

**M.SC. I Semester**  
**Subject-Computer Science**  
**Paper I -Computers and Communication Fundamentals**

**Credit:5, Hours:60**

**Max.Marks-100(80+20)**

**Unit I-Computer Organization**

Computer Organization : Digital and analog computers, major components of a digital computer, memory addressing capability of a CPU, word length of computer, processing speed of CPU, definitions of Hardware, software and firmware. Definitions of Dumb, smart and intelligent terminals, binary system : Digital system, Binary numbers, number base conversion, octal and Hexadecimal numbers, complements, signed binary numbers, Binary codes : BCD code. Grey code, ASCII code Excess 3 code, error detecting code.

**Unit II-Computer Arithmetic**

Computer Arithmetic Binary representation of negative Integers using 2's complement and signed magnitude representation, fixed point arithmetic operations on positive and signed(negative) Integers like Addition, subtraction, multiplication, booth algorithm for multiplication and bit pair (fast) multiplication, division of positive and negative binary numbers, restoring and non storing algorithm, floating point numbers (IEEE 754 standard) and their representation, NaNs and denormalize numbers.

**Unit III-Boolean Algebra and Logic Gates**

Boolean Algebra and Logic Gates: Basic definitions, basic theorems and properties of Boolean algebra, Boolean functions, Canonical and standard forms; other logic operations, digital logic gates, integrated circuits, Gate-level Minimization: The K-map method, 3 and 4 variable K-map, product of sums simplification, sum product simplification, Don't care conditions. NAND and NOR implementations, Exclusive-or function, Introduction to 8085 microprocessor.

**Unit IV-Combinational logic**

Combinational logic : Combinational Circuits, Analysis procedure, Design procedure, Binary Half adder, Binary Full adder, Binary full subtractor, binary parallel adder, carry propagation delay and Propagation delay calculation of various digital circuits, carry look ahead generator fast adder, Decimal adder, binary multiplier, magnitude comparator, Code converters like binary to gray, BCD to excess 3, Decoders, Encoders, Multiplexers, Demultiplexers.

**Unit V-Analysis of clocked sequential circuits**

Analysis of clocked sequential circuits: State diagrams, State equations for D, JK and T Flip Flops. State reduction methods using all flip flops, Mealy and Moore Models. Shift registers-serial in serial out, serial in parallel out, parallel in serial out and parallel in parallel out. Designing of Asynchronous (Ripple) Counters, Design of Synchronous counters, Synchronous sequential logic: Sequential circuits, Latches, flip flops: SR, D, JK, T.Master Slave JK Flip Flop. Characteristics equations and Excitation tables of flip flops,.

**M.SC. I Semester**  
**Subject-Computer Science**  
**Paper II –Programming and Problem Solving through C**  
**Credit:5, Hours:60** **Max.Marks-100(80+20)**

**Unit I – Overview of Problem Solving**

Introduction to computer based problem solving, programming concepts with flowcharting and algorithms, classification of programming languages, programming environment (Assemblers, Compilers, Interpreters, Linkers and Loaders), Developing and debugging, flowcharts for programming problem.

**Unit II – Fundamentals of C Programming**

Overview of C: various constructs of a C program, coding style, data types, constants and variables, Expressions and operators. Basic Input/Output operations, formatting characters, decision making and Branching. Looping Constructs.

**Unit III – Arrays and their Applications**

Arrays (One dimensional and multidimensional arrays), String Handling, Searching and Sorting techniques, matrices operations, Storage Class : Static, External, Automatic, Register.

**Unit IV – Advanced Programming Concepts**

Structure and union, functions (standard and user defined function, parameter passing, scope rules), recursion (using recursion, conversion of recursive programs into non-recursive), Dynamic memory allocation and pointer (uses, pitfalls, pointers to various user-defined and standard data types)

**Unit V – More Advanced Programming Concepts**

Pre-processors: (define, include, macros, ifdef,.....), Introduction to file handling, advanced pointer (data structures)

Graphics- Pre-defined graphics functions: Line, Circle, ellipse.

