BACHELOR OF SCIENCE

B.Sc.

Computer Science Syllabus

(SIX - SEMESTER PROGRAM)

Effective from session (2018-19)

15/4/2019 15/04/2019

DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF LUCKNOW
LUCKNOW

15/04/2019

Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Semester-wise Syllabus 2018-19

B.Sc. (Semester-I)			
S.N	**Paper Code**	**Paper Name**	**Marks**
1.	B.Sc.-101	Computer Fundamentals	80
2.	B.Sc.-102	System Analysis and Design	80

B.Sc. (Semester-II)			
S.N	**Paper Code**	**Paper Name**	**Marks**
1.	B.Sc.-201	Programming in C	80
2.	B.Sc.-202	Practical (C Language, Ms-Office)	100

B.Sc. (Semester-III)			
S.N	**Paper Code**	**Paper Name**	**Marks**
1.	B.Sc.-301	Data Structure Using C++	80
2.	B.Sc.-302	Practical (Data Structure using C++, Python)	100

B.Sc. (Semester-IV)			
S.N	**Paper Code**	**Paper Name**	**Marks**
1.	B.Sc.-401	Operating System	80
2.	B.Sc.-402	Management Information system	80

B.Sc. (Semester-V)			
S.N	**Paper Code**	**Paper Name**	**Marks**
1.	B.Sc.-501	Database and Software Engineering	80
2.	B.Sc.-502	Computer Architecture and Microprocessor	80
3.	B.Sc.-503	Advanced Computing Technologies	80

B.Sc. (Semester-VI)			
S.N	**Paper Code**	**Paper Name**	**Marks**
1.	B.Sc.-601	Application Development With java and .NET framework	80
2.	B.Sc.-602	Data Communication and Computer Network	80
3.	B.Sc.-603	Practical (Java, .NET framework, Microprocessor 8086, Database)	100
Total Marks			**1400**

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Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Third Semester Syllabus

Paper Title:	**Data Structure Using C++**	**Paper Number:**	**First**
Paper Code:	**B.Sc.-301**	**Maximum Marks:**	**80**

Unit –I

OOPs concept, Procedural vs OOP programming, OOP terminology and features, Tokens, Character set, Keywords, Data-types, Data Types declarations, Constants and variables, expressions, Standard Library and header files, Classes and Objects, Operator and Expressions: Arithmetic Operator, Increment/Decrement Operator, Relational Operator, Logical Operator and conditional operators, library functions, Logical Expressions, C++ shorthand.

Unit –II

While, Do-while, For statements nested loops. If-else, switch, break, continue and Go to statements, Classes and Objects: Need for Classes, Declaration of Classes, referencing class Members, Scope of class and its members Nested Classes, Functions in a class: Inline Functions, Constant Member functions, Nesting of Member Functions, Memory allocation of objects, Arrays of objects, Static Class Member, Constructor, Destructor, inheritance, Polymorphism, encapsulation, friend function, this operator, inline function.

Unit –III

Data Structure definition and its classification, objective to study data structure, Algorithms and their complexity related issues, Dynamic Memory Allocation, Malloc () Vs Calloc () functions, Abstract Data Types (ADT), Stack definition, application and Implementation, Polish Notation, Queue definition, application and Implementation, Doubly Ended queue, Circular Queue, Priority Queue, Linked list, Single Linked list and Doubly Linked List, Circular Linked list, Disadvantages of Queue and Stacks, Advantages of Linked list over Queue and Stacks.

Unit –IV

Searching, linear and non-linear searching, Binary searching, sorting, Internal Sorting Vs External Sorting, Insertion sort, selection sort, bubble sort, Hashing and Collision Resolution techniques, Graph, Basic Terminology, Graph Traversal, Minimal Spanning Tree, Binary Trees, In order Traversal, Post order Traversal, Preorder Traversal, Binary Search Trees, Operations on a BST, Complete Binary tree, Strictly Binary tree, AVL tree.

Referenced Books:

[1] Bjarne Stroustrup, "A Tour of C++", C++ in Depth Series.
[2] E. Balagurusamy, "Object Oriented Programming with C++", Mcgraw Hill publication.
[3] Barbara Johnston, "C++ Programming Today", Pearson Education.
[4] R B Patel, "Expert Data Structure with C", Khanna Publication, Fourth Edition.
[5] Seymour Lipschutz, "Data Structures with C", Schaum's Outlines, Mc Graw Hill Publication.
[6] S. K Srivastava and Deepali Srivastava "Data Structure through C In Depth", BPB publication.

