Department of Electronics and Telecommunication Engineering

PROGRAM OUTCOME STATEMENTS	
PO No.	**Statements**
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Department of Electronics and Telecommunication Engineering

Course outcomes of all courses		
Second Year-I		
Course no.	**Course code**	**Course name**
C301	BTBS301	Engineering Mathematics – III
COs	After the successful completion of this course student will be able to:	
1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.	
2	Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.	
3	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.	
4	Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.	
5	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.	
Course no.	**Course code**	**Course name**
C302	BTETC302	Electronic Devices & Circuits
COs	After the successful completion of this course student will be able to:	
1	Comply and verify parameters after exciting devices by any stated method.	
2	Implement circuit and test the performance.	
3	Analyze BJT, JFET and MOSFET for various applications.	
4	Analyze Feedback amplifiers and oscillators.	
Course no.	**Course code**	**Course name**
C303	BTETC303	Digital Electronics
COs	After the successful completion of this course student will be able to:	
1	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.	
2	Design combinational and sequential circuits.	
3	Design and implement hardware circuit to test performance and application	
4	Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.	
Course no.	**Course code**	**Course name**
C304	BTES303	Electrical Machines and Instruments
COs	After the successful completion of this course student will be able to:	
1	Formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.	

2	Analyze the response of any electrical machine.
3	Troubleshoot the operation of an electrical machine.
4	Select a suitable measuring instrument for a given application.
5	Estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.

Course no.	**Course code**	**Course name**
C305	BTETL305	Electronic Devices & Circuits Lab

COs	After the successful completion of this course student will be able to:
1	Comply and verify parameters after exciting devices by any stated method.
2	Implement circuit and test the performance.
3	Analyze BJT, JFET and MOSFET for various applications.
4	Analyze Feedback amplifiers and oscillators.
5	Comply and verify parameters after exciting devices by any stated method.

Course no.	**Course code**	**Course name**
C306	BTETL306	Digital Electronics Lab

COs	After the successful completion of this course student will be able to:
1	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
2	Design combinational and sequential circuits.
3	Design and implement hardware circuit to test performance and application
4	Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.
5	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.

Course no.	**Course code**	**Course name**
C307	BTETS307	Seminar I

COs	After the successful completion of this course student will be able to:
1	Acquire the basic skills to for performing literature survey and paper presentation
2	Describe the current topics in Electronics, Communication, and related areas based on current publications.
3	Demonstrate oral communications skills while giving power point presentation and written communication skills while writing report.
4	Apply ethical principles and commit to professional ethics while delivering seminar

Course no.	**Course code**	**Course name**
C308	BTES211P	Internship – 1 Evaluation

COs	After the successful completion of this course student will be able to:
1	Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.

2	Assess the Strengths, Weaknesses, Opportunities and Threats (SWOT) his/her organization of internship
3	Determine the challenges and future potential for his / her internship organization in particular and the sector in general.
4	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
5	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
6	Analyze the functioning of internship organization and recommend changes for improvement in processes.
7	Deal with industry-professionals and ethical issues in the work environment.

Second Year-II

Course no.	**Course code**	**Course name**
C401	BTETC401	Network Theory
COs	After the successful completion of this course student will be able to:
1	Apply basic laws of electric circuits and different network theorems to linear circuit to calculate the response.
2	Determine transient and steady state response of linear circuits.
3	Apply concepts of Laplace Transform to find circuit parameters.
4	Compute two port network parameters and draw equivalent network.
5	Apply matrix calculation method to find solution of circuit equation, design filter.

Course no.	**Course code**	**Course name**
C402	BTETC402	Signals and Systems
COs	After the successful completion of this course student will be able to:
1	Understand mathematical description and representation of continuous and discrete time signals and systems.
2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.
4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.

Course no.	**Course code**	**Course name**
C403	BTHM403	Basic Human Rights
COs	After the successful completion of this course student will be able to:
1	Understand the history of human rights.
2	Respect others caste, religion, region and culture.
3	Aware of their rights as Indian citizen.

