

**PRIYADARSHINI COLLEGE OF ENGINEERING**

**Department of E&T Engineering**

**Course Outcomes (CO)**

**Semester - 3<sup>rd</sup>**

<b>Course Name: Applied Mathematics-III</b>		<b>Code: BEETE 301</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand Laplace Transform and its properties to solve differential equations.	
<b>CO2</b>	Expand the function in periodic form using Fourier series and understand the relationship between z transform and the Fourier transform for discrete time signals.	
<b>CO3</b>	Use the functions of several variables in solution of boundary value problems.	
<b>CO4</b>	Understand the fundamental concepts of complex analysis and also evaluate some standard integrals using contour integrals.	
<b>CO5</b>	Formulate and solve linear partial differential equations in the field of Engineering and Technology.	
<b>CO6</b>	Apply and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices.	

<b>Course Name: Electronic Devices and Circuits</b>		<b>Code: BEETE 302</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the relation between physical structure and circuit behavior of PN junction diode and analysis of its applications.	
<b>CO2</b>	Characterize the electronic device (Bipolar Junction Transistor) in terms of appropriate external variables and differentiate different biasing techniques.	
<b>CO3</b>	Use device parameters for Small signal and High frequency analysis along with principle of Negative feedback in electronic circuits.	
<b>CO4</b>	Use electronic device (Transistor) as a circuit element in applications such as oscillators and Multivibrators.	
<b>CO5</b>	Understand various types of power amplifiers and their applications.	
<b>CO6</b>	Characterize the electronic device (Field Effect Transistor) in terms of appropriate external variables and differentiate different biasing techniques.	

<b>Course Name: Electronics Measurement and Instrumentation</b>		<b>Code: BEETE 303</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand Laplace Transform and its properties to solve differential equations.	
<b>CO2</b>	Expand the function in periodic form using Fourier series and understand the relationship between z transform and the Fourier transform for discrete time signals.	
<b>CO3</b>	Use the functions of several variables in solution of boundary value problems.	
<b>CO4</b>	Understand the fundamental concepts of complex analysis and also evaluate some standard integrals using contour integrals.	
<b>CO5</b>	Formulate and solve linear partial differential equations in the field of Engineering and Technology.	
<b>CO6</b>	Apply and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices.	

<b>Course Name: Object Oriented Programming and Data Structure</b>		<b>Code: BEETE 304</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Implement the concept of object oriented programming in any programming language.	
<b>CO2</b>	Describe and apply principles of good program design like operator,function overloading and class template to the C++ language	
<b>CO3</b>	Describe and apply various object oriented features like inheritance, pure virtual function to solve various computing problems using C++ language.	
<b>CO4</b>	Understand and implement the basic search and sort algorithms	
<b>CO5</b>	Implement and use linear and non-linear data structures like stacks, queues , linked list to solve various computing problems.	
<b>CO6</b>	Describe and implement fundamental algorithmic problems including Trees--for solving complex programming problems.	

<b>Course Name:Network Analysis and Synthesis</b>		<b>Code: BEETE 305</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Analyze the various Electrical and Electrical Networks using the mesh and nodal Techniques	
<b>CO2</b>	Analyze the different circuits by using different network theorems	

<b>CO3</b>	Demonstrate Knowledge of resonance in series and parallel circuits for telecommunication system
<b>CO4</b>	Apply filters approximation to design analog signal of active and passive filters for communication system
<b>CO5</b>	Determine the transfer function and design the initial condition.
<b>CO6</b>	Analyze and formulate network function of ladder network and pole zero configuration

**Semester - 4<sup>th</sup>**

<b>Course Name: Applied Mathematics IV</b>		<b>Code: BEETE 401</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand various types of numerical methods, that play a vital role in many areas of Engineering and technology.	
<b>CO2</b>	Apply concept of Z-transform for solving difference equations.	
<b>CO3</b>	Demonstrate basic knowledge of Bessel's function, Legendre's polynomial and series solutions.	
<b>CO4</b>	Understand concept of random variables and theory of probability to use in communication system.	
<b>CO5</b>	Apply mathematical Expectations and use them to predict expected behavior of any function.	
<b>CO6</b>	Understand thoroughly fundamentals of probability distributions and apply it to respective branch of engineering.	

<b>Course Name: Power Devices and Machines</b>		<b>Code: BEETE 402</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the basics of different components used in Power electronics.	
<b>CO2</b>	Understand the working and characteristics of different power devices along with their applications in electronics circuits.	
<b>CO3</b>	Understand the concept of AC-DC converters and their industrial applications.	

