# SYLLABUS

## BACHELOR OF SCIENCE

## COMPUTER SCIENCE


**JODHPUR NATIONAL UNIVERSITY**

**JODHPUR**

**BSc Computer Science**

**YEAR 1**

| | |
|---|---|
| **Paper-I** | **General English** |
| **Paper-II** | **General Hindi** |
| **Paper-III** | **Introduction to Information Technology** |
| **Paper-IV** | **Basic Mathematics** |
| **Paper-V** | **Problem Solving through C Programming** |
| **Paper-VI** | **Digital Electronics** |
| **Paper-VII** | **Computer Organization** |
| **Paper-VIII** | **Java** |

**YEAR 2**

| | |
|---|---|
| **Paper-I** | **Computer Oriented Statistical Methods** |
| **Paper-II** | **Database Management Systems** |
| **Paper-III** | **Fundamentals of Operating Systems** |
| **Paper-IV** | **Web Technology** |
| **Paper-V** | **Microprocessor Interfacing and Computer Hardware** |
| **Paper-VI** | **C ++ and Data Structures** |

**YEAR 3**

| | |
|---|---|
| **Paper-I** | **Systems Software** |
| **Paper-II** | **Visual Programming** |
| **Paper-III** | **Unix Programming** |
| **Paper-IV** | **Data Communication and Networking** |
| **Paper-V** | **Software Engineering** |
| **Paper-VI** | **Programming with Card Visual Basic** |
| **Paper-VII** | **Industry Based Environmental Studies** |

## PAPER I GENERAL ENGLISH

1. Comprehension and vocabulary
2. Composition
A. Letter/application writing
B. Paragraph writing/ precis writing
C. Report writing
3. Translation
A. Elements of a sentence
B. Transformation of sentence
C. Modals
D. Tense usage
E. Determiners
F. Common errors in English
G. Phrasal verbs

Books recommended
1. A.J. Thomson and : A Practical English Grammar A.V. Martinet (Oxford Paper Back)
2. S.Pit Corder : Intermediate English Practice Book ( Orient Longman )
3. Bhaskaran and : Strengthen Your English Hordburgh (OUP 1973)
4. T.l.h. Smith – Pearce : The English Errors Of Indian Students (OUP)
5. I.K. Sharma and : A Practical Course of English ( Ramesh Book V.D. Singh Depot, Jaipur)

## पेपर 2 सामा य ह द

(अ भाग)

ग एवं प संकलन क व वधवधाएं मशः

1. एक या याओं स बंधित मशः
2. डॉ॰ प रचया मक पा यपु तकसे

(ब भाग)

1. श दशु
2. वा यशु
3. पा रभा षक दावली(अं `जीश दके ह समानाथ वश द)

4. सं `पण
5. प लवन
6. वा यांशके लिये साथ क्श द
7. ा प
8. श व्यु म अथ-भेद
9. निबंध

## ग -संकलन

1. ामो थाननानाजी देशमुख ,द नदयाल्शोध सं थानचि कूट
2. पया वरणऔर सनातन छगन मेहता ,सं ंतिऔर सनातनता ,संकलन से वागदेवी काशन्बीकानेर
3. ठठुरताहुआ गणतं ) यं य(ह रशंकरपरसा ,तिरछ रेखाएं ,वाणी काशन द ली
4. लछमा रेखाचि (महादेवी वमा ,अतीत के चलचि ,वाणी काशन द ली
5. अ क्का उड़ान प र छेद
6. ए .पी .जे .अ ुल्क कलाम भात काशन,नई द ली
7. भेड़ाघाट :माब लरॉ सौरधुँआधार - अमृत लाल बेगड़ ,अमृत यनम दा ,थ म य देशअकादमी ,भोपाल ,म य देश
8. आवाज का नीलाम) एकांक (धम वीरभारती ग - भा- डॉ .नवल कशोर,पंचशील काशन,जयपुर
9. ावचेती वजयदान्देथा ,आउटलुक प क्का.10.05
10. ह दभाषा और उसक वरासत: डॉ . व ानिवासमि , ह दसा ह य्का पुनरावलोकन , व मिवास मि , भा काशन, द ली
11. सुसंग-कुसंग -सीताराम मह षकृ ष्णकुट रतनगढ़ ,चु ) राज.
12. ये ह ोफ़ेसरशशांक - डॉ . व णुकांतशा ी- मरण्को पाथेय बनने दो 'सं ह लोक भारती ,इलाहाबाद)) उ . )

13.तुलसी के का यम कुराज और सुराज -' ोसूय सादद ,सा ह यक,54 निराला नगर ,लखनऊ) उ .