**Text Book :**

Let us C, Yashwant Kanetkar, BPB Publications.

B. W. Kernighan & D. M. Ritchie, " The C Programming Language", Prentice Hall of India

**Reference books :**

B.W. Kernighan & D.M. Ritchie, "The C Programming Language", Prentice Hall of India.

Ashok N. Kamthane , "Programming with ANSI and Turbo C", Pearson Education

Ashok N. Kamthane et. al., Computer Programming and IT (for RTU), Pearson Education, 2011

  
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**Text Books :**

- Digital Design by M. Morris Mano. Publication: PHI Eastern economy edition (Year-2001)  
Computer Architecture By Nicholas Carter, Schaum Series Adaptation, end edition, 2011 .

**Reference books :**

- Data communications and networking By A. Forouzan Publication: TMH Third edition  
Computer Fundamentals – Architecture and Organization By B. Ram.  
Computer networks by Andrew Tanenbaum Publication: PHI Fourth edition (Year-2003)  
Computer organization and architecture by William Stallings.

**M.SC. I Semester**  
**Subject-Computer Science**  
**Paper III –Operating System**

**Credit:5, Hours:60**

**Max.Marks-100(80+20)**

**Unit I Processor Management**

Introduction: Evolution Of Operating System, Operating System Concepts, Operating System Services, System Calls, Processor Management: Concepts, Algorithms For Batch Processing, Algorithms For Time Sharing Operating Systems, Introduction To Real Time Systems, CPU Scheduling: Basic concept, scheduling criteria, Algorithms .

**Unit II Memory Management**

Concepts, Single User Memory Management, Partition Memory Allocation, Virtual Memory Management Using Paging And Segmentation Techniques, Virtual Memory Concept.

**Unit III Concurrent Processes**

Mutual Exclusion And Synchronization, Techniques Of Inter Process Communication, Deadlock Handling.

**Unit IV File Management**

A File, Operations On A File, Structure Of A File System, Free Block List, Keeping Track Of Blocks, Allocated To Directory Structure, Free Space Management, Sharing and Protection Of Files, File System Reliability, Unix File System.

**Unit V Device Management**


Device Management : Goals Of Input /Output Software Design, Structure Of Device Hardware And Software, Layers Of I/O Software, Device Drivers, Disk Driver, Disk Arm Scheduling Algorithms, Terminal Driver, Clock Driver.

**Required Text**

Operating System Concepts: Addition Wesley, 4<sup>th</sup> Edition, A. Silberschatz And P.Galvin

Modern Operating System, A.S. Tanenbaum , Prentice Hall Of India

Operating Sysrems,4<sup>th</sup> Edition , William Stallings, Pearson Education,2003.

  
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**M.SC. I Semester**  
**Subject-Computer Science**  
**Paper IV –Database Management System**

**Credit:5, Hours:60**

**Max.Marks-100(80+20)**

**Unit I**

Introduction: Advantages of DBMS approach, various views of data, data independence, schema and sub schema, primary concept of data models, database languages, transaction management, database administrator and user, data dictionary, database architectures.

ER Model: Basic concept, design issues, mapping constraints, keys, ER diagram, weak and strong entity sets. Specialization and Generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to table, domains, relation, kind of relation, relational databases, various types of keys: candidate, primary, alternate & foreign keys.

**Unit II**

Relational algebra and SQL: The structure, relational algebra with extended operations, modification of database, idea of relational calculus.

Relational database: Basic structure of SQL, set operation, aggregate functions, null values, nested sub queries, derived relations, views, modification of database, join relation, domain relation and keys, DDL in SQL. Programming concepts of PL/SQL, stored procedure, database connectivity with ODBC/JDBC. Introduction of NoSQL, SQL Versus NoSQL.

**Unit III**

Functional dependencies: Basic definitions, Trivial & non trivial dependencies, closure set of dependencies & of attributes, Irreducible set of dependencies, FD diagram.

Normalization: Introduction to Normalization, non-loss decomposition, First, Second and Third Normal Form, dependency preservation, BCNF, multi valued dependencies and Fourth Normal Form, Join dependencies and Fifth Normal Form.

