

Mahatma Gandhi University
Faculty of Science
B.Sc. (Computer Science)
CBCS Pattern With effect from the Academic Year 2019-2020

Code	Course Title	Course Type	HpW	Credits
Semester -I				
BS106	Programming in C	DSC-3A	4T + 3P = 7	4 + 1 = 5
Semester -II				
BS206	Programming in C++	DSC-3B	4T + 3P = 7	4 + 1 = 5
AECC				
BS107	Fundamentals of Computers	AECC	2T	2
Semester -III				
BS301	Python –1	SEC-1	2T	2
BS302	Operating System –1	SEC-2	2T	2
BS306	Data Structure using C++	DSC-3C	4T + 3P = 7	4 + 1 = 5
Semester -IV				
BS401	Python –2	SEC-3	2T	2
BS402	Operating System–2	SEC-4	2T	2
BS406	Data Base Management Systems (DBMS)	DSC-3D	4T + 3P = 7	4 + 1 = 5
Semester -V				
BS501	Information Technologies	GE	4T	4
BS502	Programming in Java	DSE-3E	4T + 3P = 7	4 + 1 = 5
Semester -VI				
BS605	Web Technologies	DSE-3F	4T + 3P = 7	4 + 1 = 5
Project/Optional				
BS606	PHP with MySQL	P/O	3T + 3P = 3	3 + 1 = 4
Total Number of Credits				48

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Computer Fundamentals: Introduction of Computers, Classification of Computers, Anatomy of a Computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.

Program Fundamentals: Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, Software Development.

Algorithms: Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.

Basics of C: Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

Unit – II

Input-Output: Non-formatted and Formatted Input and Output Functions, Escape Sequences,

Control Statements: Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements–while, for, do-while; Special Control Statement–goto, break, continue, return, exit.

Arrays and Strings: One-dimensional Arrays, Character Arrays, Functions from ctype.h, string.h, Multidimensional Arrays.

Unit – III

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Scope of Variables, Storage Classes, Inline Functions, and Recursion.

Pointers: Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Pointers to Pointers, Array of Pointers, Pointer to Array, Dynamic Memory Allocation.

Unit – IV

User-defined Data Types: Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Array of Structures (Union), Structures verses Unions, Enumeration Types.

Files: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text Book PradipDey, ManasGhosh, *Computer Fundamentals and Programming in C(2e)*

Reference s Ivor Horton, *Beginning C*

Ashok Kamthane, *Programming in C*

Herbert Schildt, *The Complete Reference C*

Paul Deitel, Harvey Deitel, *C How To Program*

Byron S. Gottfried, *Theory and Problems of Programming*

with C Brian W. Kernighan, Dennis M. Ritchie, *The C*

Programming Language

B. A. Forouzan, R. F. Gilberg, *A Structured Programming Approach Using C*

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Semester -I**Programming in C Lab****BS106****Practical****3 Hours/Week****1credit**

- 1 Write a program to find the largest two (three) numbers using if and conditional operator.
- 2 Write a program to print the reverse of a given number.
- 3 Write a program to print the prime number from 2 to n where n is given by user.
- 4 Write a program to find the roots of a quadratic equation using switch statement.
- 5 Write a program to print a triangle of stars as follows (take number of lines from user):

```

*
* * *
*****
*****
*****
*****

```

- 6 Write a program to find largest and smallest elements in a given list of numbers.
- 7 Write a program to find the product of two matrices..
- 8 Write a program to find the GCD of two numbers using iteration and recursion.
- 9 Write a program to illustrate use of storage classes.
- 10 Write a program to demonstrate the call by value and the call by reference concepts.
- 11 Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
- 12 Write a program to illustrate use of data type enum.
- 13 Write a program to demonstrate use of string functions string.h headerfile.
- 14 Write a program that opens a file and counts the number of characters in a file.
- 15 Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
- 16 Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note : Write the Pseudo Code and draw Flow Chart for the above programs.

Recommended to use Open Source Software : GCC on Linux; Dev C++ (or) CodeBlocks on Windows 10.

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Semester -II

DSC-3B

Programming in C++

BS206

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Introduction to C++: Applications, Example Programs, Tokens, Data Types, Operators, Expressions, Control Structures, Arrays, Strings, Pointers, Searching and Sorting Arrays.

Functions: Introduction, Prototype, Passing Data by Value, Reference Variables, Using Reference Variables as Parameters, Inline Functions, Default Arguments, Overloading Functions, Passing Arrays to Functions. Object Oriented Programming: Procedural and Object-Oriented Programming, Terminology, Benefits, OOP Languages, and OOP Applications.

Unit – II

Classes: Introduction, Defining an Instance of a Class, Why Have Private Members? Separating Class Specification from Implementation, Inline Member Functions, Constructors, Passing Arguments to Constructors, Destructors, Overloading Constructors, Private Member Functions, Arrays of Objects, Instance and Static Members, Friends of Classes, Member-wise Assignment, Copy Constructors, Operator Overloading, Object Conversion, Aggregation.

Unit – III

Inheritance: Introduction, Protected Members and Class Access, Base Class Access Specification, Constructors and Destructors in Base and Derived Classes, Redefining Base Class Functions, Class Hierarchies, Polymorphism and Virtual Member Functions, Abstract Base Classes and Pure Virtual Functions, Multiple Inheritance.

C++ Streams: Stream Classes, Unformatted I/O Operations, Formatted I/O Operations.

Unit – IV

Exceptions: Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Extracting Data from the Exception Class, Re-throwing an Exception, Handling the `bad_alloc` Exception.

Templates: Function Templates–Introduction, Function Templates with Multiple Type, Overloading with Function Templates, Class Templates – Introduction, Defining Objects of the Class Template, Class Templates and Inheritance, Introduction to the STL.