प संकलन

1. गंगावतरण ,भारत ुद्ह र ' भारत ुदसम 'संपादक ,हेमंत शमा ह द काशन सं थान,वाराणसी )
2. गोवध नधारण ,ह रऔध य वास'महाका य ह दसा ह युट र,वाराणसी उ . )
3. भारत वंदना ,मैथिली शरण गु ' मंगल घट 'का य शसा ह )यनीला बर प रधानसदन ,चिरगाँव ,झाँसी
4. समर शेष है ,रामधार सिंह दनकर ,परशुराम क ती 'ा शे ,राजपाल एंड स स द ली
5. वीर का कैसा हो बसंत ,सुभ कुमार चौहान' ,सुभ कुमार चौहान 'संपादक सुधा चौहान सा ह सअकादमी ,नई द ली
6. चल पड़े जधरदो डग ,सोहन लाल वेदरा ीयगीत सं ह'सा ह सअकादमी , नई द ली
7. म्दयाकृ ण वजय मधरा 'अच ना काशन,अजमेर
8. भारती क साधना ,इ ुद्बोखर त पु 'ष हमारा कोण मा रक/70 ' मानसरोवर ,जयपुर ,राज.

**Paper-III Introduction to Information Technology**

**UNIT - I**

Computer Basics: Algorithms, A Simple Model of a Computer, Characteristics of Computers, Problem-solving Using Computers. Data Representation: Representation of Characters in computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error-detecting codes.

Input & Output Devices: Description of Computer Input Units, Other Input M ethods, Computer Output Units.

**UNIT - II**

Computer Memory: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to Construct Memories, Magnet ic Hard Disk, floppy Disk Drives, Compact Disk Read Only Memory, Magnetic Tape Drives. Processor: Structure of Instructions, Description of a Processor, A Machine Language Program, An Algorithm to Simulate the Hypothetical computer.

**UNIT - III**

Binary Arithmetic: Binary Addition, Binary Subtraction, Signed Numbers , Two's Complement Representation of Numbers, Addition/Subtraction of Numbers in 2's Complement Notation, Binary Multiplication, Binary Division, Floating Point Representation of Numbers, Arithmetic Operations with Normalized Floating Point Numbers. Computer Architecture: Interconnection of Units, Processor to Memory communication, I/O to Processor Communication, Interrupt Structures, Multiprogramming, Processor Features, Reduced Instruction , Set
Computers (RISC), Virtual Memory.

**UNIT-IV**

Software Concepts: Types of Software, Programming Languages, Software (Its Nature & Qualities), Programming Languages. Operating Systems: History & Evolution, A Brief History of Linux, A B rief History of MS-DOS, A Brief History of Windows System.

**UNIT - V**

Computer Generation & Classifications: First Generation of Computers, The Second Generation, The Third Generation, The Fourth Generation, The Fifth Generation, Moore's Law, Classification of computers, Distributed Computer System, parallel computers. Internet: Network, Client and Servers, Host & Terminals, TCP /IP, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Case Study, Intranet.

**Suggested Books**

1. P.K.Sinha " Introduction to Information Technology",
2. V. Rajaraman, Fundamentals Of Computers, 3 rd Edition , PHI Publications

3. Nasib S. Gill, Essentials of Computer & Network Te chnology, Khanna Publications.
4.Deepak Bharihoke, Fundamentals of Information Tec hnology, Excel Books.

**Paper-IV Basic Mathematics**

**UNIT - I**

SETS: Sets, subsets, equal sets, null set, universal set , finite & infinite sets, open & closed sets etc., operations on sets, partition of sets, Cartesian product.
RELATIONS AND FUNCTIONS : relation, properties of relations, equivalence re lation, equivalence relation with partition, partial order relation, maximal and minimal points, glb, lub, chains and anti chains, pigeonhole principle. Function, domain & range, onto, into and one-to-one functions, composite functions, inverse functions, introduction of algebraic, trigonometrically, logarithmic, exponential, hyperbolic functions, zeroes of functions.

