Certificate/Diploma in Software Development and Programming

Objective of the Course:

To provide training in software development, programming languages, and basics of Data Structures. The course also helps the candidates to get acquainted with basics of software development and programming techniques.

Learning Outcomes:

After completion of this course the students would be able to understand the program code written in C, C++, Python, write code in these languages, design OO structure diagram s and will have basic knowledge of databases.

Duration of the Course:

1) Certificate course: 6 months

2) Diploma: 12 months

Eligibility: Any student enrolled in the degree program of the college and having knowledge about the basics of Computers.

Sr. No.	Topics	
Topics covered under Certificate Course are Sr No. 1,2 and 3		
1	GC-SDP-01T Programming using C GC-SDP-01P Programming using C Lab	Credits: 6 (4 Th. 2 Lab)
2	GC-SDP-02T Object Oriented Analysis And Design Using Uml GC-SDP-02P Object Oriented Analysis And Design Using Uml Lab	Credits: 6 (4 Th. 2 Lab)
3	GC-SDP-03T Basics of Data Structure GC-SDP-03P Basics of Data Structure Lab	Credits: 6 (4 Th. 2 Lab)
Topics covered under Diploma Course are Sr No. 1,2,3,4,5 and 6		
4	GC-SDP-04TData Base Management System GC-SDP-04P Data Base Management System	Credits: 6 (4 Th. 2 Lab)
5	GC-SDP-05T Programming Fundamentals Using Python GC-SDP-05P Programming Fundamentals Using Python	Credits: 6 (4 Th. 2 Lab)
6	GC-SDP-06P Minor Project	Credits: 6

Detailed Contents

Programming Using C

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 35%

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Section A

Unit I: Simple Program logic, Pseudo-code, Problem Identification, Analysis, Flowcharts, and algorithms

Unit II: C Programming: character set, Identifiers and keywords, Data types, Declarations, Statement and symbolic constants, Input-output statements.

Unit III: Operators and Expressions: Arithmetic, relational, logical, unary operators, others operators,

Unit IV: Control statements: Branching, looping using for, while and do-while Statements, Nested control structures, switch, break, continue statements.

Section B

Unit V: Functions: Declaration, Definition, Call, passing arguments, call by value, call by reference, Recursion, Use of library functions; Storage classes: automatic, external and static variables.

Unit VI: Arrays: Defining and processing arrays, Passing array to a function, Using multidimensional arrays, Solving matrices problem using arrays.

Unit VII: Strings: Declaration, Operations on strings.

Unit VIII: Pointers: Pointer data type, Structures: Using structures and union

Suggested Reading:

1. Byron S Gottfried, Programming with C | 4th Edition (Schaum's Outlines)

2. Yashavant Kanetkar , Let Us C, 17TH EDITION

3. E Balagurusamy, Programming in ANSI C

Programming Using C Lab

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 2
Pass Percentage: 35%

The programs in lab will be based on the contents covered in the theory syllabus.

Object Oriented Analysis and Design Using UML

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 35%

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Section A

Unit I: Introduction to Object: Object Orientation, Development, Modeling, Object Modeling technique. Object modeling: Objects and classes, Links and Association, Generalization and inheritance

Unit II: Grouping constructs, Aggregation, Abstract Classes, Generalization as extension and restriction, Multiple inheritance

Unit III: Design Methodology, Analysis: Object modeling, Dynamic modeling, Functional modeling, Adding operations, Iterating Analysis.

Unit IV: Comparison of methodologies: Structured Analysis/Structured Design, Jackson Structured Development.

Section B

Unit V: Implementation: Using Programming Language, Database System, outside
Computer. Programming Style: Object Oriented Style, Reusability, Extensibility, Robustness, Programming in-the-large.

Unit VI: UML: Basics, Emergence of UML, Types of Diagrams. Use Case: Actors, Use Case Diagram, Relationships between Use Cases

Unit VII: Classes: Class Diagram, Classes, Objects, Attributes, Operations, Methods, Interfaces, Constraints, Generalization, Specialization, Association, Aggregation.

Unit VIII: Behavioral Diagrams: Activity Diagram, Collaboration Diagram, Sequence Diagram, State chart Diagram

Suggested Reading:

1. Ugrasen Suman, Object-oriented Analysis and Design Using UML,Cengage publications

2. Michael Blaha, Object - Oriented Modeling and Design with UML I Pearson

3. Sarnath Ramnath, Object-Oriented Analysis and Design, Springer

Object Oriented Analysis and Design Using UML Lab

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 2
Pass Percentage: 35%

The programs in lab will be based on the contents covered in the theory syllabus.