4	Understand the importance of groups and communities in the society.		
5	Realize the philosophical and cultural basis and historical perspectives of human rights.		
Course no.		**Course code**	**Course name**
C404		BTBS404	Probability Theory and Random Processes
COs	After the successful completion of this course student will be able to:		
1	Understand representation of random signals		
2	Investigate characteristics of random processes		
3	Make use of theorems related to random signals		
4	Understand propagation of random signals in LTI systems.		
5	Understand representation of random signals		
Course no.		**Course code**	**Course name**
C405		BTETPE405 (A)	Numerical Methods and Computer Programming
COs	After the successful completion of this course student will be able to:		
1	Solve algebraic and transcendental equations by using numerical techniques and will be able to compare different numerical techniques used for this purpose and also will be able to choose a proper one as per the requirement of the problem.		
2	Solve a system of linear equations with any number of variables using different direct and iterative numerical techniques.		
3	Understand the concept of interpolation, finite difference operators and their relations, and can apply different interpolation techniques on equi-spaced or non equi-spaced data values.		
4	Write computer programs for the numerical computational techniques.		
5	Understand application of the NMCP course in many engineering core subjects like signal processing, digital communication, numerical techniques in electromagnetics etc.		
6	Understand procedure-oriented and object-oriented programming concepts.		
7	Writing C and C++ programs efficiently.		
Course no.		**Course code**	**Course name**
C406		BTETPE405 (E)	Python Programming
COs	After the successful completion of this course student will be able to:		
1	Explain the concepts of interpreted language.		
2	Develop programs using Python Types, Operators, Expressions, Functions and OOP concepts.		
3	Provide solution to real world needs by developing software.		
4	Explain the concepts of testing software.		
Course no.		**Course code**	**Course name**
C407		BTETS407	Seminar II
COs	After the successful completion of this course student will be able to:		

1	Acquire the basic skills to for performing literature survey and paper presentation
2	Describe the current topics in Electronics, Communication, and related areas based on current publications.
3	Demonstrate oral communications skills while giving power point presentation and written communication skills while writing report.
4	Apply ethical principles and commit to professional ethics while delivering seminar

Course no.	**Course code**	**Course name**
C408	BTETP408 (Internship – 2)	Field Training Internship/ Industrial Training

COs	After the successful completion of this course student will be able to:
1	Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.
2	Assess the Strengths, Weaknesses, Opportunities and Threats (SWOT) his/her organization of internship
3	Determine the challenges and future potential for his / her internship organization in particular and the sector in general.
4	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
5	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
6	Analyze the functioning of internship organization and recommend changes for improvement in processes.
7	Deal with industry-professionals and ethical issues in the work environment.

Third Year-I

Course no.	**Course code**	**Course name**
C501	BTETC501	Electromagnetic Field Theory

COs	After the successful completion of this course student will be able to:
1	Understand characteristics and wave propagation on high frequency transmission lines
2	Carryout impedance transformation on TL
3	Use sections of transmission line sections for realizing circuit elements
4	Characterize uniform plane wave
5	Calculate reflection and transmission of waves at media interface
6	Analyze wave propagation on metallic waveguides in modal form
7	Understand principle of radiation and radiation characteristics of an antenna

Course no.	**Course code**	**Course name**

C502	BTETC502	Digital Signal Processing
COs	After the successful completion of this course student will be able to:	
1	Understand use of different transforms and analyze the discrete time signals and systems.	
2	Realize the use of LTI filters for filtering different real-world signals.	
3	Capable of calibrating and resolving different frequencies existing in any signal.	
4	Design and implement multistage sampling rate converter.	
5	Design of different types of digital filters for various applications.	
Course no.	**Course code**	**Course name**
C503	BTETC503	Analog Communication
COs	After the successful completion of this course student will be able to:	
1	Understand and identify the fundamental concepts and various components of analog communication systems.	
2	Understand the concepts of modulation and demodulation techniques.	
3	Design circuits to generate modulated and demodulated wave.	
4	Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.	
5	Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase).	
6	Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.	
7	Develop the ability to compare and contrast the strengths and weaknesses of various	
Course no.	**Course code**	**Course name**
C504	BTETPE504-A	Analog Circuits
COs	After the successful completion of this course student will be able to:	
1	Understand the characteristics of IC and Op-Amp and identify the internal structure.	
2	Understand and identify various manufacturing techniques.	
3	Derive and determine various performances-based parameters and their significance for Op-Amp.	
4	Verify parameters after exciting IC by any stated method.	
5	Analyze and identify the closed loop stability considerations and I/O limitations.	
6	Analyze and identify linear and nonlinear applications of Op-Amp.	
Course no.	**Course code**	**Course name**
C505	BTETPE504-C	Digital System Design
COs	After the successful completion of this course student will be able to:	
1	Design and analyze combinational logic circuits	
2	Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder	
3	Design & analyze synchronous sequential logic circuits	
4	Use HDL & appropriate EDA tools for digital logic design and simulation.	
Course no.	**Course code**	**Course name**