**UNIT - II**

DIFFERENTIATION: Derivative, derivatives of sum, differences, product & quotients, chain rule, derivatives of composite functions, logarithmic differentiation, Rolle's theorem, mean value theorem, expansion of functions (Maclaurin's & Taylor's.), indeterminate forms, L'Hospitals rule, maxima & minima, concavity, asymptote, singular points, curve tracing, successive differentiation & liebnitz theorem.

**UNIT - III**

INTEGRATION: [TF – (4.1-)], [SNI – ()] Integral as limit of a sum, Riemann sum, fundamental theorem of calculus, indefinite & definite integrals, methods of integration substitution, by parts, partial fractions, integration of algebraic and transcedental functions, , reduction formulae for trigonometric functions, Gamma and Beta functions.

**UNIT - IV**

PLANE CURVES & POLAR COORDINATES:Polar coordinates, curve tracing in polar coordinates, area in polar coordinates, Arc length, area & volume of surface of revolution in Cartesian and polar coordinates.

**UNIT - V**

FUNCTIONS OF SEVERAL VARIABLES :
Limits & continuity, partial differentiation, chain rule , Euler's theorem, Maxima & Minima, Lagranges method of undetermined multipliers, Taylor's formula for functions of two variables.

Suggested Books
1. C. L. Liu.: Elements of Discrete Mathematics , Tata Mac-Graw Hill.
2. Thomas, G.B. and R. L. Finney: Calculus & Analytical Geometry, Addison Wesley , 9thedition.
3. Chandrika Prasad : Mathematics for Engineers, Prasad Mudranalaya, Allahabad,19thedition
4. Shanti Narayan: Differential Calculus, S.Chand & Co.
5. Shanti Narayan: Integral Calculus, S.Chand & Co.

**Paper-V Problem Solving through C Programming**

**UNIT- I**
Algorithm and algorithm development: Definition and properties of algorithm, flow chart symbols, conversion of flow chart to language, example of simple algorithms. Program design, errors : syntax error, runtime error, logic error, debugging, program verification, testing, documentation and maintenance.
Introduction to C:Variables and arithmetic expressions, the for statement, symbolic constants, character input and output, arrays, functions, arguments- call by value, character arrays, external variables and scope. Types, Operators and Expressions: Variable names, data type and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions, precedence and order of evaluation.

**UNIT- II**
Control Flow: Statements and blocks, if-else, else-if, switch, loops- while and for, loops- do-while, break and continue, goto and labels. Functions and Program Structure: Basics of function, functions returning non-integer s, external variables, scope rules, header files, static variables, register variables, block structure, initialization, recursion, the C preprocessor.

**UNIT - III**

Pointer and Arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic. Character pointers and functions, pointer arrays: pointers to pointers, multi-dimensional arrays, pointers vs. multi-dimensional arrays. Pointers to functions. Complicated declarations.

**UNIT - IV**

Structures: Basics of structures, structures and functions, ar rays of structures, pointers to structures, self- referencial structures, table lookup, typedef, unio ns, bit-fields.

**UNIT - V**

Input and Output: Standard input and output. Formatted output- print , variable length argument lists. Formatted input- scanf, file access, error handling - stderr and exit, line input and output, miscellany eous functions.

**Suggested Books**

1.Deendayalu R., Computer science Volume I and II, Se cond Edition,Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Rajaraman V., Fundamentals of computers, Second Edition, Prentice Hall of India Private Limited, New Delhi.
3. Kernighan B.W. and Ritchie D.M., The C Programming Language, Prentice Hall of India Private Limited New Delhi.
4. Drogmey R., How to solve it by computers. Prentice Hall of India Private Limited , New Delhi.

**Paper-VI Digital Electronics**

**UNIT- I**

Number Systems: Binary, octal, decimal, hexadecimal and BCD number systems. Representation of positive, negative integers and real numbers. Chara cters digital codes: ASCII and EBCDIC coding, binary arithmetic in 1's and 2's complement.

**UNIT-II**

Boolean Algebra: Logic gates, truth table, logic ex pression, rules and laws of boolean algebra. Demorgan's theorems, simplification of boolean expression using Karnaugh map (upto 4 variables).

