

**Table - 7: Common Course Structure for PG Degree
Programme in Science – M.C.A
(With effect from the academic year 2017-2018 onwards)**

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title	Contact Hrs./ Week (5)	Credits (6)
I	1	Core - 1	MFCS-I	5	4
	2	Core - 2	Programming in C	5	4
	3	Core - 3	Computer system Architecture	4	4
	4	Core - 4	Fundamentals of Information Technology	4	4
	5	Core - 5	Web Technology	4	4
	6	Core - 6 Practical - 1	Programming in C Lab	4	2
	7	Core - 7 Practical - 2	MS office and Internet Programming Lab	4	2
	Subtotal				30
II	8	Core - 8	MFCS-II	5	4
	9	Core - 9	Object Oriented programming Using C++	5	4
	10	Core - 10	Data Structures and algorithms using C++	4	4
	11	Core - 11	Operating Systems	4	4
	12	Core - 12	Software Engineering	4	4
	13	Core - 13 Practical - 3	Object Oriented Programming using C++ Lab	4	2
	14	Core - 14 Practical - 4	Data Structures and algorithms using C++ Lab	4	2
	Subtotal				30

Sem.	Sub. No.	Subject Status	Subject Title	Contact Hrs./ Week	Credits
(1)	(2)	(3)	(4)	(5)	(6)
III	15	Core - 15	Financial Management and Accounting	5	4
	16	Core - 16	Computer Graphics and Multimedia	5	4
	17	Core - 17	Advanced Java Programming	4	4
	18	Core - 18	Object Oriented Analysis Design using UML	4	4
	19	Core - 19	Microprocessor and its Applications	4	4
	20	Core - 20 Practical - 5	Graphics and Multimedia Lab	4	2
	21	Core - 21 Practical - 6	Advanced Java Programming Lab	4	2
Subtotal				30	24
IV	22	Core - 22	Open Source Technology	5	4
	23	Core - 23	RDBMS	5	4
	24	Core - 24	Mobile computing	4	4
	25	Core - 25	Principles of Compiler Design	4	4
	26	Elective - 1		4	3
	27	Core - 26 Practical - 7	Open Source Technology Lab	4	2
	28	Core - 27 Practical - 8	RDBMS Lab	4	2
Subtotal				30	23

Sem.	Sub. No.	Subject status	Subject Title	Contact Hrs./ Week	Credits
(1)	(2)	(3)	(4)	(5)	(6)
V	29	Core - 28	.NET Programming	4	4
	30	Core - 29	Cloud Computing	4	4
	31	Core - 30	Data Communication & Networks	4	4
	32	Core - 31	Research Methodology	4	4
	33	Core - 32	E-Commerce	4	4
	34	Elective - 2		3	3
	35	Core - 33	Mini Project	7+5*	6
Subtotal				30	29
VI	36	Core - 34	Major Project	30+2*	16
	Subtotal				30
Total				180	140

* Extra hours for Project

For the Project, flexible credits are b/w 5 – 8 &

Hours per week are b/w 10 - 16

Total number of credits ≥ 90 : 140

Total number of Core Courses : 34 (24 T + 8 P + 2 Prj.)

Total number of Elective Courses : 2

Total hours : 180

1.ELECTIVE 1: (IV Semester) - Select any one

1. Data Mining
2. Professional Ethics
3. Soft Computing
4. Bio - Metrics
5. Theory of computation

2.ELECTIVE 2: (V Semester) - Select any one

1. Digital Image Processing
2. Embedded Systems
3. Security in Computing
4. Big Data Analytics

SEMESTER – I

CORE SUBJECT – 1

MFCS-1

L T P C

4 0 0 4

UNIT - I

Logic – Statement – Proposition and its types Negation, Disjunction, Conjunction and connectives – Truth Table construction – Tautology and contradictions – bi-conditional propositions – Logical equivalence – Logical implications – Principle disjunctive and conjunctive normal forms.

14

UNIT – II

Set theory and relations: Basic operations on sets – power set – Properties of set operations – Properties of subsets – Basic set identities – Functions – Inverse functions – composition of functions – Relations on sets – properties of relations – Equivalence relations.