C506	BTETPE505-A	Control System Engineering
COs	After the successful completion of this course student will be able to:	
1	Understand the modeling of linear-time-invariant systems using transfer function andstate-space representations.	
2	Understand the concept of stability and its assessment for linear-time invariant systems.	
3	Design simple feedback controllers.	
Course no.	**Course code**	**Course name**
C507	BTETPE505-B	Artificial Intelligence and Machine learning
COs	After the successful completion of this course student will be able to:	
1	Identify the AI based problems.	
2	Apply techniques to solve the AI problems.	
3	Define learning and explain various logic inferences.	
4	Discuss different learning techniques.	
Course no.	**Course code**	**Course name**
C508	BTETM507	Mini Project – 1
COs	After the successful completion of this course student will be able to:	
1	Practice acquired knowledge within the chosen area of technology for project development.	
2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.	
3	Reproduce, improve and refine technical aspects for engineering projects.	
4	Work as an individual or in a team in development of technical projects.	
5	Communicate and report effectively project related activities and findings.	
Course no.	**Course code**	**Course name**
C509	BTETP508	Internship-2
COs	After the successful completion of this course student will be able to:	
1	Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.	
2	Assess the Strengths, Weaknesses, Opportunities and Threats (SWOT) his/her organization of internship	
3	Determine the challenges and future potential for his / her internship organization in particular and the sector in general.	
4	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.	
5	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship	

	organization.
6	Analyze the functioning of internship organization and recommend changes for improvement in processes.
7	Deal with industry-professionals and ethical issues in the work environment.

Third Year-II		
Course no.	**Course code**	**Course name**
C601	BTETC601	Antennas and Wave Propagation
COs	After the successful completion of this course student will be able to:	
1	Formulate the wave equation and solve it for uniform plane wave.	
2	Analyze the given wire antenna and its radiation characteristics.	
3	Identify the suitable antenna for a given communication system.	
Course no.	**Course code**	**Course name**
C602	BTETC602	Digital Communication
COs	After the successful completion of this course student will be able to:	
1	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.	
2	Perform the time and frequency domain analysis of the signals in a digital communication system.	
3	Select the blocks in a design of digital communication system.	
4	Analyze Performance of spread spectrum communication system.	
Course no.	**Course code**	**Course name**
C603	BTETPE603	Microprocessors and Microcontrollers
COs	After the successful completion of this course student will be able to:	
1	Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications.	
2	Students get ability to interface mechanical system to function in multidisciplinarysystem like in robotics, Automobiles.	
3	Students can identify and formulate control and monitoring systems usingmicroprocessors.	
4	Learn use of hardware and software tools.	
5	Develop interfacing to real world devices.	
6	Graduates will be able to design real time controllers using microcontroller-basedsystem.	
7	Learn importance of microcontroller in designing embedded application.	
Course no.	**Course code**	**Course name**
C604	BTETOE604-A	IoT and Industry 4.0
COs	After the successful completion of this course student will be able to:	
1	Understand the drivers and enablers of Industry4.0	
2	Appreciate the smartness in Smart Factories, Smart cities, smart products and smart	

	services		
3	Able to outline the various systems used in a manufacturing plant and their role in an Industry 4.0world		
4	Appreciate the power of Cloud Computing in a networked economy.		
5	Understand the opportunities, challenges brought about by Industry 4.0 and how organizations and individuals should prepare to reap the benefits		
Course no.		**Course code**	**Course name**
C605		BTETOE604-C	Computer Network
COs	After the successful completion of this course student will be able to:		
1	To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.		
2	To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.		
3	To be familiar with wireless networking concepts.		
4	To be familiar with contemporary issues in networking technologies.		
5	To be familiar with network tools and network programming.		
6	For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component.		
7	For a given problem related TCP/IP protocol developed the network programming.		
Course no.		**Course code**	**Course name**
C606		BTHM605	Employability & Skill Development
COs	After the successful completion of this course student will be able to:		
1	Have skills and preparedness for aptitude tests.		
2	Be equipped with essential communication skills (writing, verbal and non-verbal)		
3	Master the presentation skill and be ready for facing interviews.		
4	Build team and lead it for problem solving.		
Course no.		**Course code**	**Course name**
C607		BTETM607	Mini-project-2
COs	After the successful completion of this course student will be able to:		
1	Practice acquired knowledge within the chosen area of technology for project development.		
2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.		
3	Reproduce, improve and refine technical aspects for engineering projects.		
4	Work as an individual or in a team in development of technical projects.		
5	Communicate and report effectively project related activities and findings.		
Course no.		**Course code**	**Course name**
C608		BTETP608	Internship-3

COs	After the successful completion of this course student will be able to:
1	Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.
2	Assess the Strengths, Weaknesses, Opportunities and Threats (SWOT) his/her organization of internship
3	Determine the challenges and future potential for his / her internship organization in particular and the sector in general.
4	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
5	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
6	Analyze the functioning of internship organization and recommend changes for improvement in processes.
7	Deal with industry-professionals and ethical issues in the work environment.

