Computer Science and Engineering **First Year**
S.No	**Course Code**	**Course Outcome**
1	**BAST-102**	1. Evaluate mean value theorems and justify problems based on these theorems, calculate and use of maxima and minima related to daily life problems 2. Apply the concept of definite integral as limit of a sum, utilizing Beta and Gamma functions and evaluate the surface and volume integral 3. Develop effective mathematical tools and geometric meaning of gradient, divergence and curl; justify the Gauss divergence, stokes and Green theorems 4. Evaluate vector space and linear transformations 5. Calculate the rank of matrix, evaluate the linear equations by elementary transformation and calculate Eigen values and corresponding Eigen vectors
2	**BAST-105**	1. To evaluate ordinary differential equation of first order first degree, first order higher degree and higher order differential equations with constant coefficients 2. To evaluate second order linear differential equations with variable coefficients and find power series solutions of differential equation 3. To formulate partial differential equation and evaluate linear and non-linear partial differential equation and homogeneouslinear equation with constant coefficients 4. To justify convergence of sequence and series using tests forconvergence and develop tools for of Fourier series 5. To analyze functions of complex variable, their analyticity and evaluate their differentiation and integration using Cauchy's Integral Formula and Residue theorem and its applications
3	**BAST 103**	1. Justification of a variety of accurate sentence structures 2. Ability to infer new strategies for vocabulary expansion as well as retention and see your vocabulary grow 3. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to

		work collaboratively with others 4. To compose technical and academic article's comprehension 5. Express the capacity to use various writing forms, to achieve the specific purposes of the course
4	**BCST 101**	1. The student will learn about basics computer, different type of data type and to formulate simple algorithms for arithmetic and logical problems 2. To translate the algorithms to programs (in C language), learn and apply the concept of different types of controlstructure and linear data structure 3. Ability to learn and apply the concept of searching, sortingand functions and analyze complexity of algorithm 4. To apply and test the concept of recursion and structure To decompose a problem into functions and synthesize a complete program using divide and conquer approach 5. To learn and apply the concept of pointer, linear data structure and operations on file
5	**BAST 104**	1. Examine the principles of quantum mechanics in engineering discipline and explain the reasons for physical happenings
		2. Understand the basic knowledge about wave optics and its application in optical instruments
		3. Examine physical and structural concept of electronic materials Develop the basic understanding about the new superconducting materials to save and less consumption of energy
		4. Analyze applied physics in engineering domain Make a vision to use laser light in various fields of science, engineering, medical science, industries and defense
		5. Basic understanding about the electrostatics and its application in Evaluation of electric field and electrostaticpotential for charge distributions
6	**BAST-101**	1. Analyze and choose appropriate metals and non-metals on the basis of periodic properties such as ionization potential, electron affinity, oxidation states and electronegativity for broader industrial applications 2. Rationalize bulk properties and processes using thermodynamic considerations 3. Design and build some economical technologies for conservation, purification and effective utilization of water infuture

		4. Synthesize conservation and use some of the important materials in the field of engineering
		5. Differentiate the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
7	**BMET 102**	1. Student will able to speculate Fundamental knowledge of thermodynamics as properties, system, process, cycle etc
		2. Student will able to analyze principle of law of motion in thermodynamics
		3. Categorize the different types of Engines, steam properties
		4. Student will able to evaluate Fundamental knowledge of Forces, laws of motion, beams, trusses
		5. Student will able to calculate and analyze stress, strain, torsion, bending analysis etc
8	**BECT 101**	1. Analyze materials in terms of energy band gap and Group 4 materials as intrinsic and extrinsic depending on donors and acceptor impurities also evaluate Junction diode in terms of V-I Characteristics, resistance & capacitance
		2. Illustrate applications of Junction Diode as rectifier, clipper, clamper, voltage multiplier circuit &analyze break down diodes (Zener & Avalanche) in terms of characteristics, resistance, ratings and application as shunt regulator
		3. Analyze BJT, its configurations as CB, CE & CC and biasingalso illustrate its role as amplifier
		4. Evaluate JFET and MOSFET in terms of their construction, operation and characteristics
		5. Analyze operational amplifiers in terms of ideal, inverting, non-inverting, summer, integrator &differentiator and its applications as instrumentation circuits, active filters, controlled sources, logarithmic amplifiers, waveform generators, Schmitt triggers, comparators