Text Tony Gaddis, *Starting out with C++: from control structures through objects*(7e)

Refere B. Lippman, *C++ Primer*

nce s Bruce Eckel, *Thinking in C++*

K.R. Venugopal, *Mastering C++*

Herbert Schildt, *C++: The Complete Reference*

Bjarne Stroustrup, *The C++ Programming Language*

Sourav Sahay, *Object Oriented Programming with C++*

- 1 Write a program to.
 - a. Print the sum of digits of a given number.
 - b. Check whether the given number is Armstrong or not.
 - c. Print the prime number from 2 to n where n is a natural number given.
- 2 Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
- 3 Write a program to read the student name, roll no, marks and display the same using class and object.
- 4 Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.
- 5 Write a program to find area of a rectangle, circle, and square using constructors.
- 6 Write a program to implement copy constructor.
- 7 Write a program using friend functions and friend class.
- 8 Write a program to implement constructors
 - * Default Constructor, Parameterized Constructor, Copy Constructor
 - * Define the constructor inside/outside of the class
 - * Implement all three constructors within a single class as well as use multiple classes (individual classes)
- 9 Write a program to implement the following concepts using class and object *
 - Function overloading
 - * Operator overloading (unary/binary(+ and-))
- 10 Write a program to demonstrate single inheritance, multilevel inheritance and multiple inheritances.
- 11 Write a program to implement the overloaded constructors in inheritance.
- 12 Write a program to implement the polymorphism and the following concepts using class and object. *
 - Virtual functions
 - * Pure virtual functions
- 13 Write a program to implement the virtual concepts for
 - following concepts * Constructor (not applied)
 - * Destructor (applied)
- 14 Write a program to demonstrate static polymorphism using method overloading.
- 15 Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
- 16 Write a program to implement the template (generic) concepts
 - * Without template class and object
 - * With template class and object
- 17 Write the Pseudo Code and draw Flow Chart for the above programs.

Note:

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

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Semester -II

AECC

Fundamentals of Computers

BS107

Theory

2Hours/Week

2 credits

Unit-I

Introduction to Computers: what is a computer, characteristics of Computers, Generations of Computers, Classifications of Computers, Basic Computer organization, Applications of Computers. Input and Output Devices: Input devices, Output devices, Softcopy devices, Hard copy devices. Computer Memory and Processors: Introduction, Memory Hierarchy, Processor, Registers, Cache memory, primary memory, secondary storage devices, magnetic tapes, floppy disks, hard disks, optical drives, USB flash drivers, Memory cards, Mass storage devices, Basic processors architecture.

Unit – II

Number System and Computer Codes: Binary number system, working with binary numbers, octal number system, hexadecimal number system, working with fractions, signed number representation in binary form, BCD code, other codes. Boolean algebra and logic gates: Boolean algebra, Venn diagrams, representation of Boolean functions, logic gates, logic diagrams and Boolean expressions using karnaugh-map. Computer Software: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware, acquiring computer software, design and implementation of correct, efficient and maintainable programs.

Text Book:

ReemaThareja, Fundamentals of Computers.

References:

1. V. Rajaraman, 6th Edition Fundamentals of Computers, Neeharika Adabala.
2. Anita Goel, Computer Fundamentals.

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Semester -III

Sec-1

Python-1

BS301

Theory

2Hours/Week

2 credits

Unit – I

Introduction to Python Programming: How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations (Operators. Type conversions, Expressions), More about Data Output.

Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables.

Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Unit – II

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions- Generating Random Numbers, Writing Our Own Value-Returning Functions, The math Module, Storing Functions in Modules.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Text Books Tony Gaddis, *Starting Out With Python(3e)*

References

1. Kenneth A. Lambert, *Fundamentals of Python*
2. Clinton W. Brownley, *Foundations for Analytics with Python*
3. JamesPayne, *BeginningPythonusingPython2.6andPython3*
4. Charles Dierach, *Introduction to Computer Science using Python*
5. PaulGries, *PracticalProgramming:AnIntroductiontoComputerScienceusingPython3*

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Semester -III

SEC-2[B]

OperatingSystems-1

BS302

Theory

2Hours/Week

2 credits

Unit – I

Introduction: Computer-System Architecture, Computing Environments. Operating-System Structures: Operating-System Services, User Interface for Operating-System, System Calls, Types of System Calls, Operating System Structure.

Process Management: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples–Producer-Consumer Problem.

Process Synchronization: Critical-Section Problem, Peterson’s Solution, Synchronization, Semaphores, Monitors.

Unit – II

CPU Scheduling: Concepts, Scheduling Criteria, Scheduling Algorithms.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Text AbrahamSilberschatz,PeterBaerGalvin,GregGagne,*OperatingSystemConcepts(9e)*

Reference s NareshChauhan, *Principles of Operating Systems* Thomas W. Doeppner, *Operating Systems in Depth* Andrew S. Tanenbaum, *Modern Operating Systems*
William Stallings, *Operating Systems – Internals and Design Principles* Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

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Semester -III**DSC-3C****Data Structures Using C++****BS306****Theory**

4 Hours/Week

4credits

Practical

3 Hours/Week

1credit

Unit – I

Fundamental Concepts: Introduction to Data Structures, Types of Data Structures, Introduction to Algorithm, Pseudo-code, Flow Chart, Analysis of Algorithms.

Linear Data Structure Using Arrays: 1-D Arrays, 2-D Arrays, N-D Arrays, Memory Representation and Address Calculation of 1-D, 2-D, N-D Arrays, Concept of Ordered List, String Manipulation, Pros and Cons of Arrays.

Stacks: Concept, Primitive Operations, Abstract Data Type, Representation Stacks Using Arrays, Prefix, Infix, Postfix Notations for Arithmetic Expression, Applications of Stacks– Converting Infix Expression to Postfix Expression, Evaluating the Postfix Expression, Checking Well-formed (Nested) Parenthesis, Processing of Function Calls, Reversing a String.

Unit – II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Execution of Recursive Calls, Recursive Functions, Iteration versus Recursion.

Queues: Concept, Primitive Operations, Abstract Data Type, Representation Queues Using Arrays, Circular Queue, Double-Ended Queue, Applications of Queues.

Linked Lists: Introduction, Concept, Terminology, Primitive Operations-creating, inserting, deleting, traversing, Representation of Linked Lists, Linked List Abstract Data Type, Linked List Variants - Singly Linked List, Doubly Linked List, Linear and Circular Linked List, Representation Stacks and Queues Using Linked Singly Lists, Application of Linked List–Garbage Collection.

Unit – III

Trees: Introduction, Representation of a General Tree, Binary Tree Introduction, Binary Tree Abstract Data Type, Implementation of Binary Trees, Binary Tree Traversals – Preorder, Inorder, Postorder Traversals, Applications of Binary Trees Briefly.

