B.Sc Computer Science

(Semester with Choice Based Credit System)

Subjects in B.Sc Computer Science

I Year

I SEMESTER

S.No	SUBJECTS
1	Language.
2	Communicative English-I
3	Major- Python Programming
4	Major- Python Programming Practical
5	Allied-Mathematics-I
6	Skill Enhancement Course I: Office Automation
7	Foundation Course: Fundamentals of Computers

II SEMESTER

S.No	SUBJECTS
1	Language.
2	Communicative English-II.
3	Major- Introduction To Architecture And Microprocessor.
4	Major- Introduction To Architecture And Microprocessor Practical.
5	Allied-Mathematics-II.
6	Skill Enhancement Course II: Quantitative Aptitude.
7	Skill Enhancement Course III: Problem Solving Techniques

II Year

III SEMESTER

S.No	SUBJECTS
1	Language.
2	Language through Literature-I.
3	Major-Java & Data Structures.
4	Major-Data Structures using Java Lab.
5	Allied-Statistics-I.
6	Soft Skill-Essentials of Language & Communication.

IV SEMESTER

S.No	SUBJECTS
1	Language.
2	Language through Literature-II.
3	Major-Web Technology.
4	Major-Web Technology Lab.
5	Allied-Statistics-II.
6	Statistics I & II Practicals.
7	Environmental Studies.
8	Soft Skill-Quantitative Aptitude.

III Year

V SEMESTER

S.No	SUBJECTS
1	Computer Networks.
2	Operating Systems.
3	Relational Database Management Systems.
4	Elective-I Artificial Intelligence & Expert Systems.
5	PL/SQL Lab.
6	Operating Systems Lab.
7	Value Education.

VI SEMESTER

S.No	SUBJECTS
1	Software Engineering.
2	Introduction to Data Science.
3	Introduction to Cloud Computing.
4	Elective-II: Mobile Computing.
5	CASE Tools & Testing Tools Lab
6	Mini-Project.

SEMESTER- I

CORE: PAPER I-PYTHON PROGRAMMING(125C1A)	
This course covers the principles of Python and acquires skills in programming. It develops the emerging applications of relevant field using Python. It interprets basic Python syntax and semantics and control flow statements. It helps the students to develop simple turtle graphics programs using Python.	
CO 1	Develop and execute simple Python programs
CO 2	Write simple Python programs using conditionals and looping for solving problems
CO 3	Decompose a Python program into functions
CO 4	Represent compound data using Python lists, tuples, dictionaries etc.
CO 5	Read and write data from/to files in Python programs

CORE: PAPER II-PYTHON PROGRAMMING PRACTICAL (125C11)	
This course implements the python programming features in practical applications. Train students to write, test and debug simple Python programs using conditional and looping structures. It helps students to structure programs using functions and make use of Lists, Dictionaries, Tuples, Turtles, Files and Modules.	
CO 1	To understand the problem solving approaches
CO 2	To learn the basic programming constructs in Python
CO 3	To practice various computing strategies for Python-based solutions to real world problems
CO 4	To use Python data structures-lists, tuples, dictionaries.
CO 5	To do input/output with files in Python.

ALLIED MATHEMATICS-1	
Students understand the importance of mathematics in various fields and apply the formulations in his core study. They familiarize in correlate the mathematics with his	
study of course and hence apply the same and to apply the knowledge of Mathematics in relation to his modeling and implementation.	
CO 1	To make the student to understand the different methods of adding the series and hence find approximate solution and apply different method of interpolations.
CO 2	To understand the importance of matrices in solving the arithmetic and algebraic equations
CO 3	To understand the importance of matrices in solving the arithmetic and algebraic equations and hence making the calculations simple and easy.
CO 4	To understand the importance of Trigonometry and its applications in expansions and hence learning the hyperbolic conversions. Importance of Log expansions is given importance
CO 5	To understand the calculus branch of differentiation and hence the find difference in solving of differential equations and partial differential equations. To understand the knowledge of radius of curvature

Skill Enhancement Course I: Office Automation (125S1A)	
The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Exceland Power point. The course is highly practice oriented rather than regular class room teaching. To acquire knowledge on editor, spread sheet and presentation software.	
CO 1	Understand the basics of computer systems and its components.
CO 2	Understand and apply the basic concepts of a word processing package.
CO 3	Understand and apply the basic concepts of electronic spreadsheet software.
CO 4	Understand and apply the basic concepts of database management system.
CO5	Understand and create a presentation using PowerPoint tool.