**UNIT- III**

Combinational Circuits: Adder, subtractor, comparator, decoder, encoder, multiplexer, de-multiplexer. (Block diagram level only)

**UNIT- IV**

Flip Flops: Latches, edge-triggered flip flops, pulse triggered flip flop, R-S flip, JK master-slave flip flop, D flip flop, T flip flop. Shift register, shift left,shift right, Bidirectional

**UNIT- V**

Memory Organization: Basic memory cell, 1- 2-D memory, row and column address, accessing memory, different RAM and ROM types, Magnetic bubble memory, charged couple device.

**Suggested Books**

1.Thomas L. Floyd, Digital Fundamentals, United Book Stall New Delhi.
2. Mano M.M., Digital Logic and Computer Design, Prentice Hall of India Private Limited New Delhi.
3.Hayes J.P., Computer Organization and Architecture, Tata Mc-Graw Hill Publishing Company Limited New Delhi.
4. Mano M.M., Computer System Architecture, Prentice H all of India Private Limited New Delhi.

## Paper-VII Computer Organization

**UNIT- I**

Basic Computer Organization: Instruction codes, direct and indirect address, timing and control signal generation, instruction cycle, memory reference ins tructions, input output instructions. Register Transfer and Micro Operations: Bus and memory transfers, three state bus buffers, binary adder, binary incrementer, arithmetic circuit, logic and shift micro operations, ALU.

**UNIT- II**

Central Processing Unit: General register organization, memory stack, one address, two address instructions, data transfer, arithmetic, logical and shift instructions, software and hardware interrupts (only brief introduction), arithmetic and instruction pipelines

**UNIT- III**

Computer Arithmetic: Addition and subtraction with signed magnitude data, multiplication algorithms, hardware algorithm and booth algorithm, division algorithm.

**UNIT - IV**

Input Output Organization: Asynchronous data transfer- handshaking, asynchronous serial transfer, interrupt initiated I/O, DMA transfer, interfacing, peripherals with CPU (introduction), keyboard, mouse, printer,
scanner, network card.

**UNIT- V**

Memory Organization: ROM, RAM, hard disk, CD-ROM, Cache memory- direct mapping scheme, virtual memory concept.

**Suggested Book**

1. Mano M., Computer System Architecture, Pearson Education.

**Paper-VIII Java**

**Unit I**

Introduction to Java, history, characteristics, Object oriented programming, data types, variables, arrays.

**Unit II**

Control Statement: selection, iteration, jump statement, operators

**Unit III**

Introduction to classes, class fundamentals, constructor, methods, stack class, inheritance, creating multilevel hierarchy, method over riding.

**Unit IV**

Packages and interfaces, exception handling, multi-threaded programming. I./O applets.

**Unit V**
Java Library, string handing, string comparison, string buffer, utility classes, vector stack dictionary, applet class, introduction to AWT, working with frame windows.

**Reference books**
1.V. Daniel Liang, Introduction to Java Programming, PHI.
2.Patrick Naught on, Java Complete Reference, Tata McGraw Hill.
3.The Java Handbook, Patrick Naught on, Tata McGraw Hill.
4.Introduction to Java programming, E Balagurusamy, PHI.
5.Programming Java, Decker & Hartsfield, Vikas Publications.

**YEAR 2**

**Paper-I Computer Oriented Statistical Methods**:

**Unit - 1**
Frequency distribution measures of central tendency, mean, mode, partition values (quartiles); measures of dispersion, range, inter-quartile range, mean, deviation, standard deviation, moments, skewness and kurtosis.

**Unit - 2**
Probability, event, sample space, probability of an event, addition and multiplication theorems. Random variable, mathematical expectations, expectation of sum and product of random variables, moment generating function.

**Unit - 3**
Theoretical distribution, binomial, geometric, negative binomial, uniform, poison, normal, rectangular and exponential, and Gamma distribution, their properties and uses.

**Unit - 4**
Methods of least squares, curve fitting correlation and regression. Introduction of multiple and partial correlation. (up to three variables only).

**Unit - 5**
Elementary theory of testing of hypothesis. Errors of first and second kinds Critical region, level of significance based on Chi-square t and f statistics

**References:**
1. Gupta and Dasgupta : Fundamental Mathematical Statistics Vol. I.
2. Kishor S. Trivedi : Probability and Statisticswith Reliability.
3. Kapoor & Saxena : Mathematical Statistics.
4. Gupta & Kapoor : Fundamentals of Mathematical Statistics.
5. P. Mayer : Introductory Probability
6. Weather Burn : Mathematical Statistics.