Graphs: Introduction, Graph Abstract Data Type, Representation of Graphs, Graph Traversal – Depth-First Search, Breadth-First Search, Spanning Tree – Prim’s Algorithm, Kruskal’s Algorithm.

Hashing: Introduction, Hash Functions, Collision Resolution Strategies.

Unit – IV

Searching and Sorting: Sequential (Linear) Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, and Comparison of Sorting Techniques. Heaps: Concept, Implementation, Abstract Data Type, Heap Sort.

Text Book Varsha H. Patil, *Data Structures Using C++*

References Nell Dale, *C++ Plus Data Structures*
 Seymour Lipschutz, *Data Structures (Revised 1e)*
 Adam Drozdek, *Data Structures and Algorithms in C++*
 Mark Allen Weiss, *Data structures and Algorithm Analysis in C++ (4e)*
 D.S. Malik, *C++ Programming: Program Design Including Data Structures (6e)* Michael
 Main, Walter Savitch, *Data Structures and Other Objects Using C++ (4e)* Michael T.
 Goodrich, R. Tamassia, David M. Mount, *Data Structures and Algorithms in C++*
 Yonghui Wu, Jiande Wang, *Data Structure Practice for Collegiate Programming Contests
 and Education*

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Semester -III

Data Structures Lab

BS306

Practical

3 Hours/Week

1credit

- 1 Write programs to implement the following using an array: a) Stack ADT b) Queue ADT.
- 2 Write a program to convert the given infix expression to postfix expression using stack.
- 3 Write a program to evaluate a postfix expression using stack.
- 4 Write a program to ensure the parentheses are nested correctly in an arithmetic expression.
- 5 Write a program to find following using Recursion
 - a) Factorial of +ve Integer b) n^{th} term of the Fibonacci Sequence c) GCD of two +ve integers
- 6 Write a program to create a single linked list and write functions to implement the following operations.
 - a) Insert an element at a specified position
 - b) Delete a specified element in the list
 - c) Search for an element and find its position in the list
 - d) Sort the elements in the list ascending order
- 7 Write a program to create a double linked list and write functions to implement the following operations.
 - a) Insert an element at a specified position
 - b) Delete a specified element in the list
 - c) Search for an element and find its position in the list
 - d) Sort the elements in the list ascending order
- 8 Write a program to create singular circular linked lists and function to implement the following operations.
 - a) Insert an element at a specified position
 - b) Delete a specified element in the list
 - c) Search for an element and find its position in the list
- 9 Write programs to implement the following using a single linked list:
 - a) Stack ADT b) Queue ADT.
- 10 Write a program to implement Binary search technique using Iterative method and Recursive methods.
- 11 Write a program for sorting the given list numbers in ascending order using the following technique: Bubble sort and Selection sort
- 12 Write a program for sorting the given list numbers in ascending order using the following technique: Insertion sort and Quicksort
- 13 Write a program for sorting the given list numbers in ascending order using the following technique: Merge sort and Heapsort
- 14 Write a program to traverse a binary tree in following way.
 - a) Pre-order b) In-order c) Post-order
- 15 Write a program to the implementation graph traversals – BFS and DFS.
- 16 Write a program to find the minimum spanning tree for a weighted graph using
 - a) Prim's Algorithm b) Kruskal's Algorithm.
- 17 Write the Pseudo Code for the above programs.

Note: Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

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Semester -IV**SEC-3****Python-2****BS401**

Theory

2Hours/Week

2 credits

Unit – I

Lists and Tuples: Sequences, Introduction to Lists, List slicing, Finding Items in Lists with the in Operator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists, Tuples. Strings: Basic String Operations, String Slicing, Testing, Searching, and Manipulating Strings.

Dictionaries and Sets: Dictionaries, Sets, Serializing Objects.

Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

Unit – II

Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, Working with Instances, Techniques for Designing Classes, Inheritance, Polymorphism.

GUI Programming: Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Text Book Tony Gaddis, *Starting Out With Python(3e)*

References

1. Kenneth A. Lambert, *Fundamentals of Python*
2. Clinton W. Brownley, *Foundations for Analytics with Python*
3. JamesPayne, *BeginningPythonusingPython2.6andPython3*
4. Charles Dierach, *Introduction to Computer Science using Python*
5. PaulGries, *PracticalProgramming:AnIntroductiontoComputerScienceusingPython3*

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Semester -IV

SEC-4

Operating Systems-2

BS402

Theory**2Hours/Week****2credits****Unit – I**

Main Memory: Introduction, Swapping, Contiguous Memory Allocation, Segmentation, Paging.
 Virtual Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing.
 Mass-Storage Structure: Overview, Disk Scheduling, RAID Structure.
 File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection.

Unit – II

File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.
 Recovery, Network File System.
 Protection and Security: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Access Control, Revocation of Access Rights, The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Firewalling to Protect Systems and Networks, Computer-Security Classifications. Case Study: Windows 7 and Linux System.

Text

AbrahamSilberschatz,PeterBaerGalvin,GregGagne,*OperatingSystemConcepts(9e)*

Reference s

Naresh Chauhan, *Principles of Operating Systems*
 Thomas W. Doepfner, *Operating Systems in Depth*
 Andrew S. Tanenbaum, *Modern Operating Systems*
 William Stallings, *Operating Systems – Internals and Design Principles*
 Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

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Semester -IV**DSC–3D****Database Management Systems****BS406****Theory**
Practical4 Hours/Week
3 Hours/Week4 credits
1 credit**Unit – I**

Introduction to Databases: Introduction, Traditional File-Based Systems, Database Approach, Roles in the Database Environment, Advantages and Disadvantages of DBMSs, The Three-Level ANSI-SPARC Architecture, Database Languages, Data Models, Functions of a DBMS, Components of a DBMS. Relational Model: Introduction, Terminology, Integrity Constraints, Views.

The Relational Algebra: Unary Operations, Set Operations, Join Operations, Division Operation, Aggregation and Grouping Operations.

Unit – II

SQL: Introduction, Data Manipulation–Simple Queries, Sorting Results, Using the SQL Aggregate Functions, Grouping Results, Sub-queries, ANY and ALL, Multi-table Queries, EXISTS and NOT EXIST, Combining Result Tables, Database Updates.

