Semester – III

Engineering Mathematics-III (BTES301)

Course Outcomes:

CO 1	Explain the concept of Vector functions.
CO 2	Illustrate the concept of different matrix operations.
CO 3	Recognize the concept of linear equations and the various fundamental concepts of Fourier Series.
CO 4	Analyze the concept of determinants.
CO 5	Evaluate diagonalization and applications.
CO 1	Explain the various fundamental concepts of the Set theory and Logics.

Discrete Mathematics (BTCOC302)

Course Outcomes:

CO1	Explain the various fundamental concepts of the Set theory and Logics.
CO2	Solve problems in recurrence relations.
CO3	Utilize graph theory concepts in computer science.
CO4	Familiarize with the applications of trees and algorithms on minimal spanning trees.
CO5	Utilize the concepts and properties of algebraic structures such as groups, rings and fields.

Data Structures (BTCOC303)

Course Outcomes:

CO1	Understand fundamentals of data structures and the concepts of Hashing.
CO2	Apply Linear Data Structures: Stack, Queues and Recursion.
CO3	Apply Linear Data Structures: Linked Lists.
CO4	Apply Non-Linear Data Structures: Trees and Graphs.
CO5	Understand and Sorting Algorithms.

Computer Architectute and Organization (BTCOC304)

Course Outcomes:

CO1	Understand and describe the basic organization and operation of the components of a digital computer system.
CO2	Aquire knowledge of instruction sets and addressing modes and analyze the performance issues of the processor.
CO3	Illustrate various arithmetic and logical operations on different types of numbers to design an arithmetic and logic unit.
CO4	Categorize the hierarchical memory system and examine the virtual memory implementation techniques.
CO5	Demonstrate various control unit operations. Compare the different I/O data transfer techniques, and describe the different ways of communication among I/O devices and standard I/O interfaces.

Elective-I: Object Oriented Programming in C++ (BTCOC305)

Course Outcomes:

CO1	Explain the basic concepts of object oriented programming language in C++.
CO2	Introduces the concept of operator overloading, inheritance and polymorphism.
CO3	Introduces virtual function and dynamic binding.
CO4	Introduces stream manipulators and different operations on file.
CO5	Explain the concept of template, exception handling and STL.

Data Structure Laboratory (BTCOC306)

Course Outcomes:

CO1	Develop a program using linear data structures such as array and circular queue.
CO2	Develop a program for basic operations of stack and its applications.
CO3	Construct a program using non-linear data structures and their applications such as trees and graphs.
CO4	Construct a program using linear data structures for linked lists.
CO5	Implement sorting algorithms.

Object Oriented Programming in C++ Lab (BTCOC306)

Course Outcomes:

CO1	Develop a program using linear data structures such as array and circular queue.
CO2	Develop a program for basic operations of stack and its applications.
CO3	Construct a program using non-linear data structures and their applications such as trees and graphs.
CO4	Construct a program using linear data structures for linked lists.
CO5	Implement sorting algorithms.

Seminar – I (BTCOC307)

Course Outcomes:

CO1	Identify recent technical topics from interested domains.
CO2	Analyze the applicability of modern software tools and technology.
CO3	Develop Presentation and Communication skills.
CO4	Develop Technical report preparation skills.

Field Training / Internship / Industrial Training Evaluation (BTES211P)

Course Outcomes:

CO1	Understand the organogram of the industry and appreciate the skill enhancement.
CO2	Write an effective Field Training or Internship or Industrial Training Evaluation report.
CO3	Deliver an effective presentation.
CO4	Inculcate non-plagiarism and teamwork ethics.

Semester – IV

Design & Analysis of Algorithms (BTCOC401)

Course Outcomes:

CO1	Understand the notion of an algorithm, asymptotic notations.
CO2	Analyze the divide conquer techniques.
CO3	Explain the algorithm design techniques using backtracking, branch and bound.
CO4	Understand the algorithm design techniques using greedy algorithms.
CO5	Understand the algorithm design techniques using dynamic programming.