11

UNIT – III

Algebraic structures : Algebraic systems – Properties – Semi Groups – Monoids – Homomorphisms – Cosets – Lagrang's theorem.

12

UNIT – IV

Matrices, Rank of Matrices, solving system of equations-Eigen values and Eigen vectors- Inverse of a matrix- Caylay Hamilton Theorem.

13

UNIT – V

Graph theory: Definition – Connectedness – path – cycle – components – Matrix representation of graphs – Trees and basic properties – Rooted and binary trees – spanning trees.

10

TOTAL: 60 PERIODS

Reference Books:

- 1 *J.P. Tremblay and R. Manokar, Discrete Mathematical Structures with Applications to computer science, Tata McGraw Hill Publications.*
- 2 *N. Candrasekaran & M. Umavathi, Discrete Mathematics PHI, 2010*
- 3 *NarasimhaDeo, Graph Theory and its Applications. Tata McGraw Hill Publications.*

- 4 *Kenneth H. Rosen, Discrete Mathematics and its Applications. Tata McGraw Hill Publications.*
- 5 *Brikhoff and Barte, Modern Applied Algebra, John – Wiley Ltd.*

CORE SUBJECT - 2 PROGRAMMING IN C

L T P C

4 0 0 4

UNIT – I INTRODUCTION TO COMPUTER PROBLEM SOLVING

Introduction – The problem Solving aspect – Top down design – Implementation of algorithm – Program Verification – The efficiency of algorithm – The analysis of algorithm.

14

UNIT – II - PROGRAMMING, ALGORITHMS AND FLOWCHARTS

Programs and Programming – building blocks for simple programs – Programming life cycle phases – pseudo code representation – flow charts – Algorithm – Programming Languages – compiler – Interpreter, Loader and Linker – Program execution – Classification of Programming Language – Structured Programming Concept.

11

UNIT - III - BASICS OF ‘C’ INPUT/OUTPUT & CONTROL STATEMENTS

Introduction – Identifier – keywords – variables – constants – I/O statements – Operators – Initialization – Expressions – Expression Evaluation – L Values and R Values – Type Conversion in C – Formatted input and output functions – Specifying Test Condition for Selection and Iteration – Conditional Execution – and Selection – Iteration and Repetitive Execution – go to Statement – Nested Loops – Continue and break Statements.

12

UNIT - IV - ARRAYS, STRINGS, FUNCTIONS AND POINTERS

Array – One dimensional Character Arrays – Multidimensional Arrays – Arrays of Strings – Two dimensional character array – functions – parameter passing mechanism scope – storage classes – recursion – comparing iteration and recursion – pointer – pointer operators – uses of pointers – arrays and pointers – pointers and strings – pointer indirection – pointers to functions – Dynamic memory allocation.

13

UNIT - V - USER –DEFINED DATA TYPES AND FILES

Structures – initialization – nested structures – structures and arrays – structures and pointers – union – type def and enumeration types – bit fields – File

Management in C – Files and Streams – File handling functions – Sequential access file – Random access file – Command line arguments. **10**

TOTAL: 60 PERIODS

Reference Books:

- 1 *How to solve it by computer, R.G. Dromey, Pearson education, fifth edition, 2007.*
- 2 *PradipDey, ManasGhosh, “Fundamentals of Computing and Programming in C”, First Edition, Oxford University Press, 2009.*
- 3 *Kamthane, A.N., “Programming with ANSI and Turbo C”, Pearson Education, Delhi, 2006.*
- 4 *Deitel and Deitel, “C How to Program”, Pearson Education 2010, 6th Edition.*
- 5 *Brain W. Kernighan and Dennis M.Ritchie, “The C Programming Language”, 2006, Prentice – Hall.*
- 6 *YashavantKanetkar, “Understanding Pointer in C” 4th Revised and Updated Edition, 2008, BpbPublicaitons.*
- 7 *Cormen, Leiserson, Rivest, Stein, “Introduction to Algorithms”, MCGraw Hill, Publishers, 2002.*
- 8 *ReemaThareja, “Programming in C”, Oxford University Press, 2011.*

CORE SUBJECT – 3
COMPUTER SYSTEM ARCHITECTURE

L T P C

4 0 0 4

UNIT – I - NUMBER SYSTEMS

Binary, Decimal, Octal and Hexadecimal – Conversion from one to another – Complements – Binary Codes. Basic Logic Gates – Basic Theorems and Properties of Boolean algebra NAND, NOR – Implementation – Sum of products – product of Sums – Karnaugh map – Tabulation Method – Don't Care Conditions.