Database Integrity: General idea, integrity rules, domain rules, attribute rules, assertion, triggers, integrity and SQL.

**Unit IV**

Transaction Management: Basic concept, ACID properties, transaction state, implementation of atomicity & durability, concurrent execution, basic idea of serializability. Concurrency and recovery: basic idea of concurrency control, basic idea of deadlock, failure classification, storage structure types, stable storage, implementation data access, Recovery and Atomicity: log based recovery, deferred database modification, immediate database modification, checkpoints.

**Unit V**

Storage structure: overview of physical storage media, magnetic disk: performance and optimization, RAID.

File organization: File organization, organization of records in files, basic concept of indexing, ordered indices: B+ tree & B tree index files.

**Text Book :**

“Database System concepts – Henry F. Korth, Tata McGraw Hill” 4th Edition

**Reference books :**

1. “Fundamentals of Database Systems”, Elmasri R, Navathe S, Addison Wesley 4th Ed.,
2. An introduction to database system- Bipin C. Desai
3. An introduction to Database System - C.J Date
4. SQL, PL/SQL The programming language of Oracle- Ivan Bayross



**प्राचार्य**

माता जीप्रकाश शास्त्री महाविद्यालय  
मोती टोला, इन्दौर

**M.SC. II Semester****Subject-Computer Science****Paper I – Computer Architecture and Organization****Credit:5, Hours:60****Max.Marks-100(80+20)****Unit 1**

Technological trends, measuring performance, Andahi's law. Basic structure of computer hardware: functional units and computers in computer Organization: The memory unit, the input and output subsystem, the bus structures, ALU. Program development tools: Computer, Interpreter, Assembler.

**Unit 2**

Function sets and processor organization, Instruction and interrupt cycles, instruction. Addressing modes, instruction. 8088 microprocessor: architecture, 8088 Assembly language programming.

**Unit 3**

Processing unit design: processor micro architecture 1. fundamental concepts of data path Implementation processor micro architecture 2- data path implementation, Hardwired Control unit, micro-programmed execution.

**Unit 4**


Instruction pipelining parallel processing: instruction pipelining hazard, instruction Design influence on pipelining, example of a pipelined CISF & RICS processor.

**Unit 5**

Instruction level parallelism: VLFW processors, vector processor, multithreaded Performance, extracting parallelism. Caches, information caches, unified caches. Cache implementations, multilevel caches, Virtual Memory

**Required text(s):**

Rajkamal, computer Architecture: Scahaum's outlines by Nicholes carter Adapted  
 Computer organization by Hamecher.  
 Computer organization & Arachitecture by william stallings  
 Computer Architecture & parallel processing, Hwang & Briggs, McGraw Hill.

  
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 माता जीजाबाई शास. महाविद्यालय  
 मोती तपोला, इन्डोर

**M.SC. II Semester**  
**Subject-Computer Science**  
**Paper II – Data Structure using C++**

**Credit:5, Hours:60**

**Max.Marks-100(80+20)**

**Unit I- Introduction to Data structures**

Definition of data structure and abstract data types. Static and dynamic implementations . Examples and real life applications, data structures: Arrays address calculation in a single and multi dimensional arrays, Sparse matrices.

**Unit II- Stacks, Queues and lists**

Definition, Array based implementation of Queues/Lists, Linked List based implementation of stacks, Examples: Infix, Postfix, and Prefix representation, applications: mathematical expression evaluation.

Definition: Queues & Lists: Array based implementation of Queues / Lists, Linked List implementation of Queues/Lists, Circular implementation of Queues and singly Linked Lists, Straight/circular implementation of doubly linked Queues/Lists, priority queues, applications.

**Unit III- Tress & Graphs**

Definition of tress and Binary tress, properties of Binary tress and implementation, Binary Traversal preorder, post order, inorder traversal, binary search tress, implementations, Threaded tress, balanced multi way search tress, AVI tress, implementation, Applications, definition of undirected and directed Graphs and Networks, the array based implementation of graphs, Adjacency matrix, path matrix implementation, the linked list representation of graphs, shortest path Algorithm, graph traversal, breadth first traversal, Depth first traversal.