<b>CO4</b>	Understand the concept of Chopper and Inverter and their industrial applications.
<b>CO5</b>	Understand the construction ,working principle of three phase transformer and Induction motor with their starting methods.
<b>CO6</b>	Understand the different Types of AC/DC machines and their speed control methods.

<b>Course Name: Electromagnetic Fields</b>		<b>Code: BEETE 403</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand different coordinate systems and basics of electrostatics.	
<b>CO2</b>	Understand Current and Current density, continuity equation, and basics of magnetostatics.	
<b>CO3</b>	Derive the Maxwell's equations and boundary conditions.	
<b>CO4</b>	Apply Maxwell's equations for electromagnetic wave propagation.	
<b>CO5</b>	Understand the use of waveguides for the transmission of electromagnetic waves at higher frequencies.	
<b>CO6</b>	Understand the basic concepts of Radiation and Elements used for radiation along with the basic terminologies.	

<b>Course Name: Digital Circuit &amp; Fundamental of Microprocessor</b>		<b>Code: BEETE 404</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the fundamental of basic gates and their use in combinational and sequential circuits.	
<b>CO2</b>	To design different types of combinational circuits such as Adder, Subtractor, MUX, DEMUX, Encoder, Decoder etc.	
<b>CO3</b>	To evaluate performance of various Flip-flops based systems.	
<b>CO4</b>	To design synchronous and asynchronous systems such as up/down counter, ring counter, shift register.	
<b>CO5</b>	To make use of digital ICs to design logical circuits.	
<b>CO6</b>	To understand the Architecture of microprocessor 8085 and Instruction set which are useful for programming.	

<b>Course Name: SIGNALS AND SYSTEMS</b>		<b>Code: BEETE 405</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Get knowledge about different types of signals and systems used in communication Electronics & Be able to embed the use of fourier series and fourier transform for feature extraction of different electronic signals.	
<b>CO2</b>	Understand the concept of probability and its use in communication system.	
<b>CO3</b>	Be able to understand different digital formats in line coding ,effect of intersymbol interference and Nyquist criterion.	
<b>CO4</b>	Understand the different analog modulation schemes	
<b>CO5</b>	Understand the binary modulation schemes	
<b>CO6</b>	To be able to find channel capacity for discrete and continuous channel .To be able to understand different source and channel coding schemes	

**Semester – 5 TH**

<b>Course Name: Antennas and Wave Propagation</b>		<b>Code: BEETE 501</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Analyse transmission line characteristics and parameters .	
<b>CO2</b>	Analyse the field equations, various parameters such as Power radiated , Radiation resistance, Radiation pattern etc. of Linear Antenna and its ground effects and their application.	
<b>CO3</b>	Design and analysis of antenna arrays.	
<b>CO4</b>	Discuss the concept, radiation mechanism and applications of Microstrip Patch Antenna.	
<b>CO5</b>	Classify different Reflector antennas , Horn antennas and analyse them.	
<b>CO6</b>	Discuss the different aspects of Antenna measurements and radio wave propagation.	

<b>Course Name: Microprocessor &amp; Microcontrollers</b>		<b>Code: BEETE502</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Describe architecture, operating modes, addressing modes, instruction set, the concept of interrupts, concept of memory organization in 8086 and its interfacing.	
<b>CO2</b>	Write assembly language program of 8086 and perform the Interfacing of I/O devices and peripherals ICs (8255 & 8279) with 8086 microprocessor.	
<b>CO3</b>	Describe architecture, operating modes & interfacing of peripherals ICs (8254, 8259 & 8251) with 8086 & its programming.	
<b>CO4</b>	Describe architecture, operating modes & interfacing of DMA8237, 8087 Numeric co-processor with 8086 & its programming, introduction of Pentium Processor.	
<b>CO5</b>	Describe architecture of 8051 microcontroller, concept of interrupts, concept of memory organization and its interfacing with 8051.	
<b>CO6</b>	Describe instruction set, addressing modes, serial communication, I/O expansion using 8255, counter/timer programming in various modes of 8051, interfacing of keyboard, LED display, ADC & DAC, stepper motor with 8051 & its programming.	

<b>Course Name: Analog Circuit and Design</b>		<b>Code: BEETE503</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Analyse the basic differential Amplifier using transistor and its operation, Op-Amp Fundamentals & its characteristic.	
<b>CO2</b>	Design linear Op-Amp circuits such as Voltage follower, Summing amplifier, scaling and averaging amplifier, Instrumentation amplifier circuits for various practical applications.	
<b>CO3</b>	Design non-linear Op-Amp such as Comparators, Comparator IC such as LM 339, Schmitt trigger, multivibrator circuits for various practical applications using IC555.	
<b>CO4</b>	Design and analyse unregulated DC power supply system, series voltage regulators, regulators using IC 78xx and 79xx, protection circuits for regulators, SMPS (Buck & Boost).	

