Programme Specific Outcome (PSO) and Course Outcome (CO)

Department of Computer Science

Government General Degree College Singur

Name of The Programme	Year of Introduction	Core Course	Programme Specific Outcome	Course Outcome
B.Sc. Computer (Hons.) under CBCS	2017-18	CC 1: Programming Fundamentals using C/C++	This programme aims to introduce to the fundamentals of programming using C and C++ languages	1.1 Introduces to the basics of Procedure Oriented Programming and Object oriented programming 1.2 Discusses about various data types, constants, different types of operators 1.3 Brief introduction about precedence of operators and associativity, loops and conditional statements 1.4 Extensive use of library and user-defined functions. Use of array with different array related operations. Introduction to multidimensional arrays. 1.5 Use of structures and Unions 1.6 Extensive use of pointers within the program. 1.7 Dynamic Memory allocation using in-built function malloc and calloc. 1.8 File handling in programs using in-built file related functions.Use of Macros in programs. Difference between macro and function. 1.9 Use of Class and object in OOP with different access specifiers. Different characteristics of OOP. 1.10 Brief introduction to polymorphism using function overloading and operator overloading. 1.11 Necessity of Inheritance in OOP. Significance of exception handling in programs using try-catch statements.

		CC 2: Computer System Architecture	This course is aimed at the basic idea on Computer System architecture	2.1 This unit discusses in some detail the boolean algebra, logic gates and combinational and sequential circuits. 2.2 Focuses on representation of numbers; both fixed and floating point with basic operations on them. 2.3 This section discusses the basic computer organisation highlighting on bus systems, instruction cycle and interrupt. 2.4 This unit deals with different types of CPU architectures like RISC and CISC. Advanced topics like pipelining are introduced. 2.5 This unit deals with cache memory, main memory and its related different mapping techniques. 2.6 This section discusses different I/O devices and how it is connected with memory. Topics like DMA is also briefly introduced.
		CC 3: Programming in Java	This paper is a study on OOP using Java (J2SE) Programming language.	3.1 The first unit is an introduction to the Core JAVA programming language with its history. This section also discusses different operators, keywords, data types, and decision making statements. Also introduces Java methods. 3.2 This unit is about the Array class, String class and creation of objects of these classes. Also I/O related classes use is also introduced using Scanner and StreamBuffer.. 3.3 This unit deals with principles of OOP, use of constructors , method overloading, garbage collections etc. 3.4 This unit is about the use of different types of Inheritance, interface. Use of standard Java packages, Wrapper classes is also introduced. 3.5 This unit is dedicated to the use of different types of exceptions using built-in exceptions and user created exceptions. Use of Thread and its related different operations is also introduced. 3.6

				The unit deals with applets creation with graphics.
		CC 4: Discrete Structure	This program deals with the portion of mathematics that belongs to discrete structures.	4.1 The first unit is an introduction to Sets, Relations, and different counting mechanisms like Pigeonhole principle. 4.2 The second unit deals with the different asymptotic notations for growth of functions. 4.3 This unit introduces Recurrence relations and Generating functions. Solution methods of recurrence relations is also discussed with the help of recurrence tree and Master theorem. 4.4 This portion introduces Graph theory. Use of different types of graphs and their applications are discussed. Topics like Planar graphs and Graph colouring are also briefly highlighted. 4.5 This section discusses about propositional logic and different connectives. 4.6 The final unit studies the rise of Islamic states in the east after the fall of Roman civilization. It discusses the Caliphate and its overall authority as an embodiment of state
		CC 5: Data Structure	This programme aims to teach students about the different Data Structures available for implementation in programming languages.	5.1 The first unit offers to understand the use of array data structures and its implementation. 5.2 This unit explains the importance of Stack data structure and its applications. 5.3 This unit deals with linked lists implementation. 5.4 This unit teaches the implementation of a queue using array and linked lists. Different types of queues are also discussed. 5.5 This unit introduces recursion and its implementation to programs. Advantages and disadvantages of recursion are also discussed. 5.6