**Paper-II Database Management Systems**

**Unit-I**
Introduction : Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

**Unit II**
ER Model :entities, mapping constrains, keys, E-R diagram, reduction E-R diagrams to tables, generation, aggregation, design of an E-R database scheme.

**Unit III**
Relational Model : The catalog, base tables and views. Relational Dat a Objects-Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases. Relational Data Integrity -Candidate keys and related matters: Candidate keys . Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

**Unit IV**
The SQL Language: Data definition, retrieval and update operations. T
able expressions, conditional expressions, embedded SQL,Joins. Views:
Introduction, what are views for, data definition, data manipulation, SQL support.

**Unit V**
File and system structure : overall system structure, file organization, logical and physical file organization, sequential and random, hierarchical, inverted, multi list, indexing and hashing, B-tree index files.

**Suggested Book**
1. Date C.J., Database Systems, Addision Wesley.
2. Korth, Database Systems Concepts, McGraw Hill.

## Paper-III Fundamentals of Operating Systems

**Unit I**
Introduction: What is an operating system? Mainframe, desktop, multiprocessor, distributed, clustered, real-time and handheld systems. Operating System Structures: System components, operating system services, system calls, systems programs, system structure, virtual machines.

**Unit II**
Process: Process concept, process scheduling, operations on processes, cooperating processes. Inter process communication. CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.

**Unit III**
Process Synchronization: The critical section problem, semaphores, classical problems of synchronization.

**Unit IV**
Memory Management: Swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

**Unit V**
Virtual Memory: Demand paging, page replacement, allocation of frames, thrashing.

**Suggested Book**
1.Silberschatz G.G., Operating System Concepts, John Wiley & Sons Inc.

## Paper-IV Web Technology

### Unit I
Introduction to Internet Basic The Basic of the Internet, Concepts of Domain, IP Addressing, Resolving Domain Names, Overview of TCP/IP and its Services, WWW.

### Unit II
Designing Pages with HTML Introduction to HTML, Essential Tags, Deprecated Tags, Tags and Attributes, Text Styles and Text Arrangements, Text, Effects, Exposure to Various Tags (DIV, MARQUEE, NOBR, DFN, HR, LISTING, Comment, IMG), Color and Background of Web Pages, Lists and their Types, Attributes of Image Tag,

### Unit III
Hypertext, Hyperlink and Hypermedia, Links, Anchorsand URLs, Links to External Documents, Different Section of a Page and Graphics, Footnote and e-Mailing, Creating Table, Frame, Form and Style Sheet.

### Unit IV
DHTML Dynamic HTML, Document Object Model, Features of DHTML, CSSP (Cascading Style Sheet Positioning) and JSSS (JavaScript assisted Style Sheet), Layers of Netscape, The ID Attribute, DHTML Events.

### Unit V
Front Page Front Page Basics , Web Terminologies, Phases of Planning and Building Web Sites, The FTP, HTTP and WPP, Features, Front Page Views, Adding Pictures, Backgrounds, Links, Relating Front Page to DHTML.

### Books Suggested
1.HTML Black Book – Steven Holzner – Dreamtech Press
2. HTML, Java Script, DHTML, PERL, CGI – Evan Bayross – BPB

## Paper-V Microprocessor Interfacing and Computer Hardware

### Unit - 1
Overview of earlier 8088/86 system, middle: age 80486 system and new Pentium, Pentium MMX and Pentium II based computers and their basic capabilities.

Earthing Concept, site preparation, wiring Diagram and control of earth to neutral voltage.

**Unit - 2**

Hardware -BIOS -DOS interaction, The PC family, PC-Hardware, CPU, Peripherals, Product Engg. interconnection between the boxes, inside the system BOX, SMPS, Mohter Board, Mother Board Components, Power connections to Mother Board, PCB edge connectors, mode switches form Panel indicators and controls. EPROM/ROM types, FD and HDdrives, CDROM drives, Mother Board logic, Memory space and I/O port addresses. (Suggested level section 3.1 to 3.10 chapter 3 reference 2).