14

UNIT – II - COMBINATIONAL LOGIC CIRCUITS DESIGN

Multiplexers – Demultiplexers – Decoders – Encoders – Half Adder – Full Adder – Subtractor – Parallel Adders. Flip – Flops : RS, D, JK Flip-flops – Registers – Shift Registers – Ripple Counters – Synchronous counters.

11

UNIT – III - REGISTER TRANSFER AND MICRO OPERATIONS

Arithmetic circuits – Logic Circuit – Shift Circuits – Arithmetic Logic shift unit – Stack organization – Instruction formats – Addressing modes – Data transfer, Manipulation and program control instructions.

12

UNIT – IV - INPUT – OUTPUT ORGANIZATION

Peripheral Devices – Input – Output Interface Asynchronous Data Transfer (Strobe & Handshaking Method) – Methods of Transfer – Priority interrupt – DMA – IOP.

13

UNIT – V - MEMORY ORGANIZATION

Memory Hierarchy – Main memory – Auxiliary memory – Associative memory – Cache Memory – Virtual memory.

10

TOTAL: 60 PERIODS

Reference Books:

- 1 *Morris Mano, "Digital Logic and Computer Design", PHI.*
- 2 *Morris Mano, "Computer System Architecture", Third Edition, Pearson education.*
- 3 *Albert Paul Malvino, Donald P. Leach, "Digital Principles and applications", Tata MC Graw Hill Pub., Company Ltd.*
- 4 *V. Rajaraman & T. Radhakrishnan Computer Organization & Architecture FHI New Delhi, 2009.*
- 5 *Ananda Natarajan-Digital Design, PHI Learning P LTD, Delhi. 2015*

CORE SUBJECT – 4
FUNDAMENTALS OF INFORMATION
TECHNOLOGY L T P C

4 0 0 4

UNIT I - COMPUTER BASICS

Algorithms – A simple Model of a Computer – Characteristics of Computers – Problem Solving using Computers.

Input/ Output Units: Description of Computer Input Units - Other Input Methods – Computer Output Units.

Computer Generations and Classification : 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. **14**

UNIT II - COMPUTER MEMORY

Memory Cell – Memory Organization – Read Only Memory – Serial Access Memory – Physical Devices Used to Construct Memories – Magnetic Hard Disk – Floppy Disk Drives – Compact Disk Read Only Memory – Magnetic Tape Drive.

Programming Languages: Why Programming Language – Assembly language – Higher Level Programming Languages – Compiling High Level Language program – Some High Level Languages.

11

UNIT III - MICROCOMPUTERS

An Ideal Microcomputer – An Actual Microcomputer – Memory Systems for Microcomputers – A Minimum Microcomputer configuration – Evolution of Microcomputers – Special Purpose Microprocessors – Special Purpose Microcomputer Software – Special Purpose Applications of Microcomputers – Smart Cards and RFID.

The Computer System Hardware : Introduction – Central Processing Unit – Memory Unit – Instruction Format – Instruction Set – Instruction Cycle – Microprocessor – Interconnecting the Units of a Computer – Performance of a Computer – Inside a Computer Cabinet. **12**

UNIT IV - INTERACTION OF USER AND COMPUTER

Introduction – Types of Software – System Software – Application Software – Software Acquisition.

Computer Programming Fundamentals: Introduction – Program Development Life Cycle – Algorithm – Control Structures – Flowchart – Pseudo Code – Programming Paradigms. **13**

UNIT V - INFORMATION SYSTEMS

Introduction – Data, Information and Knowledge – Characteristics of Information – Information system – Computer-Based Information System – Need for Efficient Information System – Categories of Information System – Operations Support System – Management Support System – Specialized Information system – Careers in Information Systems.

