UG COURSE OUTCOMES - 2022 SCHEME

3rd Semester			
Subject:	**Mathematics for Computer Science**		
Subject Code:	**BCS301**	**NBA Code:**	**22C201**
CO1	Explain the basic concepts of probability, random variables, probability distribution and apply suitable probability distribution models for the given scenario		
CO2	Apply the notion of a discrete-time Markov chain and n-step transition probabilities to solve the given problem		
CO3	Use statistical methodology and tools in the engineering problem-solving process		
CO4	Compute the confidence intervals for the mean of the population		
CO5	Apply the ANOVA test related to engineering problems		

3rd Semester			
Subject:	**Digital Design & Computer Organization**		
Subject Code:	**BCS302**	**NBA Code:**	**22C202**
CO1	Apply the K–Map techniques to simplify various Boolean expressions.		
CO2	Design different types of combinational and sequential circuits along with Verilog programs		
CO3	Describe the fundamentals of machine instructions, addressing modes and Processor performance		
CO4	Explain the approaches involved in achieving communication between processor and I/O devices.		
CO5	Analyze internal Organization of Memory and Impact of cache/Pipelining on Processor Performance.		

3rd Semester			
Subject:	**Operating Systems**		
Subject Code:	**BCS303**	**NBA Code:**	**22C203**
CO1	Explain the structure and functionality of operating system.		
CO2	Apply appropriate CPU scheduling algorithms for the given problem.		
CO3	Analyse the various techniques for process synchronization and deadlock handling.		
CO4	Apply the various techniques for memory management		
CO5	Understand File Systems, Secondary Storage Structures, and Protection Principles in Operating Systems.		

3rd Semester	
Subject:	**Data Structures and Applications**
Subject Code:	**BCS304**	**NBA Code:**	**22C204**
CO1	Explain different data structures and their applications.
CO2	Apply Arrays, Stacks and Queue data structures to solve the given problems.
CO3	Use the concept of linked list in problem solving.
CO4	Develop solutions using trees and graphs to model the real-world problem.
CO5	Explain the advanced Data Structures concepts such as Hashing Techniques and Optimal Binary Search Trees.

3rd Semester	
Subject:	**Data Structures Lab**
Subject Code:	**BCS305**	**NBA Code:**	**22C205**
CO1	Analyze various linear and non-linear data structures
CO2	Demonstrate the working nature of different types of data structures and their applications
CO3	Use appropriate searching and sorting algorithms for the give scenario.
CO4	Apply the appropriate data structure for solving real world problems
CO5	Apply advanced data structure concepts such as hashing techniques to solve real world problems

3rd Semester	
Subject:	**Object Oriented Programming with Java**
Subject Code:	**BCS306A**	**NBA Code:**	**22C206**
CO1	Demonstrate proficiency in writing simple programs involving branching and looping structures
CO2	Design a class involving data members and methods for the given scenario.
CO3	Apply the concepts of inheritance and interfaces in solving real world problems
CO4	Use the concept of packages and exception handling in solving complex problem
CO5	Apply concepts of multithreading, autoboxing and enumerations in program development

3rd Semester			
Subject:	Social Connect and Responsibility		
Subject Code:	BSCK307	NBA Code:	22C207
CO1	Develop effective communication skills to connect with the surrounding environment, communities, and cultural heritage during plantation and adoption activities.		
CO2	Foster a responsible and engaged relationship with society through the exploration of local history, heritage, and traditional crafts during the heritage walk and crafts corner activities.		
CO3	Demonstrate an understanding of organic farming practices, waste management techniques, and their impact on neighboring villages and campus environments.		
CO4	Investigate and promote water conservation practices through the documentation and analysis of current methods in surrounding villages and their implementation on campus.		
CO5	Engage in the exploration of local culinary practices, food traditions, and indigenous ingredients to appreciate and promote the cultural significance of food in the region.		

3rd Semester			
Subject:	Data analytics with Excel		
Subject Code:	BCS358A	NBA Code:	22C208
CO1	Use advanced functions and Segregation functions to assist in developing worksheets.		
CO2	Use of productivity tools to develop a worksheets		
CO3	Manipulate data lists using Outline and PivotTables.		
CO4	Use Consolidation to summarise and report results from multiple worksheets.		
CO5	Apply Macros and Autofilter to solve the given real world scenario.		