**Unit IV- Hashing, Searching and Sorting**

Definition, Hash function, Collision Resolution techniques, Hashing Applications  
 Searching- Binary Search, Sequential Search, Sorting- Quick Sort, Bubble Sort, Selection Sort, Insertion Sort, Heap Sort, Merge Sort.

**Unit V- Running time**

Time complexity, Big-oh. Notation, running times, best case, worst case, average case, factors depends on running time, Introduction to recursion, Divide and Conquer Algorithm, Evaluating time Complexity.

**Text Book :**

Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

**Reference books :**

Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.

Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub. 1983,AW.

**M.Sc. II Semester**  
**Subject-Computer Science**  
**Paper III-Software Engineering**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**Unit I**

**Introduction to software engineering & software Processes.**

Software problem, software engineering problem, software engineering approach, Software characteristics and application, software processes and its components, characteristics of software processes, software development processes : Linear sequential model, Prototyping model, RAD model, Iterative enhancement model, spiral model, component based development, comparative study of various development models.

**Unit II**

**Project management process & project planning**

The people, product, process and project, phases of project management process, project life cycle, the W5HH principle, software configuration management process, process management process: Capability Maturity Model (CMM). Project estimation (size & cost), project scheduling, staffing and personnel planning, software configuration management plans, quality assurance plans, project monitoring plans, risk management.

**Unit III**

**Software Requirement Analysis and specification**

Software requirements, Problem analysis (structured analysis object oriented analysis), requirement specifications, Requirement Validation and verification, Metrics.

**Unit IV**

**Software design**

Design principles: Abstraction, problem partitioning and Hierarchy, modularity, Top-down and Bottom-up strategies, effective modular design: cohesion, coupling. Structured design methodology, coding principles, coding process.

**Software quality Assurance**

Quality concept, software reviews: formal and technical, formal approaches to SQA, software reliability, ISO 9000, SQA plan.

**Unit V**

**Software testing**

Software testing techniques: testing fundamental, white box testing, black box testing. Software testing strategies: a strategic approach to software testing, strategic issues, unit testing, integration testing, validation testing and system testing, Software maintenance and re-engineering.

**Text Book :**

An Integrated Approach to Software Engineering- Pankaj Jalote, Narosa Publishing House.

**Reference books :**

Software Engineering- Ian Sommerville, Pearson Education, New Delhi.

Software Engineering Concepts-Richard E. Fairly, Tata McGraw Hill Inc. New York.

Software Engineering: Principle & Practice-W. S. Jawadkar, Tata McGraw-Hill.



**M.Sc. II Semester**  
**Subject-Computer Science**  
**Paper IV-Computer Networks**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**Unit-I Introduction**

Computer network, Goals and applications, reference models, OSI and TCP/IP, A comparatively study . Network hardware, LAN, MAN and WAN and topologies, LAN components, File Servers, Workstations, Network Adapter Cards, Connection oriented and connectionless services, Switching techniques – Circuit Switching, Packet switching.

**Unit II Data Link Layer**

Design Issues : Framing error control, Error detection and correction, elementary data link protocols, sliding window protocols, data link layer in the Internet – SLIP and PPP.

**Unit III MAC Sub layer**

Multiple Access protocols : Aloha, CSMA protocols, Collision-free protocols, Ethernet cabling, Manchester Encoding, MAC sublayer protocol, Token bus : MAC sublayer protocol, Token Ring : MAC sublayer protocol, High speed LANs-Fast Ethernet, FDDI, wireless LANs, bridge.

**Unit IV Network layer**

Design issues, Routing algorithms : Optimality principle, shortest path routing, flooding, distance vector routing, multicasting routing, The network layer in the Internet : Internet protocol, Internet addressing and internet control protocol protocols.

**Unit V Transport Layer**

Services, the internet transport protocols : TCP and UDP.