Foundation Course: Fundamentals of Computers (125B1A)	
• to understand fundamentally the general scope of the computer system • to interact effectively with the computer • to know the uses of the basic components of the computer • to manage the system to some extent before involving an expert to know some basic things about the computer and the world	
CO 1	Fundamental concepts of computer
CO 2	Fundamental mathematical techniques and how they relate to computer
CO 3	The architecture of processing and file storage in a computer system
CO 4	Basic operations of operating systems
CO5	A variety of software packages applicable to an academic, software development andbusiness environment

SEMESTER- II

CORE: PAPER III-INTRODUCTION TO ARCHITECTURE AND MICROPROCESSOR (125C2A)	
The objective of this paper is to understand the basic organization of computers and the working of each component and the CPU. It brings out the programming features of 8085 Microprocessor and knows the features of latest Microprocessors. It makes students understand the principles of interfacing I/O Devices and Direct Memory Access (DMA).	
CO 1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085
CO 2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic.
CO 3	Applying different types of instructions to convert binary codes and analysing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.
CO 4	Analyse how peripheral devices are connected to 8085 using Interrupts and DMA controller.

CORE: PAPER IV- INTRODUCTION TO ARCHITECTURE AND MICROPROCESSOR PRACTICAL (125C21)	
The objective of this paper is to understand the programming features and operations of assembly language programs using 8085 Microprocessor kit / Simulator.	
CO 1	Remember the Basic binary codes and their conversions. Binary concepts are used inMicroprocessor programming and provide a good understanding of the architecture of 8085
CO 2	Understanding the 8085-instruction set and their classifications, enables the students to write the programs easily on their own using different logic.
CO 3	Applying different types of instructions to convert binary codes and analysing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.
CO 4	Analyse how peripheral devices are connected to 8085 using Interrupts and DMA controller.

ALLIED MATHEMATICS-II
C.O. Student will understand the importance of mathematics in various fields and apply the formulations in his core study and course work. To enhance the knowledge of the Mathematics in relation to computer studies and have a strong application module development skill.
CO I:To make the student to understand the different methods of finding the integral values using reduction formula and hence derive solution
CO II: To understand the different methods of solving the second order ODE depending on the functions given. To understand the difference in solving the ODE and PDE's.
CO III: To understand the importance of Laplace in the development and solving of complex problems and hence applying it on ordinary differential equations.
CO IV: To understand the importance of vector analysis and the application of differentials using del operator and hence understanding the physical interpretation in science.
CO V: To understand the calculus branch of Integration and hence applying the same in finding the line, area, volume of the different planes.

Skill Enhancement Course II: Quantitative Aptitude (125S2A)	
To improve the quantitative skills of the students To prepare the students for various competitive exams	
CO 1	To gain knowledge on LCM and HCF and its related problems
CO 2	To get an idea of age, profit and loss related problem solving.
CO 3	Able to understand time series simple and compound interests
CO 4	Understanding the problem related to probability, and series
CO5	Able to understand graphs, charts

Skill Enhancement Course III: Problem Solving Techniques (125S2B)	
To understand the importance of algorithms and programs, and to know of the basic problem-solving strategies. To learn efficient strategies and algorithms to solve standard problems, thus laying a firm foundation for designing algorithmic solutions to problems.	
CO 1	Understand the systematic approach to problem solving.
CO 2	Know the approach and algorithms to solve specific fundamental problems.
CO 3	Understand the efficient approach to solve specific factoring-related problems.
CO 4	Understand the efficient array-related techniques to solve specific problems.
CO5	Understand the efficient methods to solve specific problems related to text processing.Understand how recursion works.

