DEPARTMENT OF COMPUTER SCIENCE

Programme: B.Sc., Computer Science

PO No.	Programme Outcomes Upon completion of the B.Sc. Degree Programme, the graduate will be able to
PO-1	emerge with competency in the subject of Computer Science and apply knowledge to cater to the needs of Society / Employer / Institution / Own Business Enterprise
PO-2	imbibe analytical / critical / logical / innovative thinking skills in the field of Science and Technology
PO-3	acquire distinct traits and ethics with high professionalism to gain a broader insight into the domain concerned for nation building
PO-4	work in team to build a system, component, or process to meet the desired needs of IT Industries and other Employment Sectors
PO-5	analyze a problem and use appropriate skills, latest tools, technologies necessary for computing practice

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would
PSO-1	transform and empower women graduates to meet challenges through holistic education in terms of modern Teaching-Learning methodologies
PSO-2	groom the graduates to excel in their career through communication skills and leadership challenges
PSO-3	heighten the conscious of the graduates on socio-economic concern and to evolve it as an inbuilt mechanism to chisel as better human being
PSO-4	train the students on the state-of-the-art tools and techniques and facilitate them to comprehend, analyze, design and create feasible solutions/innovative products for real life problems
PSO-5	make the students socially responsible, compassionate graduates and solution providers with due empathy

Course Title	C PROGRAMMING	
CODE	**18CSUC101 / 18CAUC101**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Demonstrate the basic concepts of Algorithms to solve problems	K2
CO-2	Define the fundamentals of C Programming	K1
CO-3	Distinguish between branching and looping concept	K4
CO-4	Develop C programs using Array Data structure, Functions, Structure, Union and Pointers to solve complex problems	K3
CO-5	Apply File concepts to data storage and manipulation	K3

Course Title	C PROGRAMMING LAB	
CODE	**18CSUCP01/ 18CAUCP01**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Demonstrate branching and looping constructs	K2
CO-2	Distinguish between Iteration and Recursion	K4
CO-3	Construct C programs using arrays and functions	K3
CO-4	Make use of Pointers in C Programs	K3
CO-5	Build C programs for Biological Problems	K3

Course Title	MATHEMATICS – I (NUMERICAL METHODS AND BIO STATISTICS) (Derivations not included – Problems only)	
CODE	**18CSUA101/18CAUA101/ 18ITUA101/18CTUA101**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Identify and Apply the matrix operations for solving any matrix related problems	K1 - K3
CO-2	Determine and apply appropriate numerical methods for solving System of Linear Equations	K2 - K4
CO-3	Compare and distinguish the use of differentiation / integration methods and plan for solving scientific problems.	K3 - K4
CO-4	Analyze and infer the type of data for using measures of location and measures of dispersion.	K2 - K4
CO-5	Recognize and apply the correlation/regression methods for finding the association between the dependent and independent variables.	K2 - K3

Course Title	DIGITAL FUNDAMENTALS AND ARCHITECTURE	
CODE	**18CSUC202/18CAUC202**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Acquire knowledge on number systems and Boolean algebra	K2
CO-2	Interpret logic functions, circuits, truth tables, and Boolean algebra expressions for logic gates	K3
CO-3	Simplify the Boolean expressions and circuits using Karnaugh Maps	K3

CO-4	Outline the fundamentals of combinational logic design, Flip-Flop, computer buses, I/O Peripherals and various data transfer techniques	K2
CO-5	Outline the concept of Memory Organization and mapping Techniques	K2

Course Title	**LINUX AND PERL PROGRAMMING**	
CODE	**18CSUC203/ 18CAUC203**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Explain the structure of Linux Operating System	K2
CO-2	Develop Linux utilities to perform File processing, Directory handling, User Management and display system configuration	K3
CO-3	Develop shell scripts using pipes, redirection, filters and Pipes	K2
CO-4	Understand the concepts of process, backup and compression	K3
CO-5	Develop Perl scripts using array, hash data structures and Regular expressions	K3