B.Tech (Computer Science & Engineering		
SNo	Course Code	Course Outcome
1.	BCSP-303	1. Select appropriate data structures as applied to specified problem definition 2. Implement operations like sorting, searching, insertion, and deletion, traversing mechanism etc on various data structures 3. Students will be able to implement linear and Non-inear data structures 4. Determine and analyze the complexity of given Algorithms
2.	BCST-303	1. Select appropriate data structures as applied to specified problem definition 2. Implement operations like searching, insertion, and deletion, traversing mechanism etc on various data structures 3. Students will be able to implement Linear and Non-Linear data structures 4. Implement appropriate sorting/searching technique for given problem 5. Design advance data structure using Non-Linear data structure 6. Determine and analyze the complexity of given Algorithms
3.	BCET 301	1. Apply advanced level knowledge, techniques, skills and modern tools in the field of Energy and Environmental Engineering 2. Distinguish the different energy generation systems and their environmental impacts 3. Respond to global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment

4.	**BCST 302**	1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives 2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference 3. For a given a mathematical problem, classify its algebraic structure 4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra 5. Develop the given problem as graph networks and solve with techniques of graph theory
5.	**BECT 303**	1. Develop a digital logic and apply it to solve real life problems 2. Analyze, design and implement combinational logic circuits 3. Classify different semiconductor memories 4. Analyze, design and implement sequential logic circuits 5. Analyze digital system design using PLD 6. Simulate and implement combinational and sequential circuits
6.	**BECP 303**	1. Develop a digital logic and apply it to solve real life problems 2. Analyze, design and implement combinational logic circuits 3. Classify different semiconductor memories 4. Analyze, design and implement sequential logic circuits 5. Analyze digital system design using PLD 6. Simulate and implement combinational and sequential circuits
7.	**BCST 305**	1. Specify simple abstract data types and design implementations, using abstraction functions to document them 2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity 3. Name and apply some common object-oriented design patterns and give examples of their use 4. Design applications with an event-driven graphical user interface

8.	**BCSP 305**	1. Specify simple abstract data types and design implementations, using abstraction functions to document them 2. Recognize features of object-oriented design such as encapsulation, polymorphism, Inheritance, and composition of systems based on object identity 3. Name and apply some common object-oriented design patterns and give examples of their Use 4. Design applications with an event-driven graphical user interface
9.	**BCSP-306**	1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python 2. Express different Decision Making statements and Functions 3. Interpret Object oriented programming in Python 4. Understand and summarize different File handling operations 5. design GUI Applications in Python and evaluate different database operations
10.	**BAST 401**	1. Remember the concept of Laplace transform and apply in solving real life problems 2. Understand the concept of Fourier transform to evaluate engineering problems 3. Understand to evaluate roots of algebraic and transcendental equations 4. Understand interpolation, differentiation, integration and the solution of differential equations 5. Understand the concept of correlation, regression, moments, skewness and kurtosis and curve fitting

11.	**BCST 402**	1. For a given query write relational algebra expressions for that query and optimize the developed expressions 2. For a given specification of the requirement design the databases using ER method and normalization 3. For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2 4. For a given query optimize its execution using Query optimization algorithms 5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability 6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling
7.	**BCSP 402**	1. Understand and Analyze the Data Definition Language 2. Understand and Analyze the Data Manipulation Language 3. Understanding and performing various operations and administrative commands on data using queries 4. Understanding the significance of domain and relational calculus in DBMS 5. Inferring the usage of Pl/SQL 6. Providing a deep insight about Transaction Control Language
8.	**BCST 403**	1. Implement Software life cycle models and have a knowledge of different phases of Software life cycle 2. Identify, formulate, review, estimate and schedule complex software projects using principles of mathematics 3. Create a bug free software with good design and quality by using appropriate techniques and modern engineering and IT tools 4. Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams

9.	**BCSP 403**	1. Students will be capable to anlyse the generic software development skill through various stages of software life cycle 2. To ensure the quality of software through software development with various protocol based environment 3. To indentify the different courses contains Basic Structural Modeling, Advance Structural Modeling, Basic Behavioral Modeling, Advance Behavioral Modeling, Architectural Modeling, Stranded Elements, Designing Test cases, Test Suits, etc
10.	**BCST 404**	1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set 2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication) 3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process 4. Given a CPU organization and instruction, design a memory Unit and analyze its operation by interfacing with the CPU 5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology
11.	**BCSP 404**	1. Identify the working of working of various flip-flop using digital circuits &IC's 2. Illustrate the use of multiplexer , decoders/ Encoders, adders/subtrator using various IC's 3. Test the working of counter ,shift register &delay cycle clock using capacitors &digital circuits 4. Evaluate the output of various primary &secondary logic gates using different IC's
12.	**BCST 405**	1. Apply knowledge in designing or enhancing compilers 2. Design grammars and automata (recognizers) for different language classes 3. Apply knowledge in developing tools for language processing or text processing