SEMESTER- III

CORE: PAPER V- DATA STRUCTURES USING JAVA (SE23A)	
After successful completion of the course, the students are able to use the syntax and semantics of java programming language and basic concepts of OOPand Data Structure .Students develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages. they Apply the concepts of Multithreading, Exception handling and Applet to develop efficient and error free codes.	
CO 1	This unit covers history, Features, OOPS concepts, Data Types, Type casting, Variables, Operators - Operator Precedence, Control Statements and Arrays.
CO 2	This unit covers various overloading, overriding and Garbage Collection.
CO 3	This unit covers Packages, Exception handling, Threads, File System and Applet.
CO 4	This unit covers Abstract Data Types, Array based implementation, linked list implementation, Stackoperations, Queue
CO 5	This unit covers Trees, Binary Trees representation, Operations on Binary Trees, Traversal of a Binary Tree, Binary Search Trees and GraphRepresentation.

CORE: PAPER VI-DATA STRUCTURES USING JAVA LAB(SE231)	
This courseimplements the linear and non-linear data structures , operations of search trees and graph traversal algorithms	
CO 1	This unit covers implementing Stack ,Queue ADT using a singly linked list
CO 2	This unit covers implementingcircular Queue, infix expression, converts into postfix form
CO 3	This unit covers implementingevaluation of postfix expression and binary search tree.
CO 4	This unit covers implementing operations on binary search tree.
CO 5	This unit covers implementation of BFS,DFS for a given graph.

ALLIED STATISTICS - I	
C.O. To assists the students to solve the real life problems and obtaining the right solution requires understanding and modeling the problem correctly and applying appropriate optimization tools and skills to solve the model.	
CO 1	The students can know about the types data and learns how to classify the data. Also they learn to present the data through various graphs and TO prepare the table
CO 2	Knowing how to draw the various diagrams. They learn to construct the

	various type of chart, histogram, frequency polygon and ogives.
CO 3	The students can be able to calculate various measures of averages in statistics and its advantages
CO 4	Knowing to find the various measure of dispersion in statistics and its uses
CO 5	Knowing the construction of bivariate frequency table. They learn about the bivariate techniques correlation . They also learn the Association of attributes.

SEMESTER- IV

CORE: PAPER VII- WEB TECHNOLOGY (SE24A)	
The objective of this paper is to use PHP and MySQL to develop dynamic web sites for user on the Internet and also to develop web sites ranging from simple online information forms to complex e-commerce sites with MySQL database, building, connectivity, and maintenance	
CO 1	This unit covers the general concepts of PHP scripting language and the relationship between the client side and the server side scripts.
CO 2	This unit covers conditional, control and looping statements in PHP and numeric and string built in functions
CO 3	This unit covers arrays and its types and Date and Time functions in PHP
CO 4	This unit covers object oriented concepts and functions and its types. It also covers files and directories
CO 5	This unit covers the basic functions of MySQL database program and XML concepts

CORE: PAPER VIII- WEB TECHNOLOGY LAB (SE241)	
The objectives of this course are to have a practical understanding about how to write PHP code to solve problems and to display and insert data using PHP and MySQL.	
CO 1	To Write a PHP program which adds up columns and rows of given table, compute the sum of first n given prime numbers, email address validation, conversion of a number written in words to digit.
CO 2	To write a PHP script to delay the program execution, to changes the colour of the first character of a word, find multiplication table of a number
CO 3	To write a PHP program to understand the concepts of files and directories
CO 4	To write a PHP program code to manipulate data in MYSQL
CO 5	To write a program that connects to a MySQL database and retrieves the contents of any one of its tables asan XML file

ALLIED STATISTICS -II	
CO: Familiarizes the students with the basic knowledge of Statistics, and their tools used for applying appropriate optimization tools and skills to solve the model.	
CO 1	The students studies the basic concepts of probability and they can able to solve the simple problems. They learn the basic theorems in probability.
CO 2	The students learn the basic concepts of probability function. Knowing about standard discrete distributions and they can able to solve the simple problems on binomial, poisson distribution.
CO 3	The students learn continuous distributions (Normal and Exponential distribution). And they learn to estimate its properties
CO 4	The students can learn about the sampling distribution. Also the students know the difference between the small and large sample theory
CO 5	The students learn to analyse the data using statistical tests like t, F and chi-square Also the students able to describe and discuss anova techniques. They can able to analyse the data using anova techniques