Course Title	LINUX AND PERL PROGRAMMING LAB	
CODE	**18CSUCP02/18CAUCP02**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Develop Linux utilities to perform File processing, Directory handling and User Management	K3
CO-2	Develop shell scripts using pipes, redirection, filters and Pipes	K3
CO-3	Develop shell scripts to display system configuration	K3
CO-4	Develop simple Perl scripts	K3
CO-5	Develop simple Perl scripts applicable to Bioinformatics	K3

Course Title	MATHEMATICS – II (DISCRETE STRUCTURES)	
CODE	**18CSUA202/18ITUA202**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the logical proof and Connectives	K2
CO-2	Understand the concepts of equivalence and implication to formulas of the predicate calculus	K2
CO-3	Demonstrate Relations and Functions and determine the properties of Relations	K2
CO-4	Construct language from a grammar	K3
CO-5	Identify shortest path between two nodes. Classify different types of sets and express the logical relationships between various sets	K3

Course Title	DATA STRUCTURES AND ALGORITHMS	
CODE	**18CSUC304/ 18CAUC304**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts of data structures and algorithms	K1-K2
CO-2	Construct and analyze of stack and queue operations with illustrations	K2-K4
CO-3	Enhance the knowledge of Linked List and dynamic storage management.	K2-K3
CO-4	Demonstrate the concept of trees and its applications.	K2-K3
CO-5	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations.	K1-K4

Course Title	OBJECT ORIENTED PROGRAMMING WITH JAVA	
CODE	**18CSUC305 / 18CAUC305 / 18CTUC305**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Demonstrate the concept of object oriented programming through Java	K1, K2
CO-2	Illustrate the syntax and semantics of Java	K2
CO-3	Apply the concept of Inheritance, Modularity, Concurrency, Exceptions handling and data persistence for developing java program	K3
CO-4	Develop java programs for applets and graphics programming	K3
CO-5	Understand the fundamental concepts of AWT controls, layouts and events	K1,K2

Course Title	INTERNET OF THINGS	
CODE	**18CSUC306**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	To understand the physical, logical design of IoT and to identify various IoT levels	K1
CO-2	To describe conceptual framework, architectural views and technology behind IoT	K2
CO-3	To understand the Physical Servers and different types of applications in various domains	K1
CO-4	To demonstrate the design methodology and building blocks of IoT devices	K2
CO-5	To understand IoT privacy, security, vulnerabilities solutions and business models	K1

Course Title	**JAVA PROGRAMMING LAB**	
CODE	18CSUCP03/ 18CAUCP03 / 18CTUCP03	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping	K2
CO-2	Develop Java programs using Strings, Interfaces and Packages	K3
CO-3	Construct Java programs using Multithreaded Programming and Exception Handling	K3
CO-4	Build Java programs for Applets and Graphics programming	K3
CO-5	Create data files and Design a page using AWT controls &MouseEvents in Java programming	K3

Course Title	BUSINESS ACCOUNTING (40% Theory & 60% Problems only)	
CODE	**18CSUA303/18CAUA303**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Identify and Apply the appropriate accounting rules for the preparation of Journal and method of posting the same into Ledger	K1 - K3
CO-2	Select, Classify, Choose and Categorize the given entries to enter in appropriate subsidiary books	K1 - K4
CO-3	Classify, Apply and Build various financial statements like Trial Balance, Trading, P&L account and Balance Sheet	K2 - K4
CO-4	Define, Explain and Apply appropriate depreciation method to prepare Machinery Account	K1 - K3
CO-5	Classify the elements of cost and Construct the Cost Sheet accordingly	K2 - K3

Course Title	RELATIONAL DATABASE MANAGEMENT SYSTEMS	
CODE	**18CSUC407/ 18CAUC407/18CTUC304**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts of Relational Data Model, Entity-Relationship Model and process of Normalization	K1 – K2
CO-2	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment	K1 – K3
CO-3	Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	K2 - K4
CO-4	Understand and use built-in functions and enhance the knowledge of handling multiple tables	K1 – K3