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14.	**BCSP 406**	1. Use MATLAB for programming purposes 2. Learn and explore MATLAB further on their own 3. Use this learning experience to learn other programming languages
15.	**BCST 408**	1. Know about various attacks and viruses in cyber systems 2. Know about how to prevent digital attacks 3. Know about how to prevent Phishing Attacks 4. Know about how to do secure transactions
16.	**BCST 501**	1. To understand the evolution, role, types of OS. 2. To differentiate among the cooperating and concurrent processes and implement CPU scheduling. 3. To understand the concept of deadlock and resource management. To evaluate the contiguous and non-contiguous memory allocation. 4. Demonstrate the role and architecture of the LINUX OS.
17.	**BCST 502**	1. Characterize and appreciate computer networks from the view point of components and from the view point of services 2. Display good understanding of the flow of a protocol in general and a network protocol 3. Model a problem or situation in terms of layering concept and map it to the TCI/IP stack 4. Select the most suitable Application Layer protocol 5. Design a Reliable Data Transfer Protocol and develop solutions of Transport Layer 6. Describe principles of Network Layers and use IP addressing to create subnets

18.	BCST 503	1. Algorithm design and analysis provide the theoretical backbone of computer science and are a must in the daily work of the successful programmer. The goal of this course is to provide a solid background in the design and analysis of the major classes of algorithms. At the end of the course students will be able to develop their own versions for a given computational task and to compare and contrast their performance
19.	BCST 504 (A)	1. Justify the need for and describe the working of layered protocol suites such as TCP/IP. Develop client-server applications using TCP/IP. Assemble/disassemble packets and translate address as it traverses networks. Solve sample problems using popular routing protocols. Motivate the need for and summarize the details of service architectures, such as web services and micro-services. Describe the details, including payload types and synchronization of multimedia application protocols. Explain and distinguish the various service types supported by internet applications – for example, best effort, streaming. Construct the working of certain types of congestion control mechanisms.
	BCST 504 (B)	1. To introduce the Fundamental algorithms for pattern recognition. 2. To instigate the various classification and clustering techniques.
	BCST 504 (C)	3. Describe the concepts of WWW including browser and HTTP protocol. 4. List the various HTML tags and use them to develop the user-friendly web pages. 5. Define the CSS with its types and use them to provide the styles to the webpages at various levels. 6. Develop the modern web pages using the HTML and CSS features with different layouts asper need of applications. 7. Use the JavaScript to develop the dynamic web pages. 8. Use server-side scripting with PHP to generate the web pages dynamically using the database connectivity. 9. Develop the modern Web applications using the client and server side technologies and the web design fundamentals.
	BCST 504 (D)	This course of study builds on the skills gained by students in Java Fundamentals or Java Foundations to help advance Java programming skills. Students will design object-oriented applications with Java and will

		create Java programs using hands-on, engaging activities.
20.	BOCS-505(A)	1. To understand and describe syntax and semantics of programming languages 2. Understand data, data types, and basic statements and understand call-return architecture and ways of implementing them 3. To understand object-orientation, concurrency, and event handling in programminglanguages 4. Develop programs in non-procedural programming paradigms
	BOCS-505(B)	1. Grasp modeling concepts with emphasis on performance analysis. 2. Build simulation models and their parameterization. 3. Analyze simulation output data to evaluate performance criteria.
	BOCS-505(C)	1. Effective information security at the enterprise level requires participation, planning, and practice. It is an ongoing effort that requires management and staff to work together from the same script. Fortunately, the information security community has developed a variety of resources, methods, and best practices to help modern enterprises address the challenge. Unfortunately, employing these tools demands a high degree of commitment, understanding, and skill—attributes that must be sustained through constant awareness and training.
	BOCS-505(D)	1. Think critically and creatively about the nature of business opportunities,resources, and industries. 2. Describe the processes by which innovation is fostered, managed, andcommercialized. 3. Spot new business opportunities in the environment, whether by recognition,development, or creation. 4. Effectively and efficiently evaluate the

		potential of new business opportunities. 5. Assess the market potential for a new venture, including customer need,competitors, and industry attractiveness. 6. Develop a business model for a new venture, including revenue, margins,operations, working capital, and investment. 7. Develop pro forma financial statements that reflect business model decisions and that can be used to determine future funding requirements. 8. Write a clear, concise, and compelling business plan for a new venture. 9. Identify appropriate sources of financing for an entrepreneurial business plan. 10. Develop a compelling sales pitch to acquire financing necessary to a new venture. 11. Explain the operational implications of common terms and conditions for early-stage investment deals. 12. Describe the process by which new ventures are created and launched.