**Application layer** DNS Name space, name servers, FTP, TELNET, WWW, SNMP, HTTP, SMTP, Network.

**Network Security** – Cryptography, Digital Signature

**Text Book :**

Computer Networks, Andrew S. Tanenbaum, Addison-Wesley, 4<sup>th</sup> Ed.

**Reference books :**

Data Communications and Networking, B.A. Frouzan, McGraw-Hill.

**M.Sc. III Semester**  
**Subject-Computer Science**  
**Paper II- Computer Graphics**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**UNIT-I**

**Introduction :Application of graphics**

**Display Devices:** Refresh Cathode-Ray Tubes, Raster Scan Displays, Random Scan Displays color CRT Monitors, Flat Panel Displays. Video card/ display cards.

**Input Devices:** Mouse, Trackball, Spaceball, Data Glove, Joystick, Light pen, Scanner, Digital Camera, Touch Panels, Voice Systems. **Hardcopy Devices:** Printers and Ploters

**UNIT-II**

**Graphics Primitives:**

**Line Generation Algorithms:** DDA algorithm, Bresenham's algorithm.

**Circle Generation Algorithms:** Midpoint Circle algorithm, Bresenham's circle generation algorithm. Displaying lines, characters and polygon. **Polygon filling Algorithms:** Scan Line polygon fill algorithm, Inside-Outside Tests, Boundary Fill algorithm, Flood-Fill algorithm. Fundamentals of aliasing and Anti-aliasing Technique.

**UNIT-III**

**Clipping:Clipping operations.**

Point clipping. **Line Clipping:** Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm, polygon clipping: Sutherland-Hodgeman Algorithm, Weiler Atherton Algorithm, Text clipping, Exterior clipping.

**UNIT-IV**

**Two Dimensional & Three Dimensional**

Two Dimensional Transformations: Translation, Scaling, Rotation, Shear, Homogeneous coordinate system, composite transformations, raster method of transformation. **Two Dimensional Viewing:** window to View port coordinate transformation. **Three Dimensional:** 3D Geometry, 3D display techniques, transformations. Projections: Parallel Projections, Perspective Projection.

**UNIT-V**

**Shading and color Application:**

**Visible surface Detection Methods:** Depth Buffer Method, A-Buffer Method.

**Illumination Model:** Diffuse & Specular reflection, Point source, Ambient Light, Surface pattern & texture, shadow. Halftoning. Dithering Techniques, Color Models.

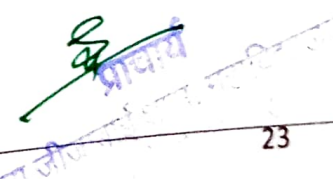
**Multimedia – Introduction, Application, multimedia data and file formats – JPEG, DIB, MPEG, Multimedia tools.**

**Text books:**

Donald Hearn and M. Pauline Baker, Computer Graphics, Second Edition, Tata McGraw Hill, 1997.

Donald Hearn and M. Pauline Baker, Computer Graphics, Second Edition, Tata McGraw Hill, 1996.

William M. Newman, Principles of Interactive Computer Graphics, Second Edition, Tata McGraw Hill, 1978.



**M.Sc. III Semester**  
**Subject-Computer Science**  
**Paper III- Object Oriented Programming using Java**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**Unit I-Introduction to Java:**

Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables & Arrays, Naming Conventions, Type conversion & casting, Operators, Control Statements, Selection Statements, iteration Statements, Jump Statements. **String handling:** The String constructors, String operators character extraction, string comparison, String Buffer.

**Unit II-Introducing class:**

Class fundamentals, Declaring objects, Introducing methods, Constructors, Garbage collection, Overloading methods, Parameter passing, Nested and Inner class.

**Inheritance:** Basic, Using super, Method overriding, Dynamic method Dispatch, Abstract classes, The object class.

**Unit III-Packages and Interfaces:**

Defining a package, Understanding CLASSPATH, Access protection, Importing packages, defining and interface, Achieving multiple inheritance through interfaces, Variables in Interfaces.

