B.Sc Physical Science with CS

Details of Papers

Sr. No	Semester	Paper Type	Subject Name	Learning Outcome
1.	**SEM I**	**Core Paper**	**Problem Solving using Computers (BSCS01)**	1. Describe the components of a computer and the notion of an algorithm. 2. Apply suitable programming constructs and data structures to solve a problem. 3. Develop, document, and debug modular python programs. 4. Use classes and objects in application programs. 5. Use files for I/O operations.
2.	**SEM II**	**Core Paper**	**Database Management Systems (BSCS02)**	1. Use database management system to manage data. 2. create entity relationship diagrams for modeling real-life situations and design the Database schema. 3. Use the concept of functional dependencies to remove data anomalies and arrive a Normalized database design. 4. Write queries using relational algebra and SQL.

3.	**SEM III**	**Core Paper**	**Operating Systems (BSCS03)**	1. Understand the rationale behind the current design and implementation decisions in modern Operating Systems by considering the historic evolution. 2. identify modules of the operating systems and learn about important functions performed by Operating system as resource manager. 3. Use the OS in a more efficient manner
		SEC 1	**Data Analysis using Python Programming (BSCS07A)**	1. Develop a python script for data analysis and execute it. 2. Install, load and deploy the required packages. 3. Clean and prepare the data for accurate analysis. 4. Analyze the data stored in files in different formats. 5. Experiment with data visualization methods.

4.	**SEM IV**	**Core paper**	**Computer System Architecture (BSCS04)**	1. Design combinational circuits using basic building blocks. Simplify these circuits using Boolean Algebra and Karnaugh maps. 2. differentiate between combinational circuits and sequential circuits 3. Represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary. 4. Determine various stages of instruction cycle, various instruction formats and instruction set. 5. Describe interrupts and their handling. 6. Explain how CPU communicates with memory and I/O devices.
		SEC 2	**Introduction to R Programming (BSCS07B)**	1. Develop an R script for data analysis and execute it. 2. Install, load and deploy the required packages. 3. Analyze the data stored in files in different formats. 4. Identify suitable data visualization and exploration methods to answer a business question. 5. Interpret the results of analysis.

5.	**SEM V**	**DSE 1**	**Data Structures (BSCS05A)**	1. Demonstrate a thorough understanding of the behavior of basic data structures. 2. Implement data structures efficiently in programming language C++. 3. Demonstrate an understanding of recursion by applying recursive techniques to solve problems.
		DSE 2	**Digital Image Processing (BSCS05B)**	1. Describe general terminology of Digital Image Processing and the roles of image processing systems in a variety of applications. 2. Describe the basic issues and the scope (or principal applications) of image processing. 3. explain representation and manipulation of digital images, image acquisition, reading, writing, enhancement, displaying and segmentation and image Fourier transform. 4. Examine various types of images, intensity transformations and spatial filtering.

		SEC-3	**Programming in C++ (BSCS08A)**	1. Solve simple programming problems using iteration and selection, and basic constructs: Structures, arrays and functions. 2. Create classes and their objects and use access specifies for data hiding depicting advantage of Abstraction. 3. construct classes for code reusability depicting advantage of Inheritance. 4. Implement Function Overloading depicting advantage of Polymorphism. 5. Create file, read/write from/to files.
			Programming in Java (BSCS08B)	1. Develop and execute Java programs using iteration and selection. 2. Create classes and their objects. 3. Implement OOPS concepts to solve problems using JAVA

6.	**SEM VI**	**DSE 1**	**Computer Networks (BSCS06A)**	1. Understand the basics of data communication. 2. Differentiate between various types of computer networks and their topologies. 3. Understand the difference between the OSI and TCP/IP protocol suit. 4. Explain merits and demerits of different types of communication media. 5. Distinguish between different types of network devices and their functions. 6. Use IP addressing and understand the need of various application layer protocols.
		DSE2	**Analysis of Algorithms (BSCS06B)**	1. Understand the idea of algorithm analysis. 2. Understand characteristics of searching and sorting algorithms and compare efficiency of different solutions for an application at hand. Model simple problems as **graphs** and solve those using graph algorithms.

		DSE3	**Project Work / Dissertation (BSCS06C)**	1. Develop a project plan based on informal description of the project. 2. Implement the project as a team. 3. Write a report on the project work carried out by the team and defend the work done by the team collectively. 4. Present the work done by the team to the evaluation committee.
		SEC-4	**Advanced Programming in Java (BSCS09A)**	1. Implement Exception Handling and File Handling. 2. Implement multiple inheritance using Interfaces. 3. logically organize classes and interfaces using packages 4. Use AWT classes to design GUI applications.
			Web Design using HTML5 (BSCS09B)	1. Define the principles and basics of Web page design. 2. Recognize the elements of HTML. 3. Apply basic concepts of CSS. 4. Publish web pages.
			Android Programming (BSCS10A)	1. Describe the design of Android operating system. 2. Describe various components of Android applications. 3. Design user interfaces using various widgets, dialog boxes, menus. 4. Design application with interaction among various activities/applications using intents. 5. Develop application(s) with database handling.

Details of Papers of Generic Elective - (GE)

Sr. No	Semester	Subject Name	Learning Outcome
7.	**SEM I**	**Programming using Python (CSGE101)**	1. Describe the components of a computer and notion of an algorithm. 2. Apply suitable programming constructs and built-in data structures to solve a problem. 3. Develop, document, and debug modular python programs. 4. Use classes and objects in application programs and visualize data.
8.	**SEM II**	**Database Management System (CSGE201)**	1. Describe the features of database management systems. 2. Differentiate between database systems and file systems. 3. Model an application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model. 4. Write queries in relational algebra / SQL. 5. Normalize a given database schema.
9.	**SEM III**	**Computer Networks (CSGE301)**	1. State the use of computer networks and different network topologies. 2. Distinguish between LAN, MAN, WAN, and between Intranet, Extranet and Internet. 3. Compare OSI and TCP/IP architectures 4. Enumerate different

			transmission media and describe the use of each of them. 5. Design web pages using HTML.
10.	**SEM IV**	**Information Security and Cyber Laws (CSGE401)**	1. Learn, structure, mechanics and evolution of various crime threats 2. Learn to protect information systems from external attacks by developing skills in enterprise security, wireless security and computer forensics. 3. Analyze the risks involved while sharing their information in cyber space and numerous related solutions like sending protected and digitally signed documents 4. Insights of ethical hacking and usage of password cracking tools 5. Get an overview of different ciphers used for encryption and decryption.