21.	**BCST-506**	1. Perform basic and advanced concepts through remote experimentation. 2. Use various tools and resources including web resources, video lectures, animated 3. demonstration and self-evaluation 4. Work on Linux environment using various commands and shell. 5. Understand the concepts of JAVA and can implement them. 6. Understand to interact with different programming environment through different tools.
22.	**BCSP- 501**	1. Identify the functions, structures, and history and design issues associated with the Operating systems. 2. Apply various process scheduling algorithms for process management. 3. Illustrate the concepts of process synchronization and methods to handle deadlocks. 4. Analyze virtual memory techniques and page replacement algorithms.
23.	**BCSP- 502**	1. Understand fundamental underlying principles of computer networking 2. Apply mathematical foundations to solve computational problems in computer networking 3. Analyze performance of various communication protocols
24.	**BCSP-503**	1. To implement various search algorithms. 2. To implement incremental algorithms. 3. To implement divide and conquer algorithms 4. To implement dynamic programming algorithms. 5. To implement backtracking and graph algorithms

25.	**BCST-601**	1. To introduce students with the architecture and operation of typical microprocessors and microcontrollers. 2. To familiarize the students with the programming and interfacing of microprocessors and microcontrollers. 3. To provide strong foundation for designing real world applications using microprocessors and microcontrollers
26.	**BCST-602**	1. This course is designed to provide a comprehensive knowledge of Compiler Construction. 2. To learn how to construct compiler to translate High Level Languages to Machine Language. 3. To learn different phases of compiler and how to implement them. 4. To learn efficient machine Language Code Generation using the techniques of Optimization.
27.	**BCST-603**	1. This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques and tools they need to deal with various facets of data Science practice, including data collection and integration, exploratory data analysis, predictive emodelling, descriptive modelling, data product creation, evaluation, and effective communication.

28.	**BCST -604(A)**	1. To understand the directed and undirected graphs. To understand the spanning trees and weighted graphs. 2. To implement the Euler's formula. 3. To implement the adjacency matrices. 4. To understand the concept of the chromatic partitioning.
	BCST -604(B)	1. To introduce data warehouse and its components 2. To introduce knowledge discovery process, data mining and its functionalities 3. To develop understanding of various algorithms for association rule mining and their differences 4. To introduce various classification techniques 5. To introduce various clustering algorithms.
	BCST -604(C)	1. This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application programming interface (OpenGL) by completing several programming projects.
	BCST -604(D)	1. The course has the basic scope to provide the students with theoretical knowledge about concepts of software quality, about the quality-models, - standards and –methodologies used in the software industry. The theory is supported and supplemented by the lecturer's 10 years' experience in software quality management. Understanding and usage of the theory are consolidated by the case studies and exercises.
29.	**BOCS -605(A)**	1. To give the students a comprehension of the concepts of discrete-time signals and systems. 2. To give the students a comprehension of the Z- and the Fourier transform and their inverse. 3. To give the students a comprehension of the relation between digital filters, difference equations and system functions. 4. To give the students knowledge about the most important issues in sampling and reconstruction. 5. To make the students able to apply digital filters according to known filter specifications. 6. To provide the knowledge about the principles behind the discrete Fourier transform (DFT) and its fast computation. 7. To make the students able to apply Fourier analysis of stochastic signals using the DFT

	BOCS -605(B)	1. In this course we will study the basic component of an intelligence system i.e. machine learning, their functions, mechanisms, policies and techniques used in their implementation and examples.
	BOCS -605(C)	1. To study fundamental concepts in software testing. 2. To discuss various software testing issues and solutions in software unit test, integration and system testing. 3. To expose the advanced software testing topics, such as object-oriented software testing methods
	BOCS -605(D)	1. To explain the evolving computer model called cloud computing. 2. To introduce the various levels of services that can be achieved by cloud. 3. To describe the security aspects in cloud.
30.	**BCSP-601**	1. Illustrate the architecture and organization of microprocessor 8085. 2. Outline the functional architecture of 8086. 3. Design assembly language program of 8086. 4. Design memory interfacing circuits