B.Sc. -302 **Practical (Data Structure Using C++, Python Basics)** MM-100

List of Exercise based on Data Structure using C++, Python:

Data Structure using C++:

1. Implementation of dynamic memory allocation
2. Implementation of single dimensional and multidimensional arrays
3. Structure implementation
4. Stack Implementation with all operations
5. Stack Implementation as abstract data type
6. Stack application for In-fix, Post-fix and Pre-fix polish expression.
7. Implementation of Recursion
8. Queue Implementation with insertion and deletions of elements.
9. De-queue Implementation
10. Circular Queue Implementation
11. Priority Queue Implementation
12. Single linked Creation with all kind of operations in all conditions
13. Implementation of pointers
14. Stack Implementation using linked list
15. Queue Implementation using Linked list
16. Doubly Linked list creation with all kind of operations in all possible conditions.
17. Circular Linked list creation with all kind of operations in all possible conditions.
18. Creation of tree and performing insertion and deletion of nodes.
19. Creation of Binary tree.
20. Traversal of Binary tree (In Order, Pre Order, Post Order)
21. Implementation of sequential search.
22. Implementation of Binary search.
23. Implementation of Insertion sort
24. Implementation of Selection sort
25. Implementation of Bubble sort

Python:

1. Implementation of Standard input and output statement
2. Implementation of variables and operators
3. Implementation of conditional and decision making statement
4. Implementation of control and looping structure
5. Implementation of strings and text

Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Fourth Semester Syllabus

Paper Title:	**Operating System**	**Paper Number:**	**First**
Paper Code:	**B.Sc.-401**	**Maximum Marks:**	**80**

Unit –I

Definition of operating system (OS), History of OS, Different types of OS, GUI Vs CLI Interface, Kernel and Shells architecture, Simple Batch Systems, Multiprogramming Vs Multitasking operating system, Multi-programmed Batched Systems, Time-Sharing Systems, Distributed Systems and Real-Time Systems, Operating System Structures-Command Interpreter System, Operating System Services, System Calls, System Programs, Process Concept, Process control Block, process Scheduling,

Unit –II

CPU scheduling-Basic Concepts, Scheduling Criteria, Shortest Job First (SJF) Scheduling, First-Come First-Serve Scheduling (FCFS), Priority Scheduling , Round Robin Scheduling, Multilevel Queue Scheduling.

Unit –III

Memory Partitioning Basic Concepts, Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Virtual Memory, Demand Paging, Paging Replacement, Fragmentation and its types, Thrashing and Demand Segmentation, File Concept, Access Methods, Directory Structure, Protection, File System Structure. Allocation methods, Free Space Management.

Unit –IV

Deadlock, Deadlock Characterizations, method for Handling Deadlocks, Deadlock prevention, Avoidance, Detection, recovery from Deadlock, Safe state.

Referenced Books:

[1] Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", WILEY Publication, Ninth Edition.

[2] Andrew S. Tanenbaum, "Modern Operating Systems", Pearson Prentice Hall, Third Edition

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Department of Computer Science
University of Lucknow, Lucknow
B.Sc (Computer Science) Fourth Semester Syllabus

Paper Title:	**Management Information System**	**Paper Number:**	**Second**
Paper Code:	**B.Sc.-402**	**Maximum Marks:**	**80**

Unit –I

Information concepts, classification of information, methods of data and information collection, value of information, information: A quality product, General model of a human as information processor, Knowledge, MIS: Concept, Definition, Role of the MIS, Impact of MIS, MIS and the user, Management as a control system, MIS support to the management, Management effectiveness and MIS, Organization as system.

Unit –II

Information system, Major areas of information system, Component of Information system, Information system resource, Fundamental roles of Information system in Business, Trends in information system, Role of e-Business in Business, Classification of Information system, Managerial challenges in information technology, success and failure with information technology.

Unit –III

MIS: Organization effectiveness, Concept of corporate planning, Essentiality of strategic planning, Development of the business strategies, Type of strategies, short-range planning, tools of planning, MIS: strategic business planning.

Unit –IV

Competitive Strategy Concepts, Strategic Uses of Information technology, Value chain and strategic Information system, Agility and its major types, Creating a virtual company, knowledge management system

Referenced Books:

[1] James A O'Brien, George M Marakas "Management Information System", McGrawHill, Tenth Edition.

[2] Leonard Jessup, Joseph Valacich, "Information System TODAY", PHI Publication.

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