<b>CO5</b>	Design and analyse sinusoidal oscillators, Function generator and evaluate figure of merit for all oscillator circuits.
<b>CO6</b>	Design of Butterworth Active Filter (up to 6th order), Relay driver circuit, stepper motor control circuit, DC servo motor control circuit.

<b>Course Name: Communication Electronics</b>		<b>Code: BEETE504</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	To make the students aware of the concepts and types of modulation along with their applications.	
<b>CO2</b>	To differentiate different analog modulation techniques in terms of bandwidth, modulation index, power requirements etc. Students also would learn the different generations techniques of each modulation type.	
<b>CO3</b>	To identify the basic difference between CW and pulse modulation and learn different pulse analog and pulse digital modulation techniques along with their generation techniques and applications.	
<b>CO4</b>	To understand the concept of noise and its effect on signal reception and to learn various types of noises along with the causes of occurrence as well as methods to remove.	
<b>CO5</b>	Students shall be able to understand and differentiate between various AM & FM receivers/detectors	
<b>CO6</b>	Students would learn broadband communication links for short and medium haul systems. In addition to this the students will be made aware of the different channel multiplexing techniques such as FDM, TDM, CDM	

<b>Course Name: Industrial economics and entrepreneurship development</b>		<b>Code: BEETE505</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand business structure and business economics and will apply this knowledge in a complex business environment.	
<b>CO2</b>	Identify and understand market structure, economic reforms and its social impact by applying the knowledge of economics.	
<b>CO3</b>	Comprehend the process of entrepreneurial development for setting up engineering / business unit.	
<b>CO4</b>	Apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.	
<b>CO5</b>	Understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry.	
<b>CO6</b>	Understand business & economic on a large scale.	

**Semester – 6TH**

<b>Course Name: Telecommunication switching systems</b>		<b>Code: BEETE601</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Describe the different types of telephone switching systems	
<b>CO2</b>	Describe the Unit of Traffic, Traffic measurement, Lost- call system, Queuing systems and their performance analysis	
<b>CO3</b>	Describe the types of Switching Networks, Gradings and their application ,Call processing Functions	
<b>CO4</b>	Understand the fundamentals of Network Synchronization and Management	
<b>CO5</b>	Acquire the knowledge of various Data Networks like LANs, MANs, Fiber optic networks and Data network Standards	
<b>CO6</b>	Understand Cellular Telephone Concepts	

<b>Course Name: Digital Signal Processing</b>		<b>Code: BEETE602</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Describe Sampling, reconstruction Process, representation of discrete time signals and analysis of discrete time systems.	
<b>CO2</b>	Use Z-transforms for analysis of signals and systems.	
<b>CO3</b>	Use Discrete Fourier Transforms for analysis of signals and systems.	
<b>CO4</b>	Design and implement IIR digital filter for various applications .	
<b>CO5</b>	Design and implement FIR digital filter for various applications .	
<b>CO6</b>	Describe the concept of multirate signal processing and apply it for the wavelet transform.	

<b>Course Name: Control System Engineering</b>		<b>Code: BEETE603</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Analyze various control systems & control system components ,represent the mathematical model of a system.	
<b>CO2</b>	Understand the system with respect to time and the response of different order systems for various inputs.	
<b>CO3</b>	Analyze the stability of the system and root locus	
<b>CO4</b>	Analyze the system with respect to Bode plot, Nyquist plot	
<b>CO5</b>	Understand various compensation techniques	
<b>CO6</b>	Apply the state variable approach in design.	

<b>Course Name: Digital Communication</b>		<b>Code: BEETE604</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Acquire the knowledge of basic concepts of digital communication system.	
<b>CO2</b>	Understand different methods of Source & Waveform Coding	
<b>CO3</b>	Describe various Digital Modulation techniques	
<b>CO4</b>	Understand the basics of Galois Field, types of error control and Convolution coding	

<b>CO5</b>	Understand concepts of Trellis coded modulation, Turbo coding, Reed Solomon Codes, Low density parity check coding (LDPC)
<b>CO6</b>	Describe spread spectrum methods and its application

<b>Course Name: Functional English</b>		<b>Code: BEETE605</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Apply English language proficiency seamlessly in professional careers.	
<b>CO2</b>	Identify the communication gaps and barriers to communication in professions and rectify them professionally.	
<b>CO3</b>	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.	
<b>CO4</b>	Build and develop the team of corporate communicators.	
<b>CO5</b>	Exploit the social digital media for effective corporate communication.	
<b>CO6</b>	Unleash public speaking/ presentation skills.	