SQL: The ISO SQL Data Types, Integrity Enhancement Feature–Domain Constraints, Entity Integrity, Referential Integrity, General Constraints, Data Definition–Creating a Database, Creating a Table, Changing a Table Definition, Removing a Table, Creating an Index, Removing an Index, Views–Creating a View, Removing a View, View Resolution, Restrictions on Views, View Updatability, WITH CHECK OPTION, Advantages and Disadvantages of Views, View Materialization, Transactions, Discretionary Access Control–Granting Privileges to Other Users, Revoking Privileges from Users.

Advanced SQL: The SQL Programming Language–Declarations, Assignments, Control Statements, Exceptions, Cursors, Subprograms, Stored Procedures, Functions, and Packages, Triggers, Recursion.

Unit – III

Entity–Relationship Modeling: Entity Types, Relationship Types, Attributes, Keys, Strong and Weak Entity Types, Attributes on Relationships, Structural Constraints, Problems with ER Models–Fan Traps, Chasm Traps.

Enhanced Entity–Relationship Modeling: Specialization/Generalization, Aggregation, Composition. Functional–Dependencies: Anomalies, Partial Functional Dependency, Transitive Functional Dependency, Multi Valued Dependency, Join Dependency.

Normalization: The Purpose of Normalization, How Normalization Supports Database Design, Data Redundancy and Update Anomalies, Functional Dependencies in brief, The Process of Normalization, 1NF, 2NF, 3NF, BCNF. The Database Design Methodology for Relational Databases(Appendix–D).

Unit – IV

Transaction Management: Transaction Support–Properties of Transactions, Database Architecture, Concurrency Control–The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods, Multi-version Timestamp Ordering, Optimistic Techniques, Granularity of Data Items, Database Recovery–The Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques, Nested Transaction Model.

Security: Database Security–Threats, Computer-Based Controls–Authorization, Access Controls, Views, Backup and Recovery, Integrity, Encryption, RAID.

Text Book Thomas M. Connolly, Carolyn E. Begg, *Database Systems–A Practical Approach to Design, Implementation, and Management (6e)*

Reference s Sharon Allen, Evan Terry, *Beginning Relational Data Modeling*
Jeffrey A. Hoffer, V. Ramesh, HeikkiTopi, *Modern Database Management*
Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*
RamezElmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*
Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*
C Coronel, S Morris, Peter Rob, *Database Systems: Design, Implementation, and Management*

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Semester -IV

Database Management Systems Lab

BS406

Practical

3 Hours/Week

1 credit

Consider the relational schema for part of the **Dream Home** case study is:

Branch (branchNo, street, city, postcode)

Staff (staffNo, fName, IName, position, sex, DOB, salary, branchNo)

Property For Rent (propertyNo, street, city, postcode, type, rooms, rent, ownerNo, staffNo, branchNo)

Client (clientNo, fName, IName, telNo, prefType, maxRent, eMail)

Private Owner (ownerNo, fName, IName, address, telNo, eMail, password)

Viewing (clientNo, propertyNo, viewDate, comment)

Registration (clientNo, branchNo, staffNo, dateJoined)

1. Create a database with name "DreamHome" and now create all the tables listed above with constraints.
2. Insert a new row into the table supplying data for all columns.
3. Modify data in the database using UPDATE
4. Delete data from the database using DELETE
5. Changing a table definition using ALTER
6. Removing a table using DROP
7. Removing rows in table using TRUNCATE
8. Create an index and removing an index
9. Practice other standard SQL commands for creating, modifying, displaying data of tables.
10. List full details of all staff.
11. List all staff with a salary greater than £10000.
12. List the property numbers of all properties that have been viewed.
13. Produce a list of salaries for all staff, showing only the staffNo, fName, IName, and salary details.
14. List all cities where there is either a branch office or a property for rent.
15. List all cities where there is a branch office but no properties for rent.
16. List all cities where there is both a branch office and at least one property for rent.
17. List the names and comments of all clients who have viewed a property for rent.
18. Produce a status report on property viewings.
19. List complete details of all staff who work at the branch in Glasgow.
20. List the addresses of all branch offices in London or Glasgow
21. List all staff with a salary between £20,000 and £30,000.
22. Identify all clients who have viewed all properties with three rooms.
23. How many properties cost more than £350 per month to rent?
24. How many different properties were viewed in May 2013?
25. Find the total number of Managers and the sum of their salaries.
26. Find the minimum, maximum, and average staff salary.
27. Find the number of staff working in each branch and the sum of their salaries.
28. List all managers and supervisors.
29. Find all owners with the string 'Glasgow' in their address.
30. List the details of all viewings on property PG4 where a comment has not been supplied.
31. Produce a list of salaries for all staff, arranged in descending order of salary.
32. Produce an abbreviated list of properties arranged in order of property type.
33. Find the number of staff working in each branch and the sum of their salaries.
34. For each branch office with more than one member of staff, find the number of staff working in each branch and the sum of their salaries.
35. List the staff who work in the branch at '163 MainSt'.
36. List all staff whose salary is greater than the average salary, and show by how much their salary is greater than the average.
37. List the properties that are handled by staff who work in the branch at '163 MainSt'.
38. Find all staff whose salary is larger than the salary of at least one member of staff at branch B003.
39. Find all staff whose salary is larger than the salary of every member of staff at branch B003
40. List the names of all clients who have viewed a property, along with any comments supplied.
41. For each branch office, list the staff numbers and names of staff who manage properties and the properties that they manage.
42. For each branch, list the staff numbers and names of staff who manage properties, including the city in which the branch is located and the properties that the staff manage.