Operating Systems (BTCOC402)

Course Outcomes:

CO1	Understand the concept of OS and functional components.
CO2	Analyse process and threads.
CO3	Analyze process synchronization and conceptualize semaphores. Analyze System model for deadlock, Methods for handling deadlocks. Analyze and describe System model for deadlock, Methods for handling deadlocks and memory management strategies
CO4	Understand the concepts of memory management and virtual memory management.
CO5	Understand the concepts of file management and mass storage structure.

Basic Human Rights (BTHM403)

Course Outcomes:

CO1	Understand the basic concept of human values, human rights and human duties.
CO2	Analyze fundamental rights and economic programme, social structure and social problems.
CO3	Analyze migrant workers, NGOs and human rights in India.
CO4	Understand human rights in Indian constitution and law.
CO5	Evaluate constitution, law, national and state human rights commission.

Probability and Statistics (BTCOC404)

Course Outcomes:

CO1	Recall the basics of Probability and Statistics.
CO2	Apply the idea of basics of probability and Random variables in solving various engineering problems.
CO3	Analyze types of correlation.
CO4	Analyze linear and non-linear regression.
CO5	Evaluate population mean and test hypotheses.

Digital Logic Design & Microprocessors (BTES405)

Course Outcomes:

CO1	Understand the concept of digital signals, circuits, number systems.
CO2	Analyze Combinational Logic circuits, Simplification of Algebraic Equations using Karnaugh Maps. Construct Digital multiplexers, Adders and Subtractors.
CO3	Construct Latches and various types of Flip-Flops.
CO4	Understand the fundamentals of microprocessors
CO5	Explain 80x86 instruction set and Design and develop assembly programs using 80x86 assembly language instructions.

Operating Systems Lab (BTES405)

Course Outcomes:

CO1	Implement the basic command of UNIX and shell script programming.
CO2	Implement CPU scheduling algorithms, page replacement algorithms and threads.
CO3	Implement the process synchronization problem using semaphore.
CO4	Implement Producer-Consumer problem using Banker's algorithm.
CO5	Implement memory allocation algorithms.

Python Programming Lab (BTES405)

Course Outcomes:

CO1	Understand basic syntax of python implementation.
CO2	Practically apply looping and conditional constructs.
CO3	Develop programs related with list data structure.
CO4	Design programs related to dictionary and set.
CO5	Implement the program for file manipulation.

Seminar – II (BTCOS407)

Course Outcomes:

CO1	Devlop webpages using HTML and CSS.
CO2	Implement simple calculator using JavaScript.
CO3	Implement program using HTML and JavaScript.
CO4	Implement programs using PHP.
CO5	Implement programs using PHP and AJAX.

Field Training / Internship / Industrial Training Evaluation (BTCOF408)

Course Outcomes:

CO1	Participate in the projects in industries during his or her industrial training.
CO2	Describe use of advanced tools and techniques encountered during industrial training and visit.
CO3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO4	Develop awareness about general workplace behavior and build interpersonal and team skills.
CO5	Prepare professional work reports and presentations.

Semester – V

Database Systems (BTCOC501)

Course Outcomes:

CO1	Summarize the concepts of database objects Make use of ER diagram.
CO2	Analyze relational data model and relational algebra.
CO3	Use Structured Query Language (SQL) for database manipulation.
CO4	Make use of normalization techniques and file organization.
CO5	Analyze transaction processing and concurrency control.

Theory of Computation (BTCOC502)

Course Outcomes:

CO1	Understand the concept of finite automata and analyze regular expressions.
CO2	Analyze context free grammers.
CO3	Illustrate context free languages.
CO4	Illustrate push down automata.
CO5	Evaluate turing machines.

Software Engineering (BTCOC503)

Course Outcomes:

CO1	Understand software engineering ethics and software process.
CO2	Analyze Agile software development.
CO3	Apply system modeling and architectural design.
CO4	Design and implement object oriented modeling using UML diagram.
CO5	Apply software testing

Elective – II: Human computer Interaction (BTCOC504)

Course Outcomes:

CO1	Understand the concept of HCI - human thinking, text entry devices, models of interaction.
CO2	Design effective HCI.
CO3	Apply implementation support, evaluation techniques,
CO4	Apply cognitive, communication and collaboration models.
CO5	Develop groupware and web content.