				This final unit is introduced to Tree data structure, especially binary tree. Different operations related to tree are also explained in the introduction to threaded binary tree. 5.7 This unit introduces searching operations using linear and binary search. Different sorting operation is also explained like Bubble, Insertion, Shell.
		CC 6: Operating System	This Programme is related to the operating system and its overall working principle.	6.1 The first unit introduces to the basics functions of an operating system and different types of operating systems are also mentioned. 6.2 This unit focuses on the internal organisation of operating systems like kernel, shell. 6.3 This unit extensively discusses processes and different types of processes. Process management is also elaborated with process scheduling algorithms 6.4 This unit discusses different memory management strategies that deal with paging and segmentation. 6.5 This unit briefly discusses the directory structure, file related operations and file allocation methods. 6.6 The final unit deals with protection and security mechanisms of a system.
		CC 7: Computer Networks	This programme deals with the network of computers and its different aspects.	7.1 The first unit offers the introduction to the computer network and its different types. Concept of OSI and TCP/IP model is also briefly discussed in order to understand the layered architecture of computer networks. 7.2 This unit describes the basics of data communications with different types of data like Analog and Digital. Different encoding schemes are also introduced. Use of multiplexing techniques is briefly explained. Use of different types of transmission medium is also highlighted. 7.3 This unit studies the different types of switching like: circuit-switching, packet switching. 7.4 This unit discusses the functions and protocols of the Data link layer. Error detection and correction techniques are discussed with error recovery protocols.

				7.5 This unit deals with Medium access protocols like ALOHA & CMSA . Different networking devices are also introduced like repeaters, hubs, switches etc. 7.6 The unit deals with the different routing algorithms . 7.7 This unit discusses on Transport layer service like error and flow control. Introduction of 3-way handshake. 7.8 The final unit gives overview on different protocols: HTTP, FTP, DNS etc.
		CC 8: Design and Analysis of Algorithms	This paper deals with the art of designing algorithms and its analysis	8.1 The first unit gives a brief introduction design and analysis of algorithms and its correctness. 8.2 This unit elaborated the different algorithm design techniques like Divide-and-Conquer, Dynamic programming, Greedy method with popular real life applications. 8.3 This sections discusses different algorithms on Searching and Sorting techniques. 8.4 & 8.5 Here, trees like Decision tree, AVL tree and Red-black tree are discussed with applications. 8.6 This unit gives a brief introduction on amortised analysis techniques. 8.7 This section is focused on on Graph related algorithms like: BFS, DFS, Dijkstra, Bellman-ford etc. 8.8 This unit gives stress on String related operations and its corresponding popular algorithm techniques. 8.9 This final unit is focused on basic cryptographic algorithms like DSA and RSA. Different classes of algorithms are also discussed: P, NP, NP-Hard and NP-Complete.
		CC 9: Software Engineering	This paper studies the basics of software and how it is being made with the sequence of different steps.	9.1 This unit introduces the role of software and its characteristics. Software process framework, different process models SMMI is also discussed. 9.2

				The second unit deals with the requirement analysis of software. Characteristics and Components of SRS are also discussed. 9.3 This unit briefly discusses the software project planning and scheduling. 9.4 This unit focuses on different software risks and risk identification, risk projection and risk refinement. 9.5 This unit focuses on software quality management 9.6 This unit deals with DFD design and its different aspects 9.7 The final portion focuses on the necessity of software testing and different types of testing like: Black-box testing, White box testing etc.
		CC 10: Database Management System	This program is about the Database Management system that is used in everyday life	10.1 The first unit introduces different data models and database architecture. It Also focuses on data independence. 10.2 This section explains the use of ER modelling in database design and its different aspects. 10.3 Next section discusses Relational model and relational calculus and SQL queries. 10.4 This portion demonstrates the mapping of ER/EER model to relational database. Extensive use of functional dependencies and normalisation is also explained. 10.5 This section gives a brief introduction to Transaction processing. 10.6 This section highlights on File organisations and different File Indexing structures.
		CC 11: Internet Technologies	This program deals with the use of different technologies for designing web related elements.	11.1 The first unit deals with creation of Java objects and use of Array and Array List class. 11.2