**Unit -3**

Data communication fundamentals Asynchronous and synchronous communication serial and current loop Interface. RS 232C, RS232C signal levels and Pins, serial port in PC, UART, 8250, RS232. interface chips, serial port basic circuit, Real time clock and counter, Magnetic tape subsystems, LAN, memory expansion options, Professional Image Board,(Suggested level section 2.1, Chapter12 of reference 2).

**Unit - 4**

Digital interfacing of Printer controller and parallel ports Centronics interface, Printer cable list, programming sequence, Data buffer, Hardwart overview of print controller : I/O port decoder, Printer, Printer Mechanisms, New Generation Printer Controllers, (Suggested levels section 8.1 to 8.7 chapter 8 of reference 2)

**Unit - 5**

Floppy Disk Controller : Error detection Techniques of parity check, Multiple bit error detection scheme, CRC, ECC floppy disk controller overview, Disk Format, FDC system interface, FDD interface, Floppy cables, overall operation of Floppy disk subsystem, FDCIC block diagram, Read Data command write data command, Read deleted data commands, write deleted data commands, Read ID commands, format tracks command, seek altd other commands, sector interleaving FDC logic functional block diagram (Section 1.11 chapter land section 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, Fig. 9.9of 9.7 9.8 to 9.8.15, 9.1, 9.10 9.12.2, 9.12chapter 9 reference 2)

**References:**

1. Winn 1., Rosch : Hardware Bible. Published by PHI.
2. B. Govind Rajalu : IBM PC and clones, Hardware. Troubleshooting and Maintenance (Tata McGraw Hill Publishing Co. Ltd. 1991)

**Paper-VI C ++ and Data Structures**

**Unit I**
Object Oriented Programming concepts, encapsulation, inheritance, polymorphism, class Object, complexity, analysis, Big O notation.

**Unit II**
Constants variables, Data types, Operators, expression, managing I/O, operators decision, making and branching, loopmg array.

**Unit III**
Strings, functions, structure, pointers, virtual functions, constructors, destructors, recursion.

**Unit IV**
Single linked lists, double linked list, circular list, sparse table, stack, queue, Deques list, priority queue, graph, spanning tree, shortest path, hashing.

**Unit V**
Tree, Binary Tree, Binary search tree, tree traversal, breadth – first, depth- first, insertion, deletion, AUL tree, Btree sorting, insertion, selection, bubble, decision tree, heap, shall, heap, quick, merge,sort, Radik sort.

**YEAR 3**

**Paper-I Systems Software**

**Unit - I:**
Language processors - Language processing activities and fundamentals - Language specification - Development Tools - Data Structures for Language processing- Scanners and Parsers.

**Unit - II:**
Assemblers: Elements of Assembly language programming - Overview of the Assembly process - Design of a Tow-pass Assembler - A single pass Assembler for the IBM PC.

**Unit - III:**
Macros and Macro processors - Macro definition, call, and expansion - Nested macro calls - Advanced macro facilities - Design of a macro pre processor - Compilers: Aspects of compilation.

**Unit - IV:**
Compilers and Interpreters - Memory allocation Compilation of Expressions and Control structures - Code optimization - Interpreters.

**Unit - V:**
Linkers : Linking and Relocation concepts - Design of a linker - Self relocating Programs - A linker for MS DOS - Linking for over-lays - loaders Software tools: Software tools for program development - Editors - Debug monitors - Programming environments - User interfaces.

**Text:**
1. D.M. Dhamdhere, Systems Programming and Operating Systems, Second Revised Edition, Tata McGrawhill Publ. Company 1999.
**References:**
1. L.L. Beck, "System Software, An Introduction to System Programming", Addison-Wesley, 1985.

**Paper-II Visual Programming**

**UNIT I**
Client Server Basics: Discover Client-Server and Other Computing Architectures, Understand File Server Versus Client-Server Database Deployment, Learn About the Two Tier Versus Three Tire Client-Server Model, Visual Basic Building Blocks and Default Controls: Forms, Using Controls, Exploring Properties,
Methods and Events, Introduction To Intrinsic Controls, Working With Text, Working With Choices, Special Purpose Controls, VB Advance Controls: Events, Menu bar, Popup Menus, Tool bar, Message Box, Input Box, Built-in Dialog Boxes, Creating MDI, Working with Menus

**UNIT II**
VB Programming Fundamentals And Variables: Introduction to Variables, Variable Declaration, Arrays, Introduction to Constants and Option Explicit Statement, Assignment Statements, Working With Math Operations, Strings,

Formatting Functions, Controlling and Managing Program: All Control Statements, Loops, Error Trapping, Working With Procedures, Functions, Controlling How Your Program Starts, Common controls and control arrays: Introduction to common controls- Tree view, list view, tab strip,
Creating and working with control arrays.

