

**SCHEME OF EXAMINATION FOR B.Sc.(COMPUTER SCIENCE) SEMESTER
SYSTEM
(Regular Course)
w.e.f. 2014-15
Scheme for B.Sc.-II
Semester-III**

Sr. No.	Paper		Internal Assessment	External Marks	Exam Duration
1	Paper-I	Data Structures	10	40	3 hrs.
2	Paper-II	Software Engineering	10	40	3 hrs.
<i>Semester- IV</i>					
3	Paper-I	Object Oriented Programming with C++	10	40	3 hrs.
4	Paper-II	Operating System	10	40	3 hrs.
5	Paper-III	Practical Morning Session: (Data Structure implementation using 'C') Evening Session: (Programming with C++)	---	100	6 hrs.(Two Sessions) Morning and Evening
Total(Semester I & II)			40	260	

Internal assessment will be based on the following criteria:

1. Two Handwritten Assignments : 5 marks
2. (1st Assignment after one month & 2nd Assignment after two months)
3. One Class Test : 2.5 marks
(one period duration)
4. Attendance : 2.5 marks

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

B.Sc. Computer Science Semester III

PAPER I: Data Structures

Maximum Marks: 50

Minimum Pass Marks: 18

Time: 3 hours

External: 40

Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (objective type/short-answer type) questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.

Strings: Introduction, strings, String operations, Pattern matching algorithms

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparse matrix.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Garbage collection, Applications of linked lists. Algorithm of insertion/ deletion in SLL.

UNIT – III

Stack: primitive operation on stack, algorithms for push and pop. Representation of Stack as Linked List and array, Stacks applications : polish notation, recursion. Introduction to queues, Primitive Operations on the Queues, Circular queue, Priority queue, Representation of Queues as Linked List and array, Applications of queue. Algorithm on insertion and deletion in simple queue and circular queue.

UNIT – IV

Trees - Basic Terminology, representation, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Applications of Binary tree. Algorithm of tree traversal with and without recursion.

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs.

TEXT BOOKS

1. Seymour Lipschutz, "Data Structures", Tata McGraw- Hill Publishing Company Limited, Schaum's Outlines, New Delhi.
2. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Pearson Education., New Delhi.

REFERENCE BOOKS

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgraw- Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.

B.Sc Computer Science Semester III
PAPER II: SOFTWARE ENGINEERING

Maximum Marks: 50

External: 40

Minimum Pass Marks: 18

Internal: 10

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Introduction: Program vs. Software, Software Engineering, Programming paradigms, Software Crisis – problem and causes, Phases in Software development: Requirement Analysis, Software Design, Coding, Testing, Maintenance, Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models, Role of Metrics.

UNIT - II

Feasibility Study, Software Requirement Analysis and Specifications: SRS, Need for SRS, Characteristics of an SRS, Components of an SRS, Problem Analysis, Information gathering tools, Organising and structuring information, Requirement specification, validation and metrics.

UNIT - III

Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision trees, Structured English, Entity-Relationship diagrams .Software Project Planning: Cost estimation: COCOMO model, Project scheduling, Staffing and personnel planning, team structure, Software configuration management, Quality assurance plans, Project monitoring plans, Risk Management.

Unit IV

Software testing strategies: unit testing, integration testing, V and V , System testing, Alpha and Beta testing. Black box, white box testing. Cyclomatic Complexity.
Software Implementation and Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

TEXT BOOKS:

1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.

REFERENCE BOOKS:

1. Sommerville, "Software Engineering", Pearson Education.
2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.

B.Sc Computer Science Semester IV

PAPER I: Object Oriented Programming with C++

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Maximum Marks: 50

External: 40

Minimum Pass Marks: 18

Internal: 10

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Object oriented Programming: Object-Oriented programming features and benefits. Object-Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Scope resolution operator and its significance, Static Data Members, Static member functions, Nested and Local Class, Accessing Members of Class and Structure.

UNIT - II

Constructor, Initialization using constructor, types of constructor– Default, Parameterized & Copy Constructors, Constructor overloading, Default Values to Parameters, Destructors, Console I/O: Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations.

UNIT - III

Manipulators, Friend Function, Friend Class, Arrays, Array of Objects, Passing and Returning Objects to Functions, String Handling in C++, Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference & pointers.

UNIT - IV

Static Polymorphism: Operators in C++, Precedence and Associativity Rules, Operator Overloading, Unary & Binary Operators Overloading, Function Overloading, Inline Functions, Merits/Demerits of Static Polymorphism.

TEXT BOOKS:

1. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

REFERENCE BOOKS:

1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.

B.Sc Computer Science Semester IV

PAPER II: Operating System

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Maximum Marks: 50

External: 40

Minimum Pass Marks: 18

Internal: 10

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: operating system, architecture, functions, characteristics, historical evolution, types: Serial batch, multiprogramming, time sharing, real time, distributed and parallel. OS as resource Manager.

Computer system structures: I/O structure, storage structure, storage hierarchy.

Operating system structure: system components, services, system calls, system programs, system structures.

UNIT – II

Process management: process concepts, process state, process control block, operations, process scheduling, inter process communication.

CPU Scheduling: scheduling criteria, levels of scheduling, scheduling algorithms, multiple processor scheduling. Deadlocks: Characterization, methods of handling, deadlock detection, prevention, avoidance, recovery.

UNIT – III

Storage Management: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.

Process synchronization: critical section problems, semaphores. Mutual exclusion

UNIT – IV

Device and file management: Disk scheduling, Disk structure, Disk management, File Systems: Functions of the system, File access and allocation methods, Directory Systems: Structured Organizations, directory and file protection mechanisms.

TEXT BOOKS:

1. Silberschatz A., Galvin P.B., and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc., New York.
2. Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.

REFERENCE BOOKS:

1. Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.
2. Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.