				This unit helps to learn the use of Javascript to design web pages using available Data types, Operators, functions, control structures etc. 11.3 This section deals with the fundamentals of JDBC, connectivity and use of SQL statements. 11.4 This section deals with Java Server pages and use of its different components 11.5 The final sections introduces Java Beans and its connection to the database.
		CC 12: Theory of Computation	The paper is a theoretical one that highlights the different types language and its grammar and processing it using computer system.	12.1 The first unit delas with the basics of languages and its operations. 12.2 The second unit describes the deterministic and non-deterministic finite automata and regular languages and their relationship with finite automata. Introduction to Melay and Moore machines are also given. 12.3 Philosophy of history, its meaning and evolution, nature and objective of history, narratives 12.4 Next section deals with context-free languages and its different properties, use of pushdown automata. Brief introduction to Pumping Lemma. 12.5 The final section deals with Turing machines, Universal Turing machines and different types of languages.
		CC 13: Artificial Intelligence	The program is an introduction to AI for undergraduate students.	13.1 The section deals with the background of AI and its applications with the introduction to intelligent agents and their behaviour with respect to their environment. 13.2 This portion deals with different types of problem solving techniques and searching techniques like: heuristic search, A* algorithm etc. 13.3

				This section deals with knowledge representation using first order predicate logic. Use of Prolog/LISP is also done. 13.4 This portion deals with uncertainty and inconsistencies 13.5 Different parsing techniques are discussed along with context-free and transformational grammars.
		CC 14: Computer Graphics	This program introduces UG students to basics of Computer Graphics and its real life applications	14.1 The first unit deals with the basic elements of Computer graphics and its applications. 14.2 This section discusses different hardware devices used in computer graphics. 14.3 The unit describes the fundamental algorithms to plot basic geometric shapes like straight lines, circle, ellipse etc. Next, polygon filling along with line and polygon clipping is discussed with algorithms.2D and 3D transformations are explained. Finally this section ends with a brief introduction on different types of projections. 14.4 This section deals with Geometric modelling of curves and surfaces. 14.5 This portion describes the techniques of elimination of hidden surfaces. 14.6 The final setion concludes with different shading models. Also a brief description of different colour models and computer animation.
		DSE 1: Microprocessors	This program gives an extensive overview of Intel 8085 microprocessor	1.1 The first unit gives an overview of Intel 8085 microprocessor's internal architecture and system bus architecture and the interfaces between memory and I/O. 1.2 The next unit gives description of register organisation, instruction formats and 8085 assembly language programming. 1.3 This unit deals with memory address decoding, I/O interface and keyboard and display interface, DMA controller etc.

		DSE 2: Numerical Methods	This program gives extensive details on numerical methods used in different realw-orld problems.	2.1 The first unit introduces different types of errors in numerical computations. 2.2 The next unit deals with finding roots of algebraic and transcendental equations using methods like Bisection, Newton-Raphson etc. 2.3 The next section deals with Gauss-elimination method, Gauss-Jordon method, Gauss Thomas method for tridiagonal systems. Jacobi and Gauss- Seidel methods are also discussed. Later, Cubic spline interpolation methods is also mentioned briefly 2.4 This section deals with numerical differentiation with first-order and second order derivatives. 2.5 In this section numerical integration is explained with the help of Trapezoidal rule and Simpson's rule. Romberg integration method is also described. 2.6 This section highlights numerical methods to solve differential equations using the Euler method and R-K method of 2nd and 4th order..
		DSE 3 Soft Computing	This program an introduction to soft computing, Neural Networks and Genetic algorithms	3.1 The module-I gives an introduction to fuzzy sets and fuzzy logic. 3.2 This section deals with fuzzy sets operations and properties of fuzzy sets.Membership functions are also explained along with fuzzy to crisp set conversion. Finally a fuzzy rule based system is introduced. 3.3 Module 3 introduces Neural Networks and its different learning models. Different neural network models are also discussed.
		DSE 4 Project Work	This program is to engage students to solve real life problems using computer based approach	
		SEC-1 Programmin g in Python	This program aims to teach theoretical and practical aspects of Python programming	1.1 The first unit deals with the use of programming in problem solving. 1.2 This unit deals with different techniques of problem solving with the help of flowchart and algorithms.

				1.3 This unit gives an introduction to Python programming. 1.4 This unit briefs on different keywords, operators , identifiers of python. 1.5 This unit shows the usage of I?O statements, different control statements and use of functions in Python.
		SEC 2 UNIX/LINUX Programming	This program aims to teach the basic interaction with UNIX/LINUX Operating system with shell programming techniques	2.1 This unit gives a brief introduction to the UNIX/LINUX Operating system. Also introduces basic internal and external commands. 2.2 This unit briefs about file types and different types of users. 2.3 This portion deals with writing shell programs using system calls, pipes, filters, loops, functions and using different utilities.