Elective – II: Numerical Methods (BTES504)

Course Outcomes:

CO1	Solve Algebraic and Transcendental Equation.
CO2	Solve Linear Simultaneous Equation.
CO3	Solve Finite Differences.
CO4	Solve Differentiation and Integration.
CO5	Evaluate Solution of ODE.

Elective – III: Economics and Management (BTHM505)

Course Outcomes:

CO1	Understand the concept of business communication.
CO2	Identify the essential skills of business communication.
CO3	Communicate the organizational issues effectively.
CO4	Understand various types of communication.
CO5	Apply leadership and ethics in business communication.

Software Engineering Lab (BTCOL506)

Course Outcomes:

CO1	Discuss and Analyses how to develop software requirements specifications for a given problem.
CO2	Design DFD, Structured chart.
CO3	Design Use case diagram, Class diagram, object diagram, Sequence diagram, Collaboration diagram.
CO4	Design State-chart diagram, Activity diagram, Component diagram, Deployment diagram.
CO5	Apply unit testing and integration testing.

Mini-project – I (BTCOM507)

Course Outcomes:

CO1	Identify societal from the villages or towns with well-defined objectives.
CO2	Build a model for the problem chosen using modern tools and technology.
CO3	Organize the technical report effectively.
CO4	Present the solution in front of faculty members.

Field Training / Internship / Industrial Training Evaluation (BTCOF408)

Course Outcomes:

CO1	Participate in the projects in industries during his or her industrial training.
CO2	Describe use of advanced tools and techniques encountered during industrial training and visit.
CO3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO4	Develop awareness about general workplace behavior and build interpersonal and team skills.
CO5	Prepare professional work reports and presentations.

Semester – VI

Compiler Design (BTCOC601)

Course Outcomes:

CO1	Explain the phases of a Compiler.
CO2	Design a lexical analyzer generator.
CO3	Construct a top down and bottom up parser.
CO4	Construct syntax tree, bottom-up evaluation and top-down translation.
CO5	List various code generation techniques.

Computer Networks (BTCOC602)

Course Outcomes:

CO1	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
CO2	Identify the different types of LAN technologies.
CO3	Evaluate error correction and detection of data link layer.
CO4	Understand the network layer protocols and congestion control.
CO5	Understand application layer protocols and the concepts of Network security and cryptography.

Machine Learning (BTCOC603)

Course Outcomes:

CO1	Understand types of learning.
CO2	Apply bayes learning, logistic regression and SVM.
CO3	Understand the basic concept of deep neural network, multilayer network and back propagation.
CO4	Apply PAC learning model.
CO5	Apply Clustering k-means, adaptive hierarchical clustering, Gaussian mixture model.

Elective – IV: Geographic Information System (BTCOC604)

Course Outcomes:

CO1	Understand different components of GIS and different types of vector data, raster data mdel and TIN data model.
CO2	Apply Raster data compression techniques.
CO3	Apply pre-processing of spatial datasets and different map projections.
CO4	Assessment of freely available DEMS GIS analysis-1
CO5	Analyze GIS and evaluate application errors in GIS.

Elective – IV: Internet of Things (BTCOC604)

Course Outcomes:

CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2	Illustrate the smart objects and the technologies to connect them to network.
CO3	Understand IP layer and optimizaion of IP for IoT.
CO4	Infer the role of Data Analytics and Security in IoT.
CO5	Build IoT with physical devices and endpoints.

Elective – IV: Embedded Systems (BTCOE604)

Course Outcomes:

CO1	Design single purpose processor.
CO2	Understand the architecture of ARM7TDMI-S processor.
CO3	Design system control and GPIO.
CO4	Design UART and serial peripheral interface.
CO5	Design and simulation of system. Undertsand basic concepts of simple digital camera.

Elective – V: Development Engineering (BTHM605)

Course Outcomes:

CO1	Understand various definations of development engineering.
CO2	Analyze poverty and development of India and identify Engineer's role.ial skills of business communication.
CO3	Implement social justice and engineering.
CO4	Apply development strategies in different perspectives.
CO5	Evaluate various developments of community by engineers.