43. Find the number of properties handled by each staff member, along with the branch number of the member of staff.
44. List all branch offices and any properties that are in the same city.
45. List all properties and any branch offices that are in the same city.
46. List the branch offices and properties that are in the same city along with any unmatched branches or properties.
47. Find all staff who work in a London branch office.
48. Construct a list of all cities where there is either a branch office or a property.
49. Construct a list of all cities where there is both a branch office and a property.
50. Create a view so that the manager at branch B003 can see the details only for staff who work in his or her branch office.
51. Create a view of the staff details at branch B003 that excludes salary information, so that only managers can access the salary details for staff who work at their branch.
52. Create a view of staff who manage properties for rent, which includes the branch number they work at, their staff number, and the number of properties they manage.
53. Removing a view using DROPVIEW
54. Give the user with authorization identifier Manager all privileges on the Staff table.
55. Give users Personnel and Director the privileges SELECT and UPDATE on column salary of the Staff table.
56. Revoke the privilege SELECT on the Branch table from all users.
57. Revoke all privileges you have given to Director on the Staff table.
58. Demonstrate exceptions in PL/SQL
59. Demonstrate cursors in PL/SQL
60. Write PL/SQL queries to create procedures.
61. Write PL/SQL queries to create functions.
62. Write PL/SQL queries to create package.
63. Write PL/SQL queries to create triggers.
64. Write PL/SQL queries using recursion.
65. Create a database with name "Hotel" and now create all the tables listed above with constraints.
66. Insert a new row into the table supplying data for all columns.
67. Modify data in the database using UPDATE
68. Delete data from the database using DELETE
69. Changing a table definition using ALTER
70. Removing a table using DROP
71. Removing rows in table using TRUNCATE
72. Practice other standard SQL commands for creating, modifying, displaying data of tables.
73. List full details of all hotels.
74. List full details of all hotels in London.
75. List the names and addresses of all guests living in London, alphabetically ordered by name.
76. List all double or family rooms with a price below £40.00 per night, in ascending order of price.
77. List the bookings for which no dateTo has been specified.
78. How many hotels are there?
79. What is the average price of a room?
80. What is the total revenue per night from all double rooms?
81. How many different guests have made bookings for August?
82. List the price and type of all rooms at the Grosvenor Hotel.
83. List all guests currently staying at the Grosvenor Hotel.
84. List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room.
85. What is the total income from bookings for the Grosvenor Hotel today?
86. List the rooms that are currently unoccupied at the Grosvenor Hotel.
87. What is the lost income from unoccupied rooms at the Grosvenor Hotel?
88. List the number of rooms in each hotel.
89. List the number of rooms in each hotel in London.
90. What is the average number of bookings for each hotel in August?
91. What is the most commonly booked room type for each hotel in London?
92. What is the lost income from unoccupied rooms at each hotel today?
93. Insert rows into each of these tables.

94. Update the price of all rooms by 5%.
95. Demonstrate that queries written using the UNION operator and same can be rewritten using the OR.
96. Apply the syntax for inserting data into a table.
97. Create a view containing the cheapest hotels in the world.
98. Create the Hotel table using the integrity enhancement features of SQL.
99. Create a database trigger for the following situations:
 - (a) The price of all double rooms must be greater than £100.
 - (b) The price of double rooms must be greater than the price of the highest single room.
 - (c) A booking cannot be for a hotel room that is already booked for any of the specified dates.
 - (d) A guest cannot make two bookings with overlapping dates.
 - (e) Maintain an audit table with the names and addresses of all guests who make bookings for hotels in London (do not store duplicate guest details).
100. Find the names and ages of all sailors.
101. Find all sailors with a rating above 7.
102. Find the names of sailors who have reserved boat 103.
103. Find the sids of sailors who have reserved a red boat.
104. Find the names of sailors who have reserved a red boat.
105. Find the colors of boats reserved by Lubber.
106. Find the names of sailors who have reserved at least one boat.
107. Find the names of sailors who have reserved at least two boats.
108. Compute increments for the ratings of persons who have sailed two different boats on the same day.
109. Find the ages of sailors whose name begins and ends with B and has at least three characters.
110. Find the names of sailors who have reserved a red or a green boat.
111. Find the names of sailors who have reserved a red and a green boat.
112. Find the sids of all sailors who have reserved red boats but not green boats.
113. Find all sids of sailors who have a rating of 10 or have reserved boat 104.
114. Find the names of sailors who have not reserved a red boat.
115. Find sailors whose rating is better than some sailor called Horatio.
116. Find sailors whose rating is better than every sailor called Horatio.
117. Find the names of sailors who have reserved all boats.
118. Find the names of sailors who have reserved at least two boats.
119. Find the names of sailors who have reserved all boats called Interlake.
120. Find sailors who have reserved all red boats.
121. Find the sailor name, boat id, and reservation date for each reservation.
122. Find the sids of sailors with age over 20 who have not reserved a red boat.
123. Find the average age of all sailors.
124. Find the average age of sailors with a rating of 10.
125. Find the name and age of the oldest sailor.
126. Count the number of different sailor names.
127. Find the names of sailors who are older than the oldest sailor with a rating of 10.
128. Find the sailors with the highest rating.
129. Find the age of the youngest sailor for each rating level.
130. Find age of the youngest sailor who is eligible to vote for each rating level with at least 2 such sailors.
131. Find the average age of sailors for each rating level that has at least two sailors.
132. For each red boat, find the number of reservations for this boat.
133. Find the average age of sailors who are of voting age (i.e., at least 18 years old) for each rating level that has at least two sailors.
134. Delete the records of sailors who have rating 8 (deleting some rows in a table).
135. Loading data which is present in the text into the table.

Note Recommended to use open source database software like MySQL, MongoDB, PostgreSQL, etc...

: In practical examination, students have to

- Create database
- Create tables with their integrity constraints.
- Insert the data into tables and then execute the queries.
- Answer any **six** queries from **ten** queries given by the examiner.

B.Sc. (Computer Science)

Semester -V**GE****Information Technologies****BS501****Theory****4Hours/Week****4 credits****Unit – I**

Information Technology Basics – introduction, Need for Information Storage and Processing, Information Technology Components , Role of information Technology, Information Technology and the Internet .
Emerging Trends in IT - Introduction , Electronic Commerce (E-Commerce), Electronic Data Interchange(EDI),
Smart Cards , Mobile Communication, Internet Protocol TV.

Unit – II

Computer Software: Introduction, Classification of Computer Software, System Software, Applications Software, Firmware, Middleware, Acquiring Computer Software.

Operating Systems: Introduction, Evolution of OS, Process Management, Memory Management, File Management, Device Management, Security Management, Command Interpreter, Windows, Linux.

Unit – III

Introduction to Algorithms and Programming Languages: Algorithm, Control Structures, Flowcharts, Pseudo code, Programming Languages, Generations of Programming Languages.

Database Systems: File Oriented Approach, Database Oriented Approach, Database Views, Three-Schema Architecture, Database Models, Components of DBMS, Introduction of SQL Queries.