Emerging Computing Environments: Current Computing Scenario – Peer to Peer Computing – Grid Computing – Cloud Computing – Utility computing.
10

TOTAL: 60 PERIODS

Reference Books:

- 1 *Fundamentals of Computers by V.Rajaraman, Fifth Edition, 2011. PHI Learning Private Limited.*
- 2 *Computer Fundamentals by Anita Goel, 2010. Pearson.*

CORE SUBJECT – 5

WEB TECHNOLOGY

L T P C

4 0 0 4

UNIT-I

Internet : History and evolution of Internet -Internet & intranet –Internet Services and Accessibility-Uses of the Internet-Protocols-Web Concepts-Data retrieval from the web-Web Browsing-Internet Standards.
14

UNIT-II

Internet Security & HTML: Overview of internet security- access security-transaction security- security zones-digital IDS-Introduction to firewalls-web page design : static and dynamic web pages-introduction to HTML-HTML elements and tags- formatting with HTML tags- physical, logical HTML styles - setting fonts -colors and headings-displaying Plain.
11

UNIT-III

ADVANCE HTML: Working with images-links and lists -creating tables.-working with frames-creating horizontal, vertical frames, named frames-opening new browser window-creating html forms-Adding controls on forms, submitting data from forms- working with multimedia- multimedia sound- video-3D,Using multimedia files-Style sheets: types, creating and, using style sheets.
12

UNIT-IV

Java script & XML: introduction to client and server side scripting- introduction to Java script-data types-operators-conditional statement- loops in Java script, functions- arrays, objects and elements in Java script- form validation using Java script- Introduction to XML- Creating XML documents-specifying attributes in DTDs- accessing XML data with XML Data Island- documents- Handling events while loading XML documents.
13

UNIT-V

Servlets: advantages of Servlets over CGI-The Servlet Life Cycle- Handling HTTP GET and POST Requests- **JAVA SERVER PAGES**:Advantages of JSP-Components of JSP.**ACTIVE SERVER PAGES**: Advantages of using ASP-ASP Cookies-ASP objects.
10

TOTAL: 60 PERIODS

Textbook:

1. *Web Technology : A Developer's Perspective*, N.P.Gopalan and J.Akilandeswari, PHI Learning, 2014

Reference Books:

1. *Web Technology and Design*, C Xavier, New Age International

CORE SUBJECT – 6

PRACTICAL - 1

PROGRAMMING IN C LAB

L T P C

(PROGRAMS INCLUDE BUT NOT LIMITED TO)

0 1 4 2

- 1.Find the area of the Triangle
- 2.To Solve the possible roots of the quadratic equation
- 3.To arrange a List of numbers in Descending order
- 4.To Find Ncr Value using Functions
- 5.To Check given string is palindrome or not
- 6.To find Transpose of a Matrix
- 7.To Multiply two matrices
- 8.To Prepare a Mark list
- 9.To sort a List of names in alphabetical Order
- 10.To print a Pascal Triangle
- 11.File Program
- 12.Pointer Program
- 13.Fibonacci using Recursion
- 14.Program using preprocessor
- 15.Program using Arrays & Strings

CORE SUBJECT – 7

PRACTICAL - 2

MS OFFICE AND INTERNET PROGRAMMING LAB

L T P C

PROGRAMS INCLUDE BUT NOT LIMITED TO)

0 1 4 2

MS – WORD:

1. Create an Invitation
2. Mail Merge

MS – EXCEL:

- 3 .Mark sheet preparation
4. Pay Roll
5. Sales detail

MS – ACCESS:

6. Mark List
7. Salary Data Base with Query
8. Create Student Database with suitable query

MS – POWER POINT:

9. Power Point Presentation
10. Create slide Show for student personality
11. Create Presentation with Animation

HTML:

12. Image and List
13. Time Table
14. Forms
15. Frames

JAVASCRIPT:

- 16 . Name and password
17. Date and time
18. Display the current day

SEMESTER – II
CORE SUBJECT – 8
MFCS – II

L T P C

4 0 0 4

UNIT- I

OR methodology – Modeling through OR methodology – History of OR – Linear Programming – Problem formulation – Graphical method – Simplex method – Big M Method. **14**

UNIT- II

Transportation Problem – Formulation – Methods to find initial basic feasible solutions – North West corner rule – Least Cost Method – Penalty method – Modi method to find optional solution – Degeneracy – Unbalanced transportation. **11**

UNIT- III

Assignment problem: Formulation – Hungarian method – Unbalanced assignment problem Travelling salesman problem. **12**

UNIT- IV

Game theory Two person – zero sum game – saddle points and value of the game – Games without saddle points – Mixed strategies – Algebraic method for 2×2 method to $2 \times n$ and $n \times 2$ game – method of domination. **13**

UNIT- V

Roots of algebraic and transcendental equations: Bisection method – Newton Raphson Method – Numerical Interpolation - Newton formula – Lagrange's interpolation. **10**

TOTAL: 60 PERIODS

Reference Books:

- 1 *KantiSwarup, Gupta, P.K. and Man Mohan, Operations Research, Sultan Chand & Sons.*
- 2 *Sundaresan, K.S. Ganapathy Subramanian, K. Ganeson, "Operations Research", A.R. Publications.*
- 3 *R. Panneerselvam Operations Research PHI, New Delhi, 2011.*
- 4 *S.S.Sastry, "Introductory Numerical Analysis" Prentice Hall of India (4th Edition)*
- 5 *M.K. Venkatraman, "Numerical Methods in Science and Engineering" National Publishing Company, 5th Edition.*

CORE SUBJECT – 9
OBJECT ORIENTED PROGRAMMING USING C++

L T P C

4 0 0 4

UNIT- I

Principles of Object-oriented Programming: Software Evolution – A look at Procedure-Oriented Programming – Object-Oriented Programming Paradigm – Basic concepts of object-Oriented Programming – Benefits of OOP – Object-Oriented Languages- Applications of OOP

Beginning with C++: What is C++? – Applications of C++ - A simple C++ Program – More C++ statements – An example with Class- Structure of C++ Program – User Defined Data Types – Derived Data Types – Reference Variables – Operators in C++ - Scope Resolution Operator – Member De referencing Operators – Memory Management Operators – Manipulators – Type Cast Operators. **14**

UNIT- II

Functions in C++: Introduction – The Main Function – Function prototyping – Call by Reference – Return by reference – Inline Functions - Default Arguments – const Arguments – Function Overloading – Math Library Functions

Classes and Objects: Introduction - C Structure Revisited – Specifying a Class – Defining Member Function-A C++ Program with Class -Making an outside Function Inline –Nesting of Member Function – Private member functions- Arrays with in a class – Memory allocation for objects – Static Data Members – Static Member Functions, Arrays of objects – Objects as Function arguments – Friendly Functions – Returning Objects - const Member Functions – Pointers to Members – Local Classes. **11**

UNIT- III

Constructors and Destructors : Introduction – Constructors – Parameterized constructors – multiple constructors in a class – Constructors with Default arguments – Dynamic Initialization of Objects- Copy Constructors – Dynamic Constructors – Constructing two dimensional Arrays – const objects – Destructors.

Operator Overloading and Type Conversion:

Introduction – Defining Operator Overloading – Overloading unary operators – Overloading Binary Operators – Overloading binary operators using Friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions. **12**

UNIT- IV

Inheritance: Extending Classes: Introduction – Defining Derived Classes – Single inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance

– Virtual Base Classes -Abstract Classes – Constructors in Derived Classes – Member Classes –Nesting of Classes

Pointers, Virtual Functions and Polymorphism: Introduction – pointers – pointers to objects – this Pointer- Pointers to Derived classes – Virtual Functions – Pure Virtual Functions.

13

UNIT- V

Managing Console I/O Operations: Introduction - C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operation – Managing output with Manipulators

Working with Files : Introduction – Classes for File Stream Operators – Opening and closing a File – Detecting end-of-file - More about open() File Modes _ File Pointers and their Manipulators – Sequential Input and Output Operations = Updating a File Random Access – Error Handling during File Operations – Command –Line Arguments.