Elective – V: Employability and Skill Development (BTHM605)

Course Outcomes:

CO1	Understand basic concepts of soft skills and communication.
CO2	Apply Arithmetic and Mathematical Reasoning and Analytical Reasoning and Quantitative Ability to solve problems.
CO3	Develop writing skills of grammer and comprehension.
CO4	Develop interview and group discussion skills.
CO5	Evaluate problem by applying problem solving model and skills.

Elective – V: Consumer Behaviour (BTHM605)

Course Outcomes:

CO1	Understand the concept of consumer behavior and its influence on market.
CO2	Understand role of market segmentation and consumer decision making process.
CO3	Analyze various models of consumer behavior.
CO4	Analyze the consumer psychology and attitude.
CO5	Evaluate relationship between Consumer influence and Diffusion of Innovations.

Competitive Programming Lab (BTCOL606)

Course Outcomes:

CO1	Solve programming challenges by online judging.
CO2	Design various programs using elementary data structures and solve challenging problems.
CO3	Design various programs using strings and solve challenging problems.
CO4	Design various programs using sorting algorithms and solve challenging problems.
CO5	Solve challenging problems by applying arithmetic and algebra.

Machine Learning Lab (BTCOL606)

Course Outcomes:

CO1	Implement program for regression analysis and plot interpretation.
CO2	Implement program for logistic regression analysis in R.
CO3	Implement program for random forest and parameter tuning in R.
CO4	Evaluate clustering algorithms in R
CO5	Develop machine learning project in python on house prices data.

Mini-project – II (BTCOM607)

Course Outcomes:

CO1	Identify societal from the villages or towns with well-defined objectives.
CO2	Build a model for the problem chosen using modern tools and technology.
CO3	Organize the technical report effectively.
CO4	Present the solution in front of faculty members.

Field Training / Internship / Industrial Training (BTCOF608)

Course Outcomes:

CO1	Participate in the projects in industries during his or her industrial training.
CO2	Describe use of advanced tools and techniques encountered during industrial training and visit.
CO3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO4	Develop awareness about general workplace behavior and build interpersonal and team skills.
CO5	Prepare professional work reports and presentations.

Semester – VII

Artificial Intelligence (BTCOC701)

Course Outcomes:

CO1	Understand the key components of Artificial Intelligence field.
CO2	Identify various problem solving strategies.
CO3	Construct the solution for the problem using various knowledge and logic representation techniques.
CO4	Interpret the knowledge in uncertain domain.
CO5	Understand basic concept of natural language processing and various learning techniques.

Cloud Computing (BTCOC702)

Course Outcomes:

CO1	Understand the concept of virtualization and how this has enabled the development of Cloud Computing.
CO2	Know the fundamentals of cloud, cloud Architectures and types of services in cloud.
CO3	Understand scaling, cloud security and disaster management.
CO4	Design different Applications in cloud.
CO5	Explore some important cloud computing driven commercial systems.

Elective – VI: Bioinformatics (BTCOE703)

Course Outcomes:

CO1	Understand history and application of Bioinformatics, types of databases.
CO2	Use sequence alignment techniques and compare genomics and proteomics.
CO3	Apply phylogeny and its concepts in molecular evolution and different methods of Phylogenetic tree construction.
CO4	Apply bioinformatics in drug designing using bioinformatics tools.
CO5	Build human genome project.

Elective – VI: Distributed System (BTCOE703)

Course Outcomes:

CO1	Understand how to apply the knowledge to gain insight of Distributed System in solving real world problems.
CO2	Implement remote procedure calls and client server binding.
CO3	Understand architecture of distributed shared memory.
CO4	Discuss resource and process management in distributed system
CO5	Explain the file accessing model.

Elective – VI: Big Data Analytics (BTCOE703)

Course Outcomes:

CO1	Understand fundamentals of Big Data analytics.
CO2	Illustrate various big data platforms.
CO3	Apply big data streaming platforms for fast data.
CO4	Apply various big data machine learning algorithms.
CO5	Construct queries on databases using mongoDB.