Unit – IV

Computer Networks: Introduction, Connection Media, Data Transmission Mode, Data Multiplexing, Data Switching, Network Topologies, Types of Networks, Networking Devices, OSI Model. The Internet: Internet Services, Types of Internet Connections, Internet Security.

Emerging Computer Technologies: Distributed Networking, Peer-to-peer Computing, Grid Computing, Cloud Computing, Utility Computing, OnDemand Computing, Wireless Network, Bluetooth, Artificial Intelligence.

Text Wiley India Editorial Team, Fundamentals of Information Technology

Reema Thareja, *Fundamentals of Computers*

Reference s P. K. sinha, *Computer Fundamentals*

Anita Goel, *Computer Fundamentals*

V. Rajaraman, *Fundamentals of Computers*

E. Balagurusamy, *Fundamentals of Computers*

J. Glenn Brookshear, Dennis Brylow, *Computer Science An Overview*

B.Sc. (Computer Science)

Semester -V**DSC–3E****Programming in Java****BS505****Theory
Practical****4Hours/Week
3 Hours/Week****4credits
1credit****Unit – I**

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Type Conversion, Casting, Conditional Statements, Loops, Branching Mechanism, Classes, Objects, Class Declaration, Creating Objects, Method Declaration and Invocation, Method Overloading, Constructors– Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects, Class Variables & Methods-static Keyword, this Keyword.

Unit – II

One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keywords, Abstract classes, Interfaces, Abstract Classes Verses Interfaces. Packages– Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class. Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Unit – III

Multithreading: Introduction, Main Thread, Creation of New Threads – By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority, Synchronization. Input/Output: Introduction, java.io Package, File Class, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

Unit – IV

Event Handling: Introduction, Types of Events, Example. AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts. Swing: Introduction, Differences between Swing and AWT, JFrame, JApplet, JPanel, Components in Swings, Layout Managers, JTable, DialogBox.

Database Handling Using JDBC: Introduction, Types of JDBC Drivers, Load the Driver, Establish Connection, Create Statement, Execute Query, Iterate Resultset, Scrollable Resultset, Developing a JDBS Application.

**Text Book
Reference s**

Sachin Malhotra, Saurabh Choudhary, *Programming in Java(2e)*

Bruce Eckel, *Thinking in Java (4e)*

Herbert Schildt, *Java: The Complete Reference (9e)*

Y. Daniel Liang, *Introduction to Java Programming (10e)*

Paul Deitel, Harvey Deitel, *Java: How To Program (10e)*

Cay S. Horstmann, *Core Java Volume I – Fundamentals (10e)*

1 Thomas Wu, *An introduction to object-oriented programming with Java*

(5e) Tony Gaddis, *Starting Out with Java From Control Structures*

Through Objects (6e)

Jeanne Boyarsky, Scott Selikoff, *OCA: Oracle Certified Associate Java SE 8 Programmer–I Study Guide*

Practical

3 Hours/Week

1credit

Write java programs to find the following

- a) largest of given three numbers
- 1 b) reverses the digits of a number
- c) given number is prime or not d) GCD of given two integers

Write java programs that implement the following

- 2 a) default constructor b) parameterized constructor c) constructor overloading
- a) Write a java program to find the smallest of given list integers using array and scannerclass.
- 3 b) Write a java program for multiplication of two matrices.

- a) Write a java program for demonstrating an inner classes or nested classes.
- 4 b) Write a java program to implement method overloading, method overriding, dynamic method dispatch

5 Write a java program to implement single, multilevel, hierarchal, multiple, hybrid inheritances.

6 Write java programs that demonstrate the use of abstract, this, super, static, final key words

- 7 a) Write a java program for creating a package and using a package.
- b) Write a java program to demonstrate the use of wrapper classes.
- 8 a) Write a java program using all five keywords of exception handling mechanism.
- b) Write a java program for creating customized (user) exception
- 9 a) Write a java program that checks whether a given string is a palindrome or not.
- b) Write a java program for sorting a given list of names in ascending order.
- 10 a) Write a java program to create a file, write the data and display the data.
- b) Write a java program that reads a file name from user and displays its information.
- 11 a) Write a java program for controlling main thread.
- b) Write a java program for creating new thread by extending Thread class.
- 12 a) Write a java program for creating new thread by implementing Runnable interface.
- b) Write a java program for thread synchronization.
- 13 a) Write a java program to create following AWT components: Button, Checkbox, Choice, and List.
- b) Write java programs to create AWT application using containers and layouts.
- 14 a) Write java programs to create a simple Applet and create swing based Applet.
- b) Write a java program to handle different types of events in a swing application.
- 15 Write java programs to create a swing application using swing components and layouts.
- 16 Write a java program to store and retrieve data from database using JDBC.
- 17 Write the program using simple text editors (not IDE), compile and run from command prompt.

Note : Encourage students to develop small java applications using IDE, like giving as assignment. Write a small java application using some features of java.

B.Sc. (Computer Science)

Semester -VI**DSE-3F****Web Technologies****BS605****Theory**

4Hours/Week

4credits

Practical

3 Hours/Week

1credit

Unit – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links.

Images, Audio, and Video: Adding Images Using the Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your web pages. Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables

Forms: Introducing Forms, Form Controls, Sending Form Data to the Server

Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

Unit – II

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules.

CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the Box Model.

More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout with CSS

Page Layout: Understating the Site's Audience, Page Size, Designing Pages, Coding your Design, Developing for Mobile Devices.

Design Issues: Typography, Navigation, Tables, Forms.

Unit – III

Learning JavaScript: How to Add Script to Your Pages, the Document Object Model, Variables, Operators, Functions, Control Statements, Looping, Events, Built- In Objects,

Working with JavaScript: Practical Tips for Writing Scripts, Form Validation, Form Enhancements, JavaScript Libraries.

Putting Your site on the web: Meta tags, Testing your site, Talking the Leap to Live, Telling the World about your site, Understanding your visitors.

Unit – IV

XML - Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, Extensible Style sheet Language and XSL Transformations, Document Object Model (DOM).

Ajax-Enabled Rich Internet Applications: introduction, history of Ajax, traditional web applications Vs Ajax Applications, RIAs with Ajax, Ajax example using XML Http Request object, XML and DOM, creating full scale Ajax-enabled application, Dojo Toolkit.