CO-5	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions	K1 – K4

Course Title	**WEB PROGRAMMING**	
CODE	**18CSUC408/ 18CAUC408**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the concept of XHTML document and create a basic web page using forms and Tables.	K2
CO-2	Create document with different styles and Identify the positioning of web page elements using Cascading Style Sheets.	K2
CO-3	Understand the basic concepts of JAVA SCRIPT.	K3
CO-4	Describe the concept of Arrays and Functions.	K3
CO-5	Develop applications using Objects and Events.	K3

Course Title	**OPERATING SYSTEMS**	
CODE	**18CSUC409/ 18CAUC409**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts of a process and its states	K1
CO-2	Acquire the knowledge of real storage and virtual storage	K2
CO-3	Procure the facts of processor scheduling by means of various scheduling algorithms	K2

CO-4	Understand the basic operations on primary and secondary storage disks	K3
CO-5	Get awareness about the functions of a file system. Able to relate UNIX and LINUX operating system	K2

Course Title	**WEB PROGRAMMING LAB**	
CODE	18CSUCP04/ 18CAUCP04	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Design and develop their own web page	K2
CO-2	Design and develop programs using CSS	K2
CO-3	Implement the concept of functions in javascript	K3
CO-4	Implement the concept of arrays and strings..	K3
CO-5	Develop applications using Events and Objects.	K4
Course Title	**ALLIED PAPER IV : OPERATIONS RESEARCH**	
CODE	**18CSUA404**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Formulate a real-world problem into a mathematical programming model that involves an objective function to maximize the benefits with linear inequalities subject to constraints and Solve LPP problems by Simplex and Big-M methods	K3, K4

CO-2	Apply appropriate method to find the initial basic feasible solution and solve the transportation and assignment problems towards optimality	K_3
CO-3	Demonstrate the various inventory costs and Identify the inventory models to find the stock and reorder levels	K_2,K_3, K_4
CO-4	Exercise and experiment the network construction by employing PERT for project planning and CPM for scheduling	K_2, K_3
CO-5	Apply the replacement models to find the optimum replacement period for equipments.	K_3

Course Title	**COMPUTER NETWORKS**	
CODE	18CSUC510 / 18CAUC510	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Acquire knowledge on Models of Networks.	K2
CO-2	Understanding the concepts of Physical layer and Data link layer	K3
CO-3	Outline the functionalities of Medium access control protocol and Switching.	K3
CO-4	Learn the Routing algorithms of Network layer and transport layer services.	K3
CO-5	Summarize the elements of application layer protocols and Network security.	K2

Course Title	SOFTWARE ENGINEERING	
CODE	**18CSUC511 / 18CAUC511 / 19ITUC306 / 18CTUC511**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Comprehend various software process models	K1
CO-2	Elicit requirements for a software project and develop a Requirement model	K3
CO-3	Apply software engineering principles, techniques, tools and practices	K4
CO-4	Identify and address design and implementation issues to develop a quality software product	K3
CO-5	Study and Compare various software testing approaches	K3

Course Title	PYTHON PROGRAMMING	
CODE	18CSUC512 / 18CAUC512/18CTUC614/18ITUC510	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Apply decision making and repetition structures in program design.	K2
CO-2	Develop functions to improve readability of programs	K1
CO-3	Design the programs using Python data types such as tuples, strings, lists and dictionaries	K4
CO-4	Adopt file and exception handling mechanisms	K3
CO-5	Ability to build python program to solve real world problems	K3

Course Title	PYTHON PROGRAMMING LAB	
CODE	**18CSUCP05/18CAUCP05/18CTUCP05/18ITUCP05**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Implement control structures	K3
CO-2	Apply the arithmetic operations and string functions	K3
CO-3	Implement the concepts of user defined functions	K3
CO-4	Apply the concept of list, dictionary, tuple and sets	K3
CO-5	Implement the concept of OOPs	K3

Course Title	CLIENT / SERVER TECHNOLOGY	
CODE	**18CSUE511**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand about the fundamental concepts of client/server computing and types of servers.	K1
CO-2	Gain knowledge about client/server capabilities of current crop of operating system.	K3
CO-3	Explore the SQLdatabase server model of client/server.	K2
CO-4	Analyze various types of TP monitor and distributed object model of client/server.	K2
CO-5	Understand the various components in client/server groupware	K3