31.	**BCSP-602**	1. Design Lexical analyzer for given language using C and LEX tools. 2. Design and convert BNF rules into YACC form to generate various parsers. 3. Generate machine code from the intermediate code forms 4. Implement Symbol table 5. To implement code optimization techniques.
32.	**BCSP-603**	1. Students will be able to write code for analysing data in Python using libraries like numpy, pandas, scikit-learn, matplotlib and seaborn. 2. Collect, pre-process and analyse data. 3. Perform Linear Regression on given data set. 4. Use IBM Cloud for Big Data tasks. 5. Implement Big Data processes using Sqoop, Flume and Hive on IBM Cloud.
33.	**BCSP-606**	1. To understand the basics of MATLAB in order to write simple programs for mathematic calculations. 2. To familiarize the use of MATALB as a computational tool for solving mathematical and matrix problems. 3. To be Able to plot and present the graph for given experimental data set.

34.	**BCSP -607**	1. To create application using latest technology trends. 2. To work as a team for creating application and develop software packages.
35.	**BCST 701**	1. To understand and apply the concepts of building block and architecture of the .NET. 2. To apply the concepts of C# in advance class construction and namespace. 3. To understand the concept of assemblies and thread. 4. To apply the concepts of C# programming to make custom applications. 5. To analyze the usage of shared libraries.
36.	**BCST 702**	1. This course covers major aspects of ad hoc networks, from design through performance issues to application requirements. It starts with characteristics features, applications of ad hoc networks, Modulation techniques and voice coding. It also covers the IEEE 802.11 Wireless LAN and Bluetooth standards.

37.	BCST 703(A)	1. Learn the foundations of Human Computer Interaction 2. Be familiar with the design technologies for individuals and persons with disabilities 3. Be aware of mobile HCI 4. Learn the guidelines for user interface.
	BCST 703(B)	1. To make students know about the Parallelism concepts in Programming. 2. To give the students an elaborate idea about the different memory systems and buses. 3. To introduce the advanced processor architectures to the students. 4. To make the students know about the importance of multiprocessor and multicomputers. 5. To study about data flow computer architectures
	BCST 703(C)	1. This course aims to develop students' abilities in using some contemporary approaches in solving problems in automation.
	BCST 703(D)	1. Students will understand the concepts of Internet of Things and can able to build IoT applications.
38.	BCST -704(A)	1. Understand the Big Data Platform and its use cases. 2. Provide an overview of Apache Hadoop. 3. Provide HDFS Concepts and Interfacing with HDFS. 4. Understand Map Reduce Jobs. 5. Provide hands on Hodoop Eco System. 6. Apply analytics on Structured, Unstructured Data. 7. Exposure to Data Analytics with R.
	BCST -704(B)	1. Develop a theoretical foundation of fundamental Digital Image Processing concepts. 2. Provide mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression. 3. Gain experience and practical techniques to write programs using MATLAB language for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.

	BCST -704(C)	1. The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security. The course includes-Impacts of Hacking; Types of Hackers; Information Security. 2. Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)
39.	**BCSP 701**	1. Understand the Microsoft .Net framework and ASP.NET page structure. 2. Design web application with variety of control. 3. Access the data using inbuilt data access tool. 4. Use Microsoft ADO.NET to access data in web Application. 5. Configure, Deploy and develop web Application.

40.	**BCSP 702**	1. Understand and explain common wireless sensor node architectures and unique issues in ad-hoc/sensor networks. 2. Describe current technology trends for the implementation and deployment of wireless ad-hoc networks. 3. Discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc networks. 4. Discuss the challenges in designing routing and transport protocols for wireless Ad-hoc networks.
41.	**BCSP 705**	1. Students will able to do the simulation-based labs of various discipline. 2. Conduct the experiment by arousing their curiosity. 3. Perform the same or new experiments multiple times at their own pace, with no time constraints. 4. Perform their project related work anywhere, anytime. 5. Analyze their project progress in real-time.
43.	**BCSP 707**	1. To create application using latest technology trends. 2. To work as a team for creating application and develop software packages or fabricate new research projects. 3. To demonstrate innovation in the fields of science and technology.