**Exception Handling:** Exception handling fundamentals, Exception types, Using try and catch, Multiple catch and nested try, Throws and finally, Creating own exception classes, chained exception.

**Multithreading:** What are threads, The java thread model, thread priorities, thread life cycle, Creating thread, Creating multiple threads, thread groups, synchronization, Inter-Thread communication, **Monitor and Monitor Lock.**

**Unit IV-Streams and Files:**

Files and Streams **Introduction to Swing:** Overview of swing components, Event Handling, Layout managers **Applets:** Applet basics, Applet Architecture, Applet skeleton, Applet HTML Tag and attributes, Passing parameters to Applets. Executing Applet in web browser and in applet viewer.

**Unit V-Database Connectivity:**

JDBC, The design of JDBC, Typical uses of JDBC, The structured query language, Basic JDBC Programming concepts, Executing Queries. Introduction to Generic and Collection API.

**Text books:**

Deitel & Deitel, JAVA How to program, 6<sup>th</sup> Edition, Pearson Education.

Herbert Schildt, The Complete Reference JAVA 2, 4<sup>th</sup> Edition, Tata McGraw-Hill.

John Hubbard, Schaums Easy outline: Programming in Java.

JAVA 2 Black Book.

Bruce Eckel, Thinking in java by Bruce Eckel, Prentice Hall.

Gray cornell, Cay Horstmann, Core Java 1.2: Volume I Fundamentals by Gary Cornell,

Java Series, The Sun Microsystems Press Java Series.

Janson Hunter with William Crawford Java Servlet Programming, O Reilly.



**M.Sc. III Semester**  
**Subject-Computer Science**  
**Paper IV- PHP Programming**

Max. Marks- 100(80+20)

Unit: 5, Hours: 60

### Unit I

Introduction to PHP, History of PHP, Versions of PHP, Features of PHP, Advantages of PHP over other scripting languages, Installation and configuration of PHP, Data types in PHP, PHP syntax, comments, PHP variables and constants, scope of variables, PHP string, string manipulation, PHP operators, Precedence of operators, Expressions, creating a PHP script, Running a PHP script, Basic HTML, Embedding PHP in HTML, accessing information between pages, PHP \$\_GET, PHP \$\_POST, Static Variables.

### Unit II

PHP conditional statements, PHP looping statements, Break, Continue, Exit, PHP Functions: Built-in and User Defined function, Regular Expression functions, Mathematical, Date and time functions, PHP Arrays: Creating Array and Accessing array elements, Associative Array, PHP file permissions, Working with files: opening, closing, reading, writing a file; Working with directory: creating, deleting changing a directory.

### Unit III

Working with forms & Databases: Introduction to a web form, processing a web form, validating a web form, PHP-supported Databases; Using PHP & MY SQL: Installation and configuration of My SQL on Windows, Checking configuration, connecting to database, selecting a database, adding table and altering table in a database, inserting, deleting and modifying data in a table, retrieving data, performing queries, processing-result sets.

### Unit IV

Input validation, PHP with client side scripting language, exception and error handling in PHP, Cookies and Session Handling.

### Unit V

Code Re-use, requires(), include(), and the include\_path, file system functions and file input and output, file uploads, use of CSS, introduction to Object Oriented Programming with PHP, installing and configuring Apache to use PHP on Windows, php.ini file, Introduction to Ajax

Text and Reference Book:

1. PHP & My SQL by Vikram Vaswani, TMH Publications
2. PHP Essentials, by Julie C. Melroni, BPB Publications
3. PHP 5 and My SQL Bible, by Tin Converse and Joyce Park, Wiley-Dream Tech India Publications.
4. Web Technologies, Black Book, Dream Tech Press,
5. Atkinson, Leon, Core PHP Programming, New York: Prentice Hall
6. Learning PHP 5, By David Sklar Publihsr: BPB
7. Exper PHP and My SQL, Wrox programmer to programmer, Wrox press 2010
8. PHP for Absolute beigneers, Apress, 209
9. Sams Teach yourself CSS in 24 Hours (2<sup>nd</sup> Edition), Sams Publishing, 2006
10. <http://www.phpbuilder.com>
11. <http://php.faqts.com>

**M.Sc. IV Semester**  
**Subject-Computer Science**  
**Paper I- Unix / Linux Administration**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**Unit I**

Background : Evaluation Of Unix OS , Implementations. Features Of Unix Operating System.