**Text Book
Reference s**

Jon Duckett, *Beginning HTML, XHTML, CSS and JavaScript*

Chris Bates, *Web Programming*

M. Srinivasan, *Web Technology: Theory and Practice*

Achyut S. Godbole, AtulKahate, *Web Technologies*

Kogent Learning Solutions Inc, *Web Technologies Black*

Book Ralph Moseley and M. T. Savaliya, *Developing Web*

Applications

P.J. Deitel& H.M. Deitel, *Internet and World Wide Web How to program*

B.Sc. (Computer Science)

Semester -VI**Web Technologies Lab****BS605****Practical****2 Hours/Week****1credit**

- a. Write a HTML program using basic text formatting tags, <hn>, <p>,
, <pre>.
- 1 b. Write a HTML page for Example Cafe using above text formatting tags.
 - a. Write a HTML program using presentational element tags , <i>, <strike>, <sup>, <sub>, <big>, <small>, <hr>
- 2 b. Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <kbd>, <address>
 - a. Write a HTML program using different list types.
- 3 b. Write a HTML page that displays ingredients and instructions to prepare a recipe.
- 4 a. Write a HTML program using grouping elements <div> and .
- b. Write a HTML Menu page for Example cafe site.
 - a. Write a HTML program using images, audios, videos.
- 5 b. Write a HTML program to create your time table.
- 6 Write a HTML program to create a form using text inputs, password inputs, multiple line text input, buttons, check boxes, radio buttons, select boxes, file select boxes.
- 7 Write a HTML program to create a frames and links between frames.
- 8 Write a HTML program to create different types of stylesheets.
- 9 Write a HTML program to create CSS on links, lists, tables and generated content.
- 10 Write a HTML program to create your college web site using multi column layouts.
- 11 Write a HTML program to create your college web site using for mobile device.
- 12 Write a HTML program to create login form and verify username and password using DOM
- 13 a. Write a JavaScript program to calculate area of rectangle using function.
 - b. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
- 14 a. Write a JavaScript program using switch case?.
 - b. Write a JavaScript program to print multiplication table of given number using loop.
- 15 a. Write a JavaScript programs using any 5 events.
 - b. Write a JavaScript program using JavaScript built in objects.
- 16 Write a JavaScript program to create registration form and validate all fields using form validation
17. Write a XML Program to represent Student Data using DTD.
18. Write a XML Program to represent Data using XML Schema Definition.

B.Sc. (Computer Science)

Semester -VI

Project/Optional	PHP with MySQL	BS606
Theory	3 Hours/Week	3credits
Practical	3 Hours/Week	1credit

Unit – I

Introducing PHP – What is PHP? Why use PHP? Evolution of PHP, Installing PHP, Other ways to run PHP, Creating your first script. PHP Language Basics – Using variables, Understanding Data Types, Operators and Expressions, Constants. Decisions and Loops – Making Decisions, Doing Repetitive Tasks with Looping, Mixing Decisions and Looping with HTML.

Strings – Creating and Accessing Strings, Searching Strings, Replacing Text with Strings, Dealing with Upper and Lowercase, Formatting Strings. Arrays – Creating Arrays, Accessing Array Elements, Looping Through Arrays with for-each, Working with Multidimensional Arrays, Manipulating Arrays.

Unit – II

Functions – What is a Function? Why Functions are useful? Calling Functions, Working with Variable Functions, Writing your own Functions, Working with References, Writing Recursive Functions.

Objects – Introduction OOP Concepts, Creating Classes and Objects in PHP, Creating and using Properties, Working with Methods, Object Overloading with `_get()`, `_set()` and `_call()`, Using Inheritance to Extend Power of Objects, Constructors and Destructors, Automatically Loading Class Files, Storing as Strings.

Handling HTML Forms with PHP – How HTML form works, Capturing Form Data with PHP, Dealing with Multi-Value Fields, Generating Web Forms with PHP, Storing PHP Variables in Forms, Creating File Upload Forms, Redirecting After a Form Submission.

Unit – III

Working with Files and Directories - Getting Information on Files, Opening and Closing Files, Reading and Writing to Files, Copying, Renaming, and Deleting Files, Working with Directories.

Introducing Databases and SQL – Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL from PHP.

Retrieving Data from MySQL with PHP – Setting Up the Book Club Database, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records, Building a Member Registration Application.

Text Book Reference s Matt Doyle, *Beginning PHP 5.3* (Wrox – WileyPublishing)
 Ellie Quigley, *PHP and MySQL by Example*
 Joel Murach, Ray Harris, *Murach's PHP and MySQL*
 Brett McLaughlin, *PHP & MySQL: The Missing Manual*
 Luke Welling, Laura Thomson, *PHP and MySQL Web Development*
 W. Jason Gilmore, *Beginning PHP and MySQL From Novice to Professional*
 Andrew Curioso, Ronald Bradford, Patrick Galbraith, *Expert PHP and MySQL*

B.Sc. (Computer Science)

Semester -I**PHP with MySQLLab****BS606****Practical****3 Hours/Week****1credit**

- 1 a) Write a PHP script to find the factorial of a given number.
b) Write a PHP script to find the sum of digits of a given number.
- 2 a) Write a PHP script to find whether the given number is a prime or not.
b) Write a PHP script to demonstrate the use of break, continue statements using nested loops.
- 3 a) Write a PHP script to display the Fibonacci sequence with HTML page.
b) Write a PHP script to create a chessboard.
a) Write a PHP script using built-in string function like strstr(), stripslashes(), substr_count(), etc...
- 4 b) Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first character uppercase
- 6 a) Write a PHP script that inserts a new item in an array in any position.
b) Write a PHP function to check whether all array values are strings or not.
- 7 a) Write a PHP script to count number of elements in an array and display a range of array elements.
b) Write a PHP script to sort a multi-dimensional array set by a specific key.
- 8 a) Write a PHP script using a function to display the entered string in reverse.
b) Write a PHP script using function for sorting words in a block of text by length.
- 9 a) Write a PHP script for creating the Fibonacci sequence with recursive function.
b) Write a PHP script using pass by value and pass by reference mechanisms in passing arguments to functions.
- 10 a) Write a PHP script to demonstrate the defining and using object properties.
b) Write a PHP script to demonstrate the inheritance.
- 11 a) Write a PHP script to demonstrate the object overloading with _get(), _set(), and _call().
a. Write a PHP script to demonstrate the overloading property accesses with _get() and _set().
- 12 a) Write a PHP script to demonstrate the method overloading and method overriding mechanisms.
a. Write a PHP script to demonstrate the use of final classes and final methods.
- 13 a) Write a PHP script to demonstrate the use interfaces.
a. Write a PHP script using constructors and destructors.
- 14 Write a PHP application to handling HTML forms with PHP script.
- 15 a) Write a PHP script to create a file, write data into file and display the file's data.
a. Write a PHP script to check and change file permissions, copying, renaming and deleting files.
- 16 a) Write a PHP application for connecting to MySQL and reading data from database table.
a. Write a PHP application for inserting, updating, deleting records in the database table.
- 17 Write a PHP application for student registration form.