SEMESTER- V

CORE: PAPER IX-OPERATING SYSTEMS (SE25B)	
The objective of this paper is to understand the fundamental concepts and role of Operating System, to learn Process Management and Scheduling algorithms, Memory Management policies, I/O and File Management Techniques.	
CO 1	This unit covers types of system, OS structure, Process Management, Inter process communication, CPU schedulers and Scheduling Algorithms.
CO 2	This unit covers various Process synchronization tools and Deadlocks.
CO 3	This unit covers various Memory Management Techniques, Contiguous and Non-Contiguous Memory allocation, Segmentation and Page Table.
CO 4	This unit covers Virtual Memory, Demand Paging Technique, File System Concepts, Protection, Allocation Methods and Free Space Management.
CO 5	This unit covers I/O Systems Interface, System Protection and Security.

CORE: PAPER X -COMPUTER NETWORK(SE25A)	
The objective of this paper is to understand concept of Computer network. Get knowledge about networking and inter networking devices. And analyze different network models, compare a number of data link, network and transport layer. Analysing key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI	
CO 1	

	This unit covers Network Hardware, Software, Reference Models, OSI and TCP/IP Models.
CO 2	This unit covers Wireless Transmission, Communication Satellites, Telephone System, Structure, Local Loop, Trunks, Multiplexing, Switching, Error Detection and Correction.
CO 3	This unit covers Elementary Data Link Protocols, Sliding Window Protocols, Data Link Layer, Channel Allocation Problem, Multiple Access Protocols and Bluetooth.
CO 4	This unit covers Network Layer, Design Issues, Routing Algorithms, Congestion Control Algorithms, IP Protocol, IP Addresses and Internet Control Protocols.
CO 5	This unit covers Simple Transport Protocol, Internet Transport Protocols and Cryptography..

CORE: PAPER XI- RELATIONAL DATABASE MANAGEMENT SYSTEMS (SE25C)	
The objective of this paper is to gain a good understanding of the architecture and functioning of Database Management Systems and also understand the use of Structured Query Language (SQL) and its syntax and apply Normalization techniques to normalize a database	
CO 1	This unit covers Describe basic concepts of database system and design a Data model and Schemas in RDBMS
CO 2	This unit deals with relational data model, relational calculus and domain relational calculus
CO 3	This unit covers various Normalization methods, Transaction processing and database security
CO 4	This unit covers SQL Commands, Data types, Join and Set Operations, Constraints and Sub query.
CO 5	This unit covers PL/SQL, Procedure, Function ,Packages, Exceptional Handling and Triggers

ELECTIVE: PAPER I- ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS (SE45A)	
The objective of this paper is gain a working knowledge of the foundations of and modern applications in, artificial intelligence heuristic search, knowledge representation and logic	
CO 1	This unit covers AI techniques, Problem Spaces, State space search and Production Systems
CO 2	This unit deals with Heuristic Search techniques like Generate and Test – Hill

	Climbing, Best-Fist, Problem Reduction, Constraint Satisfaction, Means-end analysis.
CO 3	This unit covers Representations and mappings , Approaches to Knowledge representations – Issues in Knowledge representations and Frame Problem.
CO 4	This unit covers predicate Logic, Computable functions and predicates, Resolution and Natural deduction.
CO 5	This unit covers Procedural Vs Declarative knowledge, Logic programming –Expert Systems

CORE: PAPER XII-OPERATING SYSTEMS LAB (SE252)	
The objective of this paper is to learn Process Management Scheduling, implement Memory Management policies and to understand various issues in implementing IPC.	
CO 1	Implement basic I/O programming and Scheduling Algorithms.
CO 2	Implement Reader/Writer problem using Semaphore and IPC.
CO 3	Implement Banker's Algorithm for Deadlock Avoidance.
CO 4	Implement FIFO and LRU Page Replacement Algorithms.
CO 5	Implement First Fit, Best Fit and Worst Fit algorithms for Memory Management.