Linux Operating System: Development Of Linux, Applications Of Linux Operating System.

**Unit II**

Basic Unix Environment: Basic Commands, Directory Management, Pipes, Tee, I/O Definition And Other Utilities.

Advanced Commands: File System And Process Management Commands, Shell. Pattern Matching, Navigating The File System.

**Unit III**

Unix Editor: Vi Editor, Creating New Files , Text Addition, Deletion And Changes, Dealing With Sentences And Paragraphs, Searching, Cut, Paste And Copy, Running C/C++ Programs.

**Unit IV**

~~Advance Shell Programming: Command Line Arguments. Interactive Shell Scripts.~~

~~Debugging Of Shell Scripts. Communication Facilities In Unix~~

~~Structure Of Unix Operating System: Structure Of Unix Kernel, Unix System Calls.~~

**Unit V**

Unix System: File System Calls, Process Management Calls

Advance Filter : Awk Number Processing, Interface With Shell Function.

Network management in Unix, Performance analysis of Unix desktop.

**Text Book :**

UNIX Operating Systems: Sumitabh Das, Tata McGraw Hills publication.

**Reference books :**

UNIX System Administration Handbook( Second edition): Evi Nemeth, Garth Synder, Scott Seebass, Trent R Hein, Pearson Education - Asia, 2000.

C: Design of UNIX Operating System: Maurice J. Back, Pearson Education - Asia.

*Dr.*  
 प्रमुख  
 माता जीवाबाई शास्त्री महारिचयण  
 विद्यापीठ

**M.Sc. IV Semester**  
**Subject-Computer Science**  
**Paper II- Programming with Visual Basic .Net**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**Unit I**

introduction to .NET, .NET Framework features & architecture, CLR, Common type system, MSIL, Assemblies: types of assemblies, class libraries.  
 introduction to visual studio, project basics, types of project in .net, IDE of vb.net-menu bar, toolbar, project explorer, toolbox, properties window, form designer, form layout, immediate window.  
 event driven programming-methods and events related with mouse and keyboard.

**Unit II**

the vb.net language-console programming, declaring variables .data types, scope & lifetime of a variable, arrays, types of array, control array subroutine, functions, passing argument to functions, optional argument, returning value from function.  
 control flow statements: decisions and conditional statement, loop statement exceptions.  
 working with forms: creating forms, building user interface web forms, loading, showing and hiding forms, working with multiple forms, controlling one form within another.

**Unit III**

gui programming with windows form: vb.net controls, text box control, label control, button control, listbox, combo box, checked box, picture box, radio button, panel, scroll bar, timer control, their properties, methods and events, adding controls at runtime.  
 dialog boxes-common dialog control: file, save, print, help.  
 designing menus: creating menu and menu items, access & shortcut keys.  
 MDI forms: properties of parent & child form, working with parent and child menus.

**Unit IV**

object oriented programming : classes & namespaces, objects, data members, properties, methods, raising and handling events, constructors, inheritance, access specifiers : public private, protected, overloading, overriding, creating interfaces, multiple interfaces, my base & my class keywords.  
 Concept of ole the com technology, advantages of com+, com & .net, create user control, register user control, access com component in .net application. deployment of .net application, **shared variables, methods**, static variable.

**Unit V**

accessing database with ado.net (visually): create connection with server explorer, creating data connection using data connection, command, adapter, dataset and data reader controls.  
 data binding with data grid and basic controls. the data from wizard. accessing database using ADO.net object model (through code): create connection object, command object, data adapter object, dataset object. add, delete, move & update records to dataset.  
 executing sql query, operation on data rows and columns.