<div align="center">**Basics of Data Structure**</div>

<div align="right">
Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 35%
</div>

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

<div align="center">**Section A**</div>

Unit I: Basic concept of data, Problem analysis, algorithm complexity, Big O notation and time space trade off

Unit II: Introduction to array, stack, queue, add elements and remove elements in stack and queue at first ,last and nth location, application of stacks and queues,

Unit III: Linear and binary search, bubble sort, insertion sort, selection sort.

Unit IV: Link list, insertion, deletion, traversal

<div align="center">**Section B**</div>

Unit V: Stack using Link list, Queue using link list,

Unit VI: double link list insertion and deletion

Unit VII: Tree terminology, Binary tree, Binary Search tree, tree traversal,

Unit VIII: Insert and remove element in BST, heap, quick sort, merge sort.

Suggested Reading:

1. Seymour Lipschutz , Data Structures (Revised First Edition) | Schaum's Outline Series

2. Michael H. Goldwasser, Data Structures and Algorithms in Python

Basics of Data Structure Lab

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 2
Pass Percentage: 35%

The programs in lab will be based on the contents covered in the theory syllabus.

Database Management System

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 35%

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Section A

Unit I: Introduction to DBMS - Basic DBMS terminology, Data independence. Architecture of a DBMS

Unit II: Relational Keys: Primary Key, Foreign Key, Candidate Key, Super Key etc., and Integrity Constraints

Unit III: Relational model, Relational schema Hierarchical model, and Network model.

Unit IV: Normal Forms: Functional Dependency, INF, 2NF, 3NF, BCNF, 4NF, 5NF

Section B

Unit V: Structured Query Language - Introduction to SQL/MySQL, data types, DDL, DML, DCL, querying database tables, Data Definition Language (DDL)

Unit VI: Creating Tables, Inserting and updating values into a Table.

Unit VII: Data Manipulation Language: Various form of SELECT- simple, using special operators, aggregate functions, group by clause, sub query

Unit VIII: Introduction to views, Dropping a VIEW, GRANT command, REVOKE command, COMMIT and ROLLBACK

Suggested Reading:

1. James Groff , SQL The Complete Reference, 3rd Edition
2. Monika Pathak, Fundamentals of Database Management System (DBMS), Bookman Publishers
3. S. Sumathi, Fundamentals of Relational Database Management Systems, Springer

Database Management System Lab

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 2
Pass Percentage: 35%

The programs in lab will be based on the contents covered in the theory syllabus.

<h1 style="text-align:center">Programming Fundamentals Using Python</h1>

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 35%

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

<h3 style="text-align:center">Section A</h3>

Unit I: Introduction: Python installation and setup, Command line Basics; Python Objects.

Unit II: Data Structures Basics: Introduction to Python data types, Variable assignments, accepting input from the console, assignment statement,

Unit III: Expressions, operators and their precedence Numbers, String, String methods, Lists

Unit IV: Python Comparison Operators: Chaining comparison operators with logical operators, Pass Break and continue. write a lot of programs: interest calculation, primarily testing, and factorials.

<h3 style="text-align:center">Section B</h3>

Unit V: Program Flow control in Python: If Elif and Else statements in python, Loops: for loops, While loops

Unit VI: Methods and Functions in python: Introduction to functions, Def keyword, User defined functions, arguments and parameters, Parameter naming in python

Unit VII: Errors and Exception Handling: Introduction to errors, Built-in errors, raising errors in python

Unit VIII: File handling in Python: Files in python, importing own files, Read and writing text files, working with CSV, XML and JSON files.

Suggested Reading:

1. Udemy, https://www.udemy.com/course/python-the-complete-python-developer-course/

2. Timothy Budd, Exploring Python, TMH, 1st Ed, 2011

Programming Fundamentals Using Python Lab

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 2
Pass Percentage: 35%

The programs in lab will be based on the contents covered in the theory syllabus.

Minor Project

Minor project will be allocated to each student. The student can develop the project in C or python language, The project report will be submitted by the student for evaluation and viva - voce based on project will be conducted.

-----***----