



**Godavari Foundation's**  
**GODAVARI COLLEGE OF ENGINEERING  
AND POLYTECHNIC, JALGAON**

**Semester – III**

**Engineering Mathematics-III (BTES301)**

**Course Outcomes:**

CO1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits .
CO2	Solve problems related to fourier transform, Laplace transform and applications to communication systems and signal processing.
CO3	Perform vector differentiation and integration ,analyze the vector fields and apply to Electromagnetic fields.
CO4	Analyze conformal mappings, transformation and performed contour integration of complex functions in the study of electrostatics and signal processing.
CO5	Evaluate diagonalization and applications.

**Electronic Devices and Circuits (BTETC302)**

**Course Outcomes:**

CO1	Comply and verify parameters after exciting devices by any stated method.
CO2	Implement circuit and test the performance.
CO3	Analyze BJT, JFET and MOSFET for various applications
CO4	Analyze Feedback amplifiers and oscillators.

**Digital Electronics (BTETC303)**

**Course Outcomes:**

CO1	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
CO2	Design combinational and sequential circuits.
CO3	Design and implement hardware circuit to test performance and application.
CO4	Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.

## **Electrical Machines and Instruments (BTES304)**

### **Course Outcomes:**

CO1	The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.
CO2	The skill to analyze the response of any electrical machine.
CO3	The ability to troubleshoot the operation of an electrical machine.
CO4	The ability to select a suitable measuring instrument for a given application.
CO5	The ability to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.

## **Seminar – I (BTETS307)**

### **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.

## Semester – IV

### Network Theory (BTETC401)

#### Course Outcomes:

CO1	Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.
CO2	Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.
CO3	Identify issues related to transmission of signals, analyze different RLC networks.
CO4	Find technology recognition for the benefit of the society.

### Signals and Systems (BTETC402)

#### Course Outcomes:

CO1	Understand mathematical description and representation of continuous and discrete time signals and systems.
CO2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
CO3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.
CO4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.

### Basic Human Rights (BTHM403)

#### Course Outcomes:

CO1	Students will be able to understand the history of human rights.
CO2	Students will learn to respect others caste, religion, region and culture.
CO3	Students will be aware of their rights as Indian citizen.
CO4	Students will be able to understand the importance of groups and communities in the society
CO5	Students will be able to realize the philosophical and cultural basis and historical perspectives of human rights. .

## **Probability Theory and Random Processes (BTBS404)**

### **Course Outcomes:**

CO1	Understand representation of random signals
CO2	Investigate characteristics of random processes
CO3	Make use of theorems related to random signals
CO4	To understand propagation of random signals in LTI systems

## **Python Programming (BTETPE405E)**

### **Course Outcomes:**

CO1	Experience with an interpreted Language.
CO2	To build software for real needs
CO3	Prior Introduction to testing software

## **Semester – V**

## **Electromagnetic Field Theory (BTETC501)**

### **Course Outcomes:**

CO1	Understand characteristics and wave propagation on high frequency transmission lines
CO2	Carryout impedance transformation on TL. Carryout impedance transformation on TL
CO3	Characterize uniform plane wave
CO4	Calculate reflection and transmission of waves at media interface
CO5	Analyze wave propagation on metallic waveguides in modal form Understand principle of radiation and radiation characteristics of an antenna

## **Digital Signal Processing (BTETC502)**

### **Course Outcomes:**

CO1	Understand use of different transforms and analyze the discrete time signals and systems.
CO2	Realize the use of LTI filters for filtering different real-world signals.
CO3	Capable of calibrating and resolving different frequencies existing in any signal.
CO4	Design and implement multistage sampling rate converter
CO5	Design of different types of digital filters for various applications.

## **Analog Communication (BTETC503)**

### **Course Outcomes:**

CO1	Understand and identify the fundamental concepts and various components of analog communication systems.
CO2	Understand the concepts of modulation and demodulation techniques.
CO3	Design circuits to generate modulated and demodulated wave.
CO4	Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.
CO5	Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

## **Analog Circuits (BTCOC504)**

### **Course Outcomes:**

CO1	Understand the characteristics of IC and Op-Amp and identify the internal structure.
CO2	Understand and identify various manufacturing techniques.
CO3	Derive and determine various performance-based parameters and their significance For Op-Amp.
CO4	Verify parameters after exciting IC by any stated method.
CO5	Analyze and identify linear and nonlinear applications of Op-Amp.
CO6	Understand and verify results (levels of V & I) with hardware implementation.
CO7	Implement hardwired circuit to test performance and application for what it is being designed.

## **Embedded System Design (BTETPE504B)**

### **Course Outcomes:**

CO1	The student will study ARM Processor based Embedded System design
CO2	To build software for real needs
CO3	Prior Introduction to testing software

## Semester – VI

### **Network Theory ( BTETC401)**

#### **Course Outcomes:**

CO1	Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.
CO2	Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.
CO3	Identify issues related to transmission of signals, analyze different RLC networks.
CO4	Find technology recognition for the benefit of the society.

### **Signals and Systems (BTETC402)**

#### **Course Outcomes:**

CO1	Understand mathematical description and representation of continuous and discrete time signals and systems.
CO2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
CO3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.
CO4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.

### **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 model 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 optimization 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. Understand basic concepts of simple digital camera.

## **Elective – V: Development Engineering (BTHM605)**

### **Course Outcomes:**

CO1	Understand various definitions 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 grammar 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 components 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 search.
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 sustainability 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.