10

TOTAL: 60 PERIODS

Reference Books:

1. Object Oriented Programming C++ Third Edition – E Balagurusamy, Tata McGraw-Hill Publishing Company Limited
2. *Complete Reference C++ - Herbert Schildt, Fourth Edition, Tata McGraw-Hill Publishing Company Limited*
3. *Object Oriented Programming with ANSI and Turbo C++ - Ashok N. Kamthane, Pearson Edition*
4. *C++ How to Program – Deitel, Fifth Edition Prentice Hall of India*
5. *Programming with C++ - D.Ravichandran, Second Edition, Tata McGraw-Hill Publishing Company Limited.*

CORE SUBJECT – 10
DATA STRUCTURE AND ALGORITHMS USING C++

L T P C

4 0 0 4

UNIT -I

Program performance: Introduction – Space Complexity – Time Complexity – Asymptotic Notations – Practical Complexities.

Arrays: One Dimensional Array – Multidimensional Arrays – Pointer Arrays, Linked Lists, Singly Linked List – Circular Linked List – Doubly Linked List, Application of Linked Lists (Polynomial Representation).

14

UNIT- II

Stacks: Representations of stack (Array and Linked List) – Operations on Stacks Applications of Stacks (Parenthesis matching, Tower of Hanoi).

Queues: Representations of Queues (Array and Linked List) – Circular Queues.

11

UNIT- III

Trees: Basic Terminologies – Definition and Concepts (Binary Trees and Properties of Binary Tree) – Representation of Binary Tree (Linear, Linked representation, Physical Implementation of Binary Tree in Memory) – Operations on Binary Tree – Types of Binary Trees (Expression Tree & Binary Search Tree).

12

UNIT -IV

Graphs: Graph Terminologies – Representation of Graphs – Graph search methods – Breadth first search, Depth first search – Application of Graph structures (Shortest Path Preterm Minimum Spanning Trees, Connected Graphs and components).

13

UNIT- V

Algorithm – Design Methods: The Greedy Method – Divide and Conquer Method – Dynamic Programming Back Tracking – Branch and bound Applications: The greedy method (container loading) Divide and conquer method (Merge Sort) – (0/1 Knapsack problem) Backtracking (Travelling Sales Person).

10

TOTAL: 60 PERIODS

Reference Books:

- 1 *Data Structures, Algorithms and Applications in C++, SartajSahni – Universites press pvt. Ltd. 2005.*
- 2 *Classic Data Structures – D.Samantha – Prentice Hall of India Pvt. Ltd. 2011.*
- 3 *Data Structures with C++, Varsha H. Patil Oxford University Press, 2012.*
- 4 *Data Structures & Algorithm Analysis in C++ Mark Allen Weiss, Pearson Blussion 2002.*

**CORE SUBJECT – 11
OPERATING SYSTEMS**

L T P C

4 0 0 4

UNIT I - INTRODUCTION

Introduction - Types of operating systems – operating systems structures – system components – operating systems services – System calls – Systems programs – Processes – process concept – process scheduling – operation on processes – co-operating processes – Inter process communications – CPU Scheduling – Scheduling criteria – Scheduling algorithms – Multiple – process Scheduling.

14

UNIT II - PROCESS SYNCHRONIZATION

Process Synchronization – Critical section problem – Semaphores – Classical problems of synchronization – critical regions – Monitors – Deadlock characterization – Deadlock handling – Deadlock Prevention – Deadlock avoidance – Deadlock Detection – Deadlock Recovery – Threads Multithreading Models.

11

UNIT III - MEMORY MANAGEMENT

Memory Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Virtual Memory – Demand Paging – Page Replacement – Thrashing.

12

UNIT IV - DISK SCHEDULING AND DISTRIBUTED SYSTEMS

Disk Structures – Disk Scheduling – File systems Interface – File concepts – Access methods – Directory Disk Structures – Disk Scheduling – File Systems structures – Directory Implementation – Allocation Methods – Free Space management – Distributed File systems – Naming and Transparency – Remote File Accesses – Stateful Versus Stateless Service – File replication.