**UNIT III**

Visual Basic and databases: Understanding the Data Controls and Bound Controls, Introduction to Data Form Wizard, Introduce DAO, Working With Record sets, Record Pointer, Filters, Indexes, Sorts And Manipulation of Records. Remote and ActiveX Data Objects: Working With ODBC, Remote Data Objects and Remote data Control, Introducing ADO, ADO Data Control

**UNIT IV**

Using Data Grid Control and ActiveX Data Objects. ActiveX Controls, Extending ActiveX Controls and Classes: Creating, Testing, Compiling, Enhancing and User Drawn ActiveX Controls, Using ActiveX Control Interface Wizard and Property Pages Wizard, Introducing Ambient, Extender Objects, Creating Property Pages, Building Class Modules, ActiveX DLL

**UNIT V**

Client-Server Development Tools: COM, Services Models, Development Tools Included with VB 6, Working With SourceSafe Projects. Reports and Packaging: Data Reports and Crystal Reports, Packaging A Standard EXE Project, VB And Internet: Introduction to VBScript, Tools used with VBScript and VBScript Languages, Introduction to Active Server Pages, ASP Objects.

**References:**

1. Gary Cornell - Visual Basic 6 from the Ground up- Tata McGraw Hill - 1999.
2. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill - 1999.

**Paper-III Unix Programming**

**Unit - I**

INTRODUCTION: File and common commands - Shell - More about files- Directories- Unix system - Basics of file Directories and filenames - Permissions - modes - Directory hierarchy - Devices - the grep family - Other filters - the stream

editor sed - the awk pattern scanning and processing language - files and good filters.

**Unit - II**

CONCEPTS OF SHELL: Command line structure - Meta characters - Creating new commands - Command arguments and parameters - program output as arguments - Shell variables - More on I/O redirection - loop in shell programs - Bundle - Setting shell attributes, Shift command line parameters - Exiting a command or the shell, evaluating arguments - Executing command without invoking a new process - Trapping exit codes -- Conditional expressions.

**Unit - III**

SHELL PROGRAMMING: Customizing the cal command, Functions of command, While and Until loops - Traps - Catching interrupts- Replacing a file - Overwrite - Zap - Pick command -News command - Get and Put tracking file changes.

**Unit - IV**

FEATURES IN UNIX: Standard input and output - Program arguments - file access - A screen at a time printer - On bugs and debugging - Examples - Zap - pick - Interactive file comparison program - Accessing the environment - Unix system calls - Low level I/O, File system Directories and modes, Processors, Signal and Interrupts.

**Unit - V**

PROGRAM DEVELOPMENT AND DOCUMENT PREPARATION: Program development - Four function calculator - Variables and error recovery - Arbitrary variable names, Built in functions, Compilation into a machine, Control flow and relational operators, Functions and procedures - Performance evaluation - Ms macro package - Troff level - Tbl and eqn pre processors - Manual page - Other document preparation.

**Text Book for Study:**

1. Brian W. Kernighan, Rob Pike - The UNIX Programming Environment - Prentice Hall of India( 1984).

**References:**

I.Steven Earhart - The UNIX System for MSDOS Users - Galgotia book source P. Ltd. (1990).

II.Stefen Prata - Advanced UNIX - A Programmer Guide.

## Paper-IV Data Communication and Networking

**Unit - I:**
Introduction to Data Communication. Network, Protocols & standards and standards organizations - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.

**Unit - II:**
Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

**Unit - III:**
Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet Token Bus - Token Ring - FDDI - IEEE 802.6-SMUS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

**Unit - IV:**
History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol – ATM, ATM Topology - ATM Protocol.

**Unit - V:**
Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.

**Text:**
1. Behrouz and Forouzan - Introduction to Data Communication and Networking - 2ndEdition - TMH - 2001.
**Reference:**
1.Jean Wairand - Communication Networks (A first Course) - Second Edition - WCB/ McGraw Hill - 1998.