4th Semester			
Subject:	Analysis & Design of Algorithms		
Subject Code:	BCS401	NBA Code:	22C209
CO1	Apply asymptotic notational method to analyze the performance of the algorithms in terms of time complexity.		
CO2	Demonstrate divide & conquer approaches and decrease & conquer approaches to solve computational problems.		
CO3	Make use of transform & conquer and dynamic programming design approaches to solve the given real world or complex computational problems.		
CO4	Apply greedy and input enhancement methods to solve graph & string based computational problems.		
CO5	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NP Complete problems.		

4th Semester	
Subject:	Microcontrollers
Subject Code:	BCS402	NBA Code:	22C210
CO1	Explain the ARM Architectural features and Instructions.
CO2	Develop programs using ARM instruction set for an ARM Microcontroller.
CO3	Explain C-Compiler Optimizations and portability issues in ARM Microcontroller.
CO4	Apply the concepts of Exceptions and Interrupt handling mechanisms in developing applications.
CO5	Demonstrate the role of Cache management and Firmware in Microcontrollers.

4th Semester	
Subject:	Database Management Systems
Subject Code:	BCS403	NBA Code:	22C211
CO1	Describe the basic elements of a relational database management system.
CO2	Design entity relationship for the given scenario.
CO3	Apply various structured query language (SQL) statements for database manipulation.
CO4	Analyze various normalization forms for the given application.
CO5	Understand the concepts related to NOSQL databases.

4th Semester	
Subject:	Analysis & Design of Algorithms Lab
Subject Code:	BCSL404	NBA Code:	22C212
CO1	Develop programs to solve computational problems using suitable algorithm design strategy.
CO2	Compare algorithm design strategies by developing equivalent programs and observing running times for analysis (Empirical).
CO3	Make use of suitable integrated development tools to develop programs
CO4	Choose appropriate algorithm design techniques to develop solution to the computational and complex problems.
CO5	Demonstrate and present the development of program, its execution and running time(s) and record the results/inferences

4th Semester			
Subject:	**Discrete Mathematical Structures**		
Subject Code:	**BCS405A**	**NBA Code:**	**22C213**
CO1	Apply concepts of logical reasoning and mathematical proof techniques in proving theorems and statements		
CO2	Demonstrate the application of discrete structures in different fields of computer science		
CO3	Apply the basic concepts of relations, functions and partially ordered sets for computer representations.		
CO4	Solve problems involving recurrence relations and generating functions.		
CO5	Illustrate the fundamental principles of Algebraic structures with the problems related to computer science & engineering		

4th Semester			
Subject:	**Green IT and Sustainability**		
Subject Code:	**BCS456A**	**NBA Code:**	**22C214**
CO1	Classify the challenges for Green ICT		
CO2	Relate the environmental impact due to emerging technologies.		
CO3	Demonstrate different aspects of ICT metrics.		
CO4	Compare the various parameters related to Sustainable Cloud Computing.		
CO5	Interpret the effects of software design on the sustainability.		

4th Semester			
Subject:	**Biology For Computer Engineers**		
Subject Code:	**BBOC407**	**NBA Code:**	**22C215**
CO1	Elucidate the basic biological concepts such as cell biology, stem cells, biomolecules properties and key biomolecule function		
CO2	Explore the application of biomolecules in biotechnology, medicine and industry.		
CO3	Understanding the anatomical knowledge to the design and development of bioengineering solution		
CO4	Understanding the natural material and mechanism for bio inspiration		
CO5	Discussing the impact of bioengineering on healthcare, sustainability and industry.		

4ᵗʰ Semester			
Subject:	**Universal human values course**		
Subject Code:	**BUHK408**	**NBA Code:**	**22C216**
CO1	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.		
CO2	They would have better critical ability.		
CO3	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).		
CO4	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.		
CO5	Develop a holistic vision and social responsibility, fostering environmentally conscious behavior and societal well-being.		