Course Title	UNIFIED MODELING LANGUAGE	
CODE	**18CSUE521**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts of UML	K1-K2
CO-2	Recognize the concepts and principles of object oriented programming concepts	K2-K4
CO-3	Understand the purposes, major components and key mechanisms of Class and Object Diagram	K2-K3
CO-4	Understand and Apply use case diagrams	K2-K3
CO-5	Applying the techniques for Component and Deployment Diagrams.	K3

Course Title	PREDICTIVE ANALYTICS	
CODE	**18CSUE531/ 18CAUE521/18ITUE531/18CTUE521**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Know about the fundamentals concepts of big data	K1
CO-2	Gain knowledge about data mining and predictive analytics.	K1
CO-3	Analyze various types of Predictive Models and develope a Predictive Model	K3
CO-4	Analyze various types of social networks and mapping of social networks	K3

Course Title	OPEN SOURCE TECHNOLOGIES	
CODE	18CSUC613/18CAUC613/ 18ITUC613/ 18CTUC613/	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Acquire knowledge on open source, principles and its methodology.	K2
CO-2	Develop the knowledge of different software licenses and their usage.	K2
CO-3	Practice the concepts of control structures and functions in PHP applications	K2-K3
CO-4	Use string handling and array operations in PHP applications	K2-K3
CO-5	Apply the connectivity between PHP and MySQL database and develop web pages using PHP, HTML and MySQL	K4

Course Title	ANDROID PROGRAMMING	
CODE	**18CSUC512 / 18CAUC512 / 18CTUC614**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Demonstrate the Android Platform, Architecture and Features	K1 – K2
CO-2	Design User Interface and Develop Activity for Android Applications	K1 – K2
CO-3	Use Indent, Broadcast Receivers and Internet Services in Android Applications	K3
CO-4	Apply Multimedia, Camera and Location Based Services in Android Applications	K3
CO-5	Develop and Implement Database Applications using JSON	K3 – K5

Course Title	ANDROID PROGRAMMING LAB	
CODE	**18CSUCP05/18CAUCP05/18CTUCP06**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Demonstrate the functions of UI components	K2
CO-2	Create User Interfaces for any mobile application	K3-K5
CO-3	Construct Mobile apps incorporating message sending, camera activation, audio playing and google maps features	K3-K5
CO-4	Build Mobile apps with database using SQLite	K3-K5
CO-5	Create simple applications using JSON	K3-K5

Course Title	WIRELESS APPLICATION PROTOCOL	
CODE	**18CSUE612 / 18CAUC613/ 18CTUE632**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts of wireless application protocol	K1-K2
CO-2	Explain the architecture, functioning and protocols of various WAP	K2-K4
CO-3	Enhance the knowledge of gateway and hosting for WAP pages	K2-K3
CO-4	Demonstrate the concept of wireless markup language and its applications.	K2-K3
CO-5	Demonstrate an ability to evaluate security issues associated with wireless application protocol	K1-K4

Course Title	DATA MINING AND WAREHOUSING	
CODE	**18CSUE622**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts, fundamentals and techniques in data mining	K2
CO-2	Gain knowledge about the types of classification and clustering algorithms	K2
CO-3	To understand the basic concepts in data warehousing	K2
CO-4	To design a data warehouse	K3

Course Title	**ANALYSIS & DESIGN OF INFORMATION SYSTEMS**	
CODE	**18CSUE632**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the need and quality of information system	K1 – K2
CO-2	Understand tools and techniques to effectively communicate with project team members, client and users to develop information system of an organization	K1 – K3
CO-3	Evaluate requirements of an information system as well as build general and detailed models that specify the system requirements.	K2 - K4
CO-4	Analyze any system by applying different techniques and generate logical design of user requirements using various structured design tools	K1 – K3
CO-5	Use methods to design input data by converting user-originated input format to a computer based format and determine how to present, display the output information in the acceptable format to the intended recipients	K1 – K4