## Paper-V Software Engineering

**UNIT - I:**
Introduction to Software Engineering: Definitions-Size Factors - Quality and Productivity Factors - Managerial Issues - Planning a software project: Defining the problem - Developing a Solution Strategy

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Planning the Development Process - Planning an Organization structure - Other Planning Activities.

**UNIT - II:**
Software Cost Estimation: Software cost factors - Software Cost Estimation Techniques - Staffing-level Estimation - Estimating Software Maintenance Costs - The Software Requirements Specification - Formal Specification Techniques - Languages and Processors for Requirements Specification.

**UNIT - III:**
Software design: Fundamental Design Concepts - Modules and Modularization Criteria - Design Notations - Design Techniques - Detailed Design Considerations - Real-Time and Distributed System Design - Test Plans - Milestones, walkthroughs, and Inspections.

**UNIT - IV:**
Implementation issues: Structured Coding Techniques- Coding Style - Standards and Guidelines - documentation guidelines -Type Checking - Scoping Rules - Concurrency Mechanisms.

**UNIT - V:**
Quality Assurance - Walkthroughs and Inspections - Static Analysis - Symbolic Execution - Unit Testing and Debugging - System Testing - Formal Verification: Enhancing Maintainability during Development - Managerial Aspects of Software Maintenance - SourceCode Metrics - Other Maintenance Tools and Techniques.

**Books for Study:**
1. R.Fairley, Software Engineering Concepts, Tata McGraw-Hill Edn. 1997.
2. R.SPressman, Software Engineering, Fourth Ed., McGraw Hill, 1997.

**Paper-VI Programming with Card Visual Basic**

**Unit I**
C Language: Types, Operators and Expressions, variable names, data types and sizes, constants, declarations, operator, expressions and type conversions.
Control flow: Statements and blocks, selection and loops structures, break, continue, branching and labels. Functions and program structure: Basics, functions

and their arguments, external variables and staticvariables, scope rules, register variables, block structures, initialization, recursion.

**Unit II**

Pointers and Arrays: Pointers and addresses, pointes and function arguments, pointers and arrays, address arithmetic, character pointers and function, multi-dimensional arrays, pointers arrays, pointer to functions.

**Unit III**

Structures: Basics, structures and functions, arrays of structures, pointers to structures, table lookup fields, typedef, file stack, linked list, prefix, postfix, infix, queue.

**Unit IV**

Introducing Visual basic, event driven programming, controls and events, menu system, program language, program design, forms and the controls writing and testing code, making an EXE file, logicaltesting, branching. User interface programming. Msg boxes, input box functions, scroll bars, frames, options, check boxes, menus, testing and debugging programs.

**Unit V**

Graphic object and properties for drawing, importing graphics, animation, procedures, functions forms, modules, recursive functions, multiple and startup forms, transferring, sub main, arrays, dimensions, elements and subscripts, control arrays, data file saving, data analysis, random access files, MD I forms, data manger, data controls, data aware controls.

**Reference Books**

1.Introduction to programming using Visual Basis 5.0,David Schneider, PHI
2.Programming with visual Basic 6.0, Mohammed Azam, Vikas publications.
3.ANSI C,E. Balagurusamy, Tata McGraw Hill
4.Programming in C, Gottfried, Tata McGraw.
5.Unix & C, A. Tutorial Introduction, Philip corneas,Tata McGraw.

**Paper VII Industry Based Environmental Studies**

**UNIT – 1**

Environment – Definition – Scope – Structure and function of eco system's procedures, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chain, food web and ecological pyramids - concepts of sustainable development.

**UNIT – 2**

Natural resources: Renewable – air, water, soil, land and wildlife resources. Non-renewable – mineral, coal, oil and gas. Environmental problems related to the extraction and use of natural resources.

**UNIT – 3**

Biodiversity – Definition – values – consumption use, productive social, ethical, aesthetic and option values threats to biodiversity – Hotspots of bio diversity – conservation of bio-diversity: In-situ Ex-situ. Bio-wealth – national and global level.

**UNIT – 4**

Environmental pollution : Definition – causes, effects and mitigation measures – Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution – Nuclear hazards – solid wastes acid rain – climate change and global warming environmental laws and regulations in India – Earth summit.

**UNIT – 5**

Population and environment – Population explosion – Environment and human health – HIV / AIDS – Women and child welfare – Resettlement and Rehabilitation of people, role of information technology in environmental health – Environmental awareness.