manager – Different views of Operating Systems – I/O programming – Interrupt Structure and Processing.

Unit 2 Memory Management – Single Contiguous – Partitioned – Relocate able partitioned – Paged – Demand Paged – Segmented Memory management schemes.

Unit 3 Processor Management – State Model – Job Scheduling – Process Scheduling – Process Synchronization – Dead lock – Bankers Algorithm.

Unit 4 Device Management – Techniques for device management – I/O Traffic Controller – I/O Scheduler – I/o Device Handlers – Virtual Devices – Spooling.

Unit 5 Information Management – Simple file System – General Model – Symbolic File System – BFS – Logical and Physical File Systems – Case Study: Unix Operating System.

Text Book:

1. Operating Systems, Stuart E Madnick and John J Donovan, TMH, 2006 (Reprint).
UNIT – 1: Pages 1 – 20, 52 – 70
UNIT – 2: Pages 105 – 181
UNIT – 3: Pages 209 – 262
UNIT – 4: Pages 283 – 285, 300 – 325
UNIT – 5: Pages 337 – 370
2. Operating Systems – An overview, Deital and Deital, TMH, 2002
UNIT – 1: Pages 1 – 10, 166 – 179
UNIT – 5: Pages 635 – 650

Reference Book:

1. Operating Systems Principles, Milan and Milankovic, Wiley India Ltd, 2002.

Course:	B.Sc.	Part: III	Core: XVI-P	Semester	VI
Major:	Computer Science	Major Practical – IV: JAVA AND WEB DESIGNING LAB		Credits	4
				Hours	5

Scope & Objective : To familiarize the features of general Java, OOPS and applet programming and to do the basic web pages designing in HTML with different tags.

Java Programming Lab (VI Semester)

- 1 Program to implement objects and class
- 2 Program to Illustrate various forms of constructors
- 3 Program to illustrate the use of method overloading and Method Overriding
- 4 Program to implement the concept of Interfaces and packages.
- 5 Generate programs using exception.
- 6 Program using methods in String and String Buffer Class.
- 7 Applet – Usage of <param> tag
- 8 Usage of AWT Components.
- 9 Program using Graphics commands

HTML Practical List (VI Semester)

- 1 Design a Web page using
 - a) Lists
 - b) Tables
 - c) Links
 - d) Frames and Framesets
 - e) Form Design
- 2 Create a web page using Cascading style sheets – Embedded style sheets – Inline style sheets

Reference Books:

1. Programming with Java, C. Muthu, Vijay Nicole, Imprints Pvt. Ltd., 2004
2. Programming with Java A Primer, E. Balagurusamy, Tata McGraw Hill
3. Java 2 Complete Reference, Fourth Edn., Herbert Schildt, TMH, 2002.
4. World Wide Web design with HTML, Xavier, C, Tata McGraw Hill, New Delhi, 2000.
5. Web enabled commercial application development using HTML, DHTML, Java script, Perl CGI, 2nd revised edition, Ivan Bayross, BPB Publishing, 2002

Course:	B.Sc.	Part: III	Major Elective: III	Semester	VI
Major:	Computer Science	COMPUTER NETWORKS		Credits	4
				Hours	5

Scope & Objective : To study the concepts of computer networking, networking models and its layered architecture with different protocols.

Unit 1 Basic Concepts: Line Configuration – Topology – Transmission Modes – Categories of Networks – The OSI model – Layered architecture – Functions of the layers.

Unit 2 Signals: Analog and Digital data – Analog and digital signals – Periodic and aperiodic signals – Analog signals – Digital Signals – Error detection & Correction: Types of Errors – Detection – VRC, LRC – CRC – Checksum – Error Correction.

Unit 3 Data Link Layer Protocols: Asynchronous Protocols – Synchronous Protocols – Character Oriented Protocols – Bit Oriented Protocols – Switching: Circuit Switching – Packet Switching – Message Switching.

Unit 4 Networking and Internetworking Devices: Repeaters – Bridges – Routers – Gateways – Routing algorithms – Distance Vector Routing – Link State Routing.

Unit 5 TCP/IP Protocol Suite: Overview – Network Layer – Addressing – Subnetting – Transport Layer – TCP & UDP – Application layer: BOOTP, DHCP – DNS – Telnet – FTP – TFTP – SMTP – SNMP – HTTP.

Text Book:

1. Data Communications and Networking, 2nd Edn., Behrouz A Forouzan, TMH.

Reference Book:

1. Computer Networks, Andrew S. Tanenbaum, Computer Networks, PHI.

Course:	B.Sc.	Part: IV	Skill Based Elective: III	Semester	VI
Major:	Computer Science	PHP PROGRAMMING		Credits	2
				Hours	2

Scope & Objective : To introduce the vital concepts of PHP and to design colourful web pages in PHP.

Unit 1 Introduction to PHP – Basics language in PHP

Unit 2 Decisions and Loops – Strings – Arrays.

Unit 3 Functions – Objects – Generating Image with PHP

Unit 4 Handling HTML form with PHP – Preserving state with Query strings – Cookies and Sessions.

Unit 5 Introducing Database and SQL – Retrieving data from MySQL with PHP – Manipulating MySQL data with PHP.

Text Book:

1. Beginning PHP 5.3, Matt Doyle, Wiley Publishing, Inc. Indianapolis, 2010.

Reference Book:

1. Beginner to Intermediate PHP5, Mario Lurig, 2008.