Final Year-I

Course no.	**Course code**	**Course name**
C701	BTETC701	Digital Communication

COs	After the successful completion of this course student will be able to:
1	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
2	Perform the time and frequency domain analysis of the signals in a digital communication system.
3	Select the blocks in a design of digital communication system.
4	Analyze Performance of spread spectrum communication system.

Course no.	**Course code**	**Course name**
C702	BTETPE702 (D)	Elective 3 - Fiber Optic Communication

COs	After the successful completion of this course student will be able to:
1	Explain the principles of fiber-optic communication, the components
2	Describe the properties of the optical fibers and optical components.
3	Describe the operation of Lasers, LEDs and Optical Detectors.
4	Analyze system performance of optical communication systems.

Course no.	**Course code**	**Course name**
C703	BTETPE702 (E)	Elective 3 - Wireless Sensor

		Networks
COs	After the successful completion of this course student will be able to:	
1	Design wireless sensor networks for a given application	
2	Understand emerging research areas in the field of sensor networks	
3	Understand MAC protocols used for different communication standards used in WSN	
4	Explore new protocols for WSN.	
Course no.	**Course code**	**Course name**
C704	BTETPE703 (B)	Elective 4 - Artificial Intelligence Deep learning
COs	After the successful completion of this course student will be able to:	
1	Identify the AI based problems.	
2	Apply techniques to solve the AI problems.	
3	Define learning and explain various logic inferences.	
4	Discuss different learning techniques.	
Course no.	**Course code**	**Course name**
C705	BTETPE704 (F)	Elective 5 - Electronics in Smart City
COs	After the successful completion of this course student will be able to:	
1	Explain necessity of smart city with Global and Indian Perspective	
2	Explain Concept of IOT and apply IOT in Smart City	
3	Explain concept of Smart Objects and use smart objects in Smart city Projects	
4	Evaluate smart cities from the perspective of distributed intelligence and central planning.	
5	Apply wireless protocols for Smart City projects	
Course no.	**Course code**	**Course name**
C706	BTHM705	Financial Management
COs	After the successful completion of this course student will be able to:	
1	Understand and define basic terminology used in finance and accounts	
2	Prepare& appraise Financial Statements and evaluate a company in the light of different measurement systems.	
3	Analyze the risk and return of alternative sources of financing.	
4	Estimate cash flows from a project, including operating, net working capital, and capital spending.	
5	Estimate the required return on projects of differing risk ,to estimate the cash flows from an investment project, calculate the appropriate discount rate, determine the value added from the project, and make a recommendation to accept or reject the project	
6	Describe and illustrate the important elements in project finance Using financial	

	calculator and Excel in a variety of problems.		
Course no.		**Course code**	**Course name**
C707		BTETP709	Project Part I
COs	After the successful completion of this course student will be able to:		
1	Identify and formulate Engineering problem addressing needs of Industry & Society.		
2	Conduct investigations of the Engineering problem formulated by using Engineering Sciences.		
3	Design and develop solution(s) for Engineering problem with due consideration to public health, safety, culture, society, environment and sustainability.		
4	Create, select and apply modern tools for investigating, designing and developing solution(s) to engineering problem.		
5	Work as individual and in team for communicating and managing the project work and its finances.		
6	Apply professional ethics while identifying the problem, investigating the problem, designing a solution to the problem, working as a individual or team for communicating and managing the project work and its finances.		
7	Develop ability for independent & life long learning.		
Course no.		**Course code**	**Course name**
C708		BTETF611	Field Training/ Internship/ Industrial Training Evaluation
COs	After the successful completion of this course student will be able to:		
1	Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.		
2	Assess the Strengths, Weaknesses, Opportunities and Threats (SWOT) his/her organization of internship		
3	Determine the challenges and future potential for his / her internship organization in particular and the sector in general.		
4	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.		
5	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.		
6	Analyze the functioning of internship organization and recommend changes for improvement in processes.		
7	Deal with industry-professionals and ethical issues in the work environment.		

Final Year-II		
Course no.	**Course code**	**Course name**
C801	BTETP806	Project Part-II

COs	After the successful completion of this course student will be able to:
1	Identify and formulate Engineering problem addressing needs of Industry & Society.
2	Conduct investigations of the Engineering problem formulated by using Engineering Sciences.
3	Design and develop solution(s) for Engineering problem with due consideration to public health, safety, culture, society, environment and sustainability.
4	Create, select and apply modern tools for investigating, designing and developing solution(s) to engineering problem.
5	Work as individual and in team for communicating and managing the project work and its finances.
6	Apply professional ethics while identifying the problem, investigating the problem, designing a solution to the problem, working as a individual or team for communicating and managing the project work and its finances.
7	Develop ability for independent & life long learning.