CORE: PAPER XIII-PL/SQL LAB (SE251)	
The objective of this paper is to Learn the various DDL and DML commands, understand queries in SQL to retrieve information from data base, understand PL/SQL statements: Exception Handling, Cursors, and Triggers	
CO 1	Implement basic DDL , DML Commands with constraints.
CO 2	Implement SQL Queries: Queries, sub queries, Aggregate function
CO 3	Implement PL/SQL : Exceptional Handling and PL/SQL : Cursor
CO 4	Implement PL/SQL : Trigger and PL/SQL : Packages
CO 5	Design and develop database applications using front and back end tools

SEMESTER- VI

CORE: PAPER XIV-SOFTWARE ENGINEERING (SE26A)	
The objective of this paper is to introduce various Software Development Cycles, Structured and Object Oriented Analysis & Design concepts, UML and Software Testing Techniques.	
CO 1	This unit covers evolution of Software Engineering, Various Projects, and Software Life Cycle Models like Water Fall Model, RAD Model, Spiral Model and Agile Model.
CO 2	This unit covers Requirement Analysis & Specification, SRS and Formal System Specification.
CO 3	This unit covers concepts of Software Design, Coupling & Cohesion, Function Oriented Design, Structured Analysis & Design, DFD and Detailed design.
CO 4	This unit covers concepts of UML and UML diagrams like Use Case diagram, Class diagram, Interaction diagram, Activity diagram and State Chart diagram.
CO 5	This unit covers Coding, Reviews, and Documentation, Testing types like Black Box, White Box, Integration Testing, OO Testing and Smoke Testing.

CORE: PAPER XV- INTRODUCTION TO DATA SCIENCE (SE26B)	
To introduce the concepts, techniques and tools with respect to the various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling and effective communication.	
CO 1	This unit covers introduction of Data Science, Benefits and its uses and Big data ecosystem and datascience
CO 2	This unit covers various Data science process
CO 3	This unit covers various algorithms like Machine learning algorithms, Supervised, Unsupervised - Semi-supervised
CO 4	This unit deals with various frameworks like Hadoop, Spark and also about NoSQL – ACID – CAP – BASE – types
CO 5	This unit deals with case study – Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling -presentation and automation

CORE: PAPER-XVI -INTRODUCTION TO CLOUD COMPUTING(SE26C)	
The objective of this paper is to understand Cloud Computing and its various levels of services that can be achieved by cloud.	
CO 1	This unit covers Introduction to Cloud Computing, Types of Cloud and Working of Cloud Computing
CO 2	This unit covers Cloud Computing Architecture, Cloud Computing Technology, Cloud Architecture, Cloud Modeling, Design and Virtualization,
CO 3	This unit covers Data Storage from LANs to WANs, Cloud, Cloud Services ,Cloud Computing at Work
CO 4	This unit covers Cloud Computing and Security ,Tools and Technologies for Cloud, Cloud Mashaps, Apache Hadoop
CO 5	This unit covers finding square and square root Cloud Applications,Moving Applications to the Cloud, Microsoft Cloud Services, Google Cloud Applications Amazon Cloud Services and Cloud Applications

ELECTIVE : PAPER II- MOBILE COMPUTING(SE46A)	
The objective of this paper is to understand the concepts of mobile computing and familiar with the network protocol stack, Ad-Hoc networks Gain knowledge about different mobile platforms and application development	
CO 1	This unit covers Mobile Computing Vs wireless Networking, Mobile Computing Applications and Characteristics of Mobile computing .
CO 2	This unit covers Mobile Internet Protocol, Transport Layer, Mobile IP and TCP/IP .
CO 3	This unit covers various Mobile Telecommunication SystemGlobal System for Mobile Communication, General Packet Radio Service, Universal Mobile Tele communication System.
CO 4	This unit covers Mobile Ad-Hoc Networks-Ad-Hoc Basic Concepts , MANET Vs VANET and Security.
CO 5	This unit covers Mobile Platforms and Applications.