13

UNIT V - CASE STUDIES

Linux System – design Principles – process management – File Systems – Windows Vista – Systems Structures – Process management – memory management – Android OS-Virtual machine OS.

10

TOTAL: 60 PERIODS

Reference Books:

- 1 *Abraham Silberschalz Peter B Galvin, G. Gagne, “Operating Systems Concepts”, Seventh Edition, Addison Wesley Publishing Co. 2010.*
- 2 *Andrew S. Tanenbaum, “Modern operating Systems”, Third Edition, PHI Learning Pvt. Ltd., 2008.*
- 3 *William Stallings, “Operating Systems: Internals and Design Principles”, Seventh Edition, Prentice Hall, 2011.*

- 4 *H M Deital, P J Deital and D R Choffnes, "Operating Systems", 3rd Edition, Pearson Education, 2011.*
- 5 *D M Dhamdhere, "Operating Systems : A Concept-based Approach", Second Edition, Tata McGraw-Hill Education, 2007.*
- 6 *NareshChauhan, "Principles of Operating Systems" OXFORD HIGHER EDUCATION – 2014.*
- 7 *Pabitra Pal Choudhury, "Operating Systems" Eastern Economy Editions 2009.*

CORE SUBJECT – 12
SOFTWARE ENGINEERING

L T P C

4 0 0 4

UNIT-I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, Requirements analysis using DFD(with case studies), Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

14

UNIT-II

Software Project Management Concepts:Software Project Management-The Management spectrum, The People, The Problem, The Process, The Project. Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management. **11**

UNIT-III

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Layered arrangement of modules, Function Oriented Design, Object Oriented Design- Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics.

12

UNIT-IV

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics.

13

UNIT-V

Software Testing: Code Review, Testing Process, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing(Performance Testing and Error Seeding), Debugging Activities. Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

10

TOTAL: 60 PERIODS

Textbook:

1. *Software Engineering 4/e Rajib Mall, PHI*

Reference Books:

1. *Software Engineering, Pressman, McGraw Hill*
2. *Software Engineering, K.L.James, PHI*

CORE SUBJECT – 13
PRACTICAL - 3

OBJECT ORIENTED PROGRAMMING USING C++ LAB
L T P C

0 1 4 2

1. Finding the Volume of any three geometric figures using function Overloading
2. Exchange values between two class objects using friend functions
3. Define a class to represent a bank account

DATA MEMBERS:

- | | |
|--------------------------|-------------------------------|
| 1. Name of the Depositor | 2. Account Name |
| 3. Type of Account | 4. Balance amount in the Bank |

MEMBER FUNCTIONS

- | | |
|-----------------------------|--------------------------------|
| 1. To assign initial values | 3. To Deposit an amount |
| 2. To withdraw an amount | 4. To display name and balance |

WRITE A MAIN PROGRAM TO TEST THE PROGRAM:

1. Find the minimum of two objects using friend function
2. Using Dynamic Constructors, concatenate two strings
3. Using class and objects, find the sum of two matrices using pointers
4. Overload unary minus operator to change the sign of given vectors (3 elements)
5. Overload Binary + Operator to add two complex numbers
6. Add two vector objects. Use >> and << overloading
7. Process student Mark List using multilevel inheritance
8. Using Hierarchical inheritance process employee details
9. Print the Inventory Report of a book shop using objects and file
10. Write a Program using virtual base class
11. Write a Program using Template class with stack
12. Write a Program using files

CORE SUBJECT – 14
PRACTICAL - 4

DATA STRUCTURES & ALGORITHMS USING C++ LAB

L T P C

0 1 4 2

1. Stack Implementation
2. Queue Implementation
3. Binary Search
4. Quick Sort
5. Strassen's matrix multiplication
6. Minimum Spanning Tree using Prim's Algorithm
7. All pair's shortest path
8. N – Queen Problem
9. Breadth First Search
10. Depth First Search
11. Travelling Sales Person Problem
12. Merge Sort
13. 0/1 Knapsort problem
14. Travelling Sales Person Problem
15. Linked List
16. Tree Traversal