Open Elective – VII: Cryptography and Network Security (BTCOE704)

Course Outcomes:

CO1	Crypt-Analysis of classical cryptosystems.
CO2	Crypt-Analysis symmetric key ciphers.
CO3	Understand Stream Ciphers and Pseudo-randomness and evaluate hash functions and MACs.
CO4	Construction and crypt-analysis of asymmetric key ciphers.
CO5	Apply modern trends in asymmetric key cryptography.

Open Elective – VII: Business Intelligence (BTCOE704)

Course Outcomes:

CO1	Understand the basic componets and life cycle of business intelligence.
CO2	Apply best practices, business decision making and analyze business.
CO3	Evaluate performance of business using business intelligence tools.
CO4	Apply data warehousing options.
CO5	Illustrate dimension modeling, OLAP, MDD, Data warehouse project management.

Open Elective – VII: Blockchain Technology (BTCOE704)

Course Outcomes:

CO1	Explain the basic concepts and technology used for blockchain.
CO2	Illustrate the concepts of Bitcoin and working consensus in bitcoin.
CO3	Analyze the working of Smart Contracts and illustrate consensus models for permissioned blockchain.
CO4	Comprehend the use Blockchain in real world scenarios and applications.
CO5	Build blockchain and write smart contracts.

Open Elective – VIII: Virtual Reality (BTCOE705)

Course Outcomes:

CO1	Describe how VR systems work and create 3D computer graphics.
CO2	Create 3D scenes with Unity and experiment with various user interface (UI) techniques that are used in VR applications.
CO3	Apply linear and non linear translation and animate the object in virtual environment.
CO4	Evaluate physical simulation of various applications.
CO5	Illustrate human factors, VR hardware, VR software and its applications.

Open Elective – VIII: Deep Learning (BTCOE705)

Course Outcomes:

CO1	Understand perceptron learning algorithm.
CO2	Understand the significant features of feedforward neural network.

CO3	Analyse various types of auto encoders.
CO4	Elaborate various types of neural networks.
CO5	Elaborate recurrent neural networks.

Open Elective – VIII: Design Thinking (BTCOE705)

Course Outcomes:

CO1	Understand the process of design thinking.
CO2	Apply the Design Thinking process and use tools like Empathy Map for solving problems in user centric way.
CO3	Develop skills in Brainstorming for Product Design and Development.
CO4	Develop skills in testing and implementation for prototyping and validation.
CO5	Apply the Design thinking Techniques for solving problems in a company and understand Innovation Management.

Artificial Intelligence Lab (BTCOL707)

Course Outcomes:

CO1	Implement a program to solve 8 queens problem using PROLOG.
CO2	Implement a program to solve any problem using depth first search and best first search.
CO3	Implement a program to solve 8-puzzle problem using best first serch.
CO4	Implement a program to solve Robot traversal problem using means and end analysis.
CO5	Implement a program to solve traveling salesman problem.

Cloud Computing Lab (BTCOL707)

Course Outcomes:

CO1	Sketch out architecture of moodle cloud portal and moodle cloud site.
CO2	Implement a scenario in wordpress for Social Marketing, Search engine and Sharing Tools.
CO3	Install and configure virtual machine with guest OS.
CO4	Implement various cloud entities using Amazon Web Service(AWS) and Microsoft Azure.
CO5	Organize a case in Aneka / Eucalyptus for simulation entities in run-time.

Project Phase – I (BTCOL708)

Course Outcomes:

CO1	Analyze the problem, formulation and solution of the selected project.
CO2	Develop solutions for contemporary problems using modern tools for sustainable development.
CO3	Demonstrate ethical and professional sustainaability while working in a team and communicate effectively for the benefit of the society.
CO4	Understand the engineering, finance and management principles.

Field Training / Internship / Industrial Training (BTCOF708)

Course Outcomes:

CO1	Participate in the projects in industries during his or her industrial training.
CO2	Describe use of advanced tools and techniques encountered during industrial training and visit.
CO3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO4	Develop awareness about general workplace behavior and build interpersonal and team skills.
CO5	Prepare professional work reports and presentations.