44.	**BCST-801**	1. Have an understanding of high-level OS kernel structure. 2. Gained insight into hardware-software interactions for compute and I/O. 3. Have practical skills in system tracing and performance analysis. 4. Have been exposed to research ideas in system structure and behaviour. 5. Have learned how to write systems-style performance evaluations.
45.	**BCST-802**	The objective of the course is to provide a basic understanding of the various issues related to information systems security (esecurity). The course will present an overview of the risks encountered in information systems security, and the tools used for resolving these risks.
46.	**BCST -803(A)**	This course provides an introduction to the theory of natural language processing (NLP). The creations of computer programs that can understand, generate, and learn natural language. We will use natural language understanding as a vehicle to introduce the three major subfields of NLP: syntax (which concerns itself with determining the structure of a sentence), semantics (which concerns itself with determining the explicit meaning of a single sentence), and pragmatics (which concerns itself with deriving the implicit meaning of a sentence when it is used in a specific discourse context). The course will introduce both knowledge-based and statistical approaches to NLP, illustrate the use of NLP techniques and tools in a variety of application areas, and provide insight into many open research problems.
	BCST -803(B)	1. To understand the concepts of Hardware of various microcontrollers to enable Programming and Interfacing of microcontroller.
	BCST -803(C)	1. To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering. 2. To understand the basic concepts of probability, one and two dimensional random variablesnand to introduce some standard distributions applicable to engineering which can describe real life phenomenon.

		3. To understand the basic concepts of random processes which are widely used in IT fields. 4. To understand the concept of queueing models and apply in engineering. 5. To understand the significance of advanced queueing models. 6. To provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.
	BCST -803(D)	1. To provide introduction to the fundamental principles of cloud computing. 2. Students should able to identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud. 3. Students should learn and investigate the hardware and software architecture of Cloud 4. Computing and understand how virtualization is key to a successful Cloud Computing solution.
	BCST -803(E)	1. Understand how blockchain systems (mainly Bitcoin and Ethereum) work. 2. To securely interact with them. 3. Design, build, and deploy smart contracts and distributed applications. 4. Integrate ideas from blockchain technology into their own projects.
47.	**BOCS-804(A)**	Dependability is now a major requirement for all computing systems and applications. Computer hardware, software, data, networks and systems are always subject to faults. The faults cannot be eliminated, however their impact can be limited and a suitably designed fault-tolerant system can function even in the presence of faults. This course introduces the widely applicable concepts in reliable and fault-tolerant computing. Topics to be covered include basic testing concepts, hardware and software faults, reliability evaluation, design and evaluation of redundant systems, relationship between testing and reliability, software reliability growth, security vulnerabilities and emerging issues.
		The adoption of Artificial Intelligence (AI) technologies is widely expanding in our society. Applications of AI include: self-driving cars, personal assistants, surveillance systems, robotic manufacturing, machine translation,

		BOCS-804(B)	financial services, cyber security, web search, video games, and code analysis and product recommendations. Such applications use AI techniques to interpret information from a wide variety of sources and use it to enable intelligent, goal-directed behaviour.
		BOCS-804(C)	1. Interpret the basics of various spectrum sensing techniques and K3 algorithm. 2. Recognize the concepts of cooperative spectrum sensing and handoff process. 3. Understand the functions of MAC layer and Network layer and its various protocols.
		BOCS-804(D)	1. To build an understanding of the fundamental concepts of service oriented architecture. 2. To familiarize the basics of service oriented analysis and design. 3. To familiarize the various WS-specification standards

48.	**BCSP-801**	1. Students will be able to run various UNIX commands on a standard UNIX/LINUX Operating system. 2. Students will be able to understand and handle UNIX system calls. 3. To understand the challenges of the system software in modern era computing like cloud computing, Big-data analytics and IoT. 4. To promote research activities to uphold in the theory and practice.
49.	**BCSP-802**	1. Understand computer security principles and discuss ethical issues for theft of information. 2. Identify threat models and common computer network security goals. 3. Explain various encryption algorithms, hashing functions, one-way authentication and public key cryptology. 4. Analyze firewalls, DOS attacks and defense types. 5. Dramatize example scenarios in DNS and IPSec applications.
50.	**BCSP -805**	1. Plan, analyze, design and implement a software project or gather knowledge over the field of research and design or plan about the proposed work. 2. To demonstrate their project work by presentation and enhance technical skills. 3. Demonstrate the ability to communicate effectively in speech and writing. 4. To evaluate the outcome of the project work and present through report.