UG (B.Sc.) Scheme of Examinations
Computer Science
 (CBCS 2019-2020)

Elaborations

Paper	Credits	Theory Exam		Practical Exam
		University Exam	Internal Exam	
DSC	4+1	80 Marks	20 Marks	25 Marks
DSE	4+1	80 Marks	20 Marks	25 Marks
SEC	2	40 Marks	10 Marks	No Practical
GE	4	80 Marks	20 Marks	No Practical
AECC	2	40 Marks	10 Marks	No Practical
P/O	3+1	60 Marks	15 Marks	25 Practical

- DSC** - Discipline specific core course
DSE - Discipline specific elective course
SEC - Skill enhancement course
GE - Generic elective
AECC - Ability Enhancement Compulsory
P/O - Project/Optional

PART -A Answer any eight questions in part –A

8X4 M = 32 Marks

UNIT- I 1
2
3

UNIT- II 4
5
6

UNIT- III 7
8
9

UNIT- IV 10
11
12

Part – B

Answer all Questions 12MX4 = 48 Marks

UNIT- I 13
Or
14

UNIT- II 15
Or
16

UNIT- III 17
Or
18

UNIT- IV 19
Or
20

4 Credit Core (DSC) Paper
Internal Exam (Theory)

Time:1Hr.

Maximum marks:20

- Two internal exams (one at the middle of the semester and the other at the end) of one-hour duration are to be conducted carrying 15 marks each.
- Average of the scores of two exams should be taken into account.
- Following is the examination pattern.
 - 10 MCQs (multiple choice questions) of half mark each,
 - 10 FIBs (Fill in the Blanks) of half mark each
 - 5 SAQs (short answered questions) of one mark each
 - Totaling 15 marks.
 - 5 marks meant for assignment.

University Exam (Practical)

Time:2Hrs.

Maximum marks:25

- The question paper is to be typeset with **four** programs with due weightage to **all the units** from the question bank provided in the syllabus.
- The candidates are to answer any **two** of them in the practical exam.
- Each question has to carry **six** marks totaling **12** marks.
- Viva - **8** marks
- Record - **5** marks

2 Credit (SEC) Paper

University Exam (Theory)

Time: 2Hrs.

Maximum marks: 40

Section - A (4X 4M = 16 Marks)

Answer any four of the following six questions. Each carries four marks.

- Q1. From Unit 1
- Q2. From Unit 1
- Q3. From Unit 1
- Q4. From Unit 2
- Q5. From Unit 2
- Q6. From Unit 2

Section - B (2 X 12M = 24Marks)

Answer all the following two questions. Each carries fifteen marks.

- Q09. (a) or (b) from Unit 1
- Q10. (a) or (b) from Unit 2

Internal Exam (Theory)

Time: 1/2Hr.

Maximum marks: 10

- One internal exam at the end of the semester, of half an hour duration is to be conducted carrying 10 marks.
- Following is the examination pattern.
 - 10 MCQs (multiple choice questions) of one mark each, No assignment is required.

University Exam (Theory) for Sermester VI (Project/optional) only

3 Hours

Max Marks -60

Credits -3

PART -A Answer any Six questions in part –A 6X4 M = 24 Marks

UNIT- I 1
 2
 3

UNIT- II 4
 5
 6

UNIT- III 7
 8
 9

Part – B

Answer all Questions 12MX3 = 36 Marks

UNIT- I 13
 Or
 14

UNIT- II 15
 Or
 16

UNIT- III 17
 Or
 18

Internal Exam(Theory)for Semester VI (Project /optional)only

Time:1Hr.

Maximum marks:15

- Two internal exams (one at the middle of the semester and the other at the end) of one-hour duration are to be conducted carrying 15 markseach.
- Average of the scores of two exams should be taken intoaccount.
- Following is the examinationpattern.
 - 10 MCQs (multiple choice questions) of half markeach,
 - 10 FIBs (Fill in the Blanks) of half markeach
 - 5 SAQs (short answered questions) of one markeach
 - Totaling 15marks.
 - No assignment required.

**OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)**

Practical Question Paper(Project /optional)

3 HoursMax Marks -25

Credits -1

Answer any Two

6X2=12MARKS

UNIT – I	1 Program
UNIT- II	1 Program
UNIT-III	1 Program
UNIT-I or UNIT-II or UNIT-III	1 Program

Viva - 8 Marks

Record – 5 Marks

E-Learning:

- NPTEL :nptel.ac.in [Core Subjects Certification]
- C++INSTITUTE :cppinstitute.org [C++ Certification]
- ORACLEEDUCATION :education.oracle.com [Java, DBMS Certification]
- BIG DATAUNIVERSITY :bigdatauniversity.com [Big Data Certification]
- COURSERA :coursera.org [Core Subjects Certification]
- CODEACADEMY :codecademy.com [Coding Certification]
- KHANACADEMY :khanacademy.org [Core Subjects Certification]
- PIXAR INABOX :khanacademy.org/partner-content/pixar
- VIDEOLECTURES :videolectures.net
- YOUTUBEEDU :plus.google.com/+YouTubeEDU/posts
- DISNEYRESEARCH :disneyresearch.com
- ALISON :alison.com [Core Subjects Certification]
- INTERNETARCHIVE :archive.org

Freeware:

- SCILAB : scilab.org [MatLab Equivalent]
- GEOGEBRA :geogebra.org [Software for Class Room Teaching]

Search Engine:

- WOLFRAMALPHA :wolframalpha.com [Computing Engine]
- CITESEER :citeseerx.ist.psu.edu [Searching Research Articles]
- DOAJ :doaj.org [Open Access to Journals]