**M.Sc. IV Semester**  
**Subject-Computer Science**  
**Paper III- Software Testing and Project Management**

**Unit: 5, Hours: 60**

**Max. Marks- 100(80+20)**

**Unit-I**

**Testing Basics and development Models:** principals and context of Testing In Software Production, Software Quality Control and its Relation With Testing, Validating and Verification.

**Unit-II**

**Black Box Testing-** positive and negative Testing, Boundary Value Testing, Equivalence Partitioning, User Documentation Testing: Introduction and types of Integration Testing Scenario Testing, System and Acceptance –Acceptance Testing.

**UNIT-III**

**Performance Testing-** Introduction Factor related to Performance Testing, Methodology For Performing Testing, Regression Testing, Overview Testing Tools :Win runner ,Load runner Test Director, **Introduction to Selenium testing tool.**

**UNIT-IV**

**Software Project Management:** Overview, Software Project Management Framework, Problem in Software Projects. Scope Management, Communication Techniques and Tools. Required Specifications, Resource types for a Software Projects.

**UNIT-V**

**Software Project Estimation:** Work Breakdown Structure(WBS), Steps in WBS, Measuring efforts for a Project, Project Scheduling: Scheduling and its Need, Scheduling Basics; Gantt Chart.

**TEXT& REFERENCE BOOKS:**

Software testing: principles and practise by bgopalswamy and sriniuasan, 81775812 lx. Publisher, pearson education india. Isbn, 81775812 lx.

Software testing tools: covering win runner, skil test, load runner, jmeter and testdirector with case by dr.k.v.k.k.

<http://www.columbia.edu/~jm2217/>

Basic of software project management by niit, prenticehall ofIndia, isbn 81-2032490-0

Software project management by bob hughes & mike cotterell, tata mcgraw hill, isbn 0-07-061 985-9

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**प्राचार्य**

महाराष्ट्र शासन, महाविद्यालय  
 मराठवाडा, अहमदनगर

**M.Sc. IV Semester**  
**Subject-Computer Science**  
**Paper IV- Compiler Design**

Max. Marks- 100(80+20)

**Unit: 5, Hours: 60**

**Unit I**

Translators, interpreters, assemblers, compilers, Model of a compiler: Analysis of source program, The phases of a compiler, Cousins of the Compilers.

**Unit II**

Finite automata, non-deterministic and deterministic finite automata, Acceptance of strings by NFA and DFA, Transforming NFA to DFA.

Minimization/Optimization of a DFA, related algorithm, Regular sets and regular expression. Obtaining regular expression from finite automata, Lexical analyzer design, The role of Lexical Analyzer, Input Buffering, Specification of tokens, and Recognition of tokens.

**Unit III**

Syntax analysis, CFG, derivation of a parse tree, reduction of grammar, useless grammar symbols, Elimination of null and unit productions.

Elimination of left recursion Regular grammar, Right linear and left linear grammar, Parsing, Top-Down and Bottom Up parsing, general parsing strategies. Brute force approach, recursive descent parser and algorithms.

**Unit IV**

Simple LL(1) grammar, LL(1) with null and without null rules grammars, Bottom-up parsing – Handle of a right sentential form, Shift - reduce parsers, Operator precedence parsing, LR,SLR, Canonical LR and LALR grammar and parsers.

Symbol table contents, organization for non – block structured language – unordered, ordered and tree – structured and hash symbol tables.

**Unit V**

Organization for block structured languages – stack symbols table Stack implemented tree structured stack implemented hash structured symbol tables.

Specification of translations, implementation of translation specified by syntax – directed definition, L- attributed definitions, and syntax – directed translation schemes.

**Text Book :**

Aho-Ullman, Principles of compiler Design, Narosa Publishing House.  
 Compiler Design by O. G. Kakde.

**Reference books :**

Aho-Ullman, Compilers: Principles Techniques & Tools, Addison Wesley.  
 Dhamdhare, Compiler Construction.

*(Signature)*  
 प्राचार्य  
 माता जीवाबाई साठे महाविद्यालय  
 माली रोड, मुंबई