**Semester – 7TH**

<b>Course Name: Television and Video Engineering</b>		<b>Code: BEETE702</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the fundamentals of television and display.	
<b>CO2</b>	Understand various TV standards.	
<b>CO3</b>	Understand digital TV systems.	
<b>CO4</b>	Understand modern TV systems.	
<b>CO5</b>	Understand Video Recorders.	
<b>CO6</b>	Understand various consumer applications of Television Systems	

<b>Course Name: DSP Processor and Architecture</b>		<b>Code: BEETE701</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Explain design concepts and features of PDSPs.	
<b>CO2</b>	Describe the detailed architecture, addressing modes and instructions of TMS320C5X	
<b>CO3</b>	Describe instructions and write simple ALP of DSP Processor.	
<b>CO4</b>	Describe internal architecture, addressing modes of TMS320C54XX..	
<b>CO5</b>	Design & implement DSP algorithm using code composer studio	
<b>CO6</b>	Design decimation filter and interpolation filter.	

<b>Course Name: Optical Communication</b>		<b>Code: BEETE703</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the basic elements of optical fiber.	
<b>CO2</b>	Understand the different kinds of losses, signal distortion in optical wave guides & other signal degradation factors.	
<b>CO3</b>	Describe the classification of various optical source materials, LED structures, LASER diodes.	
<b>CO4</b>	Understand the fiber optic receivers such as PIN, APD diodes, receiver operation & performance.	
<b>CO5</b>	Understand the analog and digital links of optical fibers.	
<b>CO6</b>	Understand and use the operational principal of WDM, SONET, measurement of attenuation, dispersion, refractive index profile in optical fibers.	

<b>Course Name: Advanced Digital System Design</b>		<b>Code: BEETE704</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Describe and understand VHDL development flow and Basic VHDL concepts.	
<b>CO2</b>	Design the combinational & sequential circuit using VHDL	
<b>CO3</b>	Develop the skills to become VLSI front end designers.	
<b>CO4</b>	Implement the digital system.	
<b>CO5</b>	perform experimentation on Hardware /Software co-design.	

<b>Course Name: Data Compression and Encryption</b>		<b>Code: BEETE705</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Implement various text compression techniques.	
<b>CO2</b>	Implement various audio compression techniques	
<b>CO3</b>	Implement various Image and video compression techniques	
<b>CO4</b>	Implement various security techniques in communication.	
<b>CO5</b>	Provide various authentications using digital communication.	
<b>CO6</b>	Gain the knowledge of encryption techniques application to digital.	

<b>Course Name: VLSI Signal Processing</b>		<b>Code: BEETE705</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Implement pipelining and parallel processing for clock period minimization & \ or low power.	
<b>CO2</b>	Perform retiming of DFG for clock period minimization.	

<b>CO3</b>	C406.3 Use unfolding algorithm for sample period reduction, parallel processing.
<b>CO4</b>	C406.4 Use folding transform for register minimization and multirate system.
<b>CO5</b>	C406.5 Implement convolution using fast convolution algorithm.
<b>CO6</b>	C406.6 Solve convolution using cyclic & iterated convolution method.

**Semester 8 th**

<b>Course Name: Microwave and Radar Engineering</b>		<b>Code: BEETE801</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand and analyze the use of active microwave devices like Klystron, TWT, BWO and magnetron.	
<b>CO2</b>	Analyze and use different power distribution Tees and passive microwave devices using scattering parameter.	
<b>CO3</b>	Understand and analyze different solid state microwave devices.	
<b>CO4</b>	Measure various parameters like frequency, power, attenuation, VSWR, impedance, insertion loss, dielectric constant, Q of a cavity resonator, phase shift.	
<b>CO5</b>	Understand and analyze fundamentals of Radar.	
<b>CO6</b>	Demonstrate acquisition of technical competence in specialized areas of Radar Engineering.	

<b>Course Name: Computer Communication Network</b>		<b>Code: BEETE802</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the requirement of theoretical & practical aspect of computer network.	
<b>CO2</b>	Understand the switching techniques of computer networks.	
<b>CO3</b>	Understand the different wired & wireless LAN standards & hardware.	
<b>CO4</b>	Describe various protocols and routing techniques used in network.	
<b>CO5</b>	Describe various application protocols used in communication.	
<b>CO6</b>	Describe the concept of computer network security and network administration.	

<b>Course Name: Wireless &amp; Mobile Communication</b>		<b>Code: BEETE803</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Design a model of cellular system communication and analyze their Operation and performance.	
<b>CO2</b>	Quantify the causes and effects of path loss and signal fading on received signal characteristics.	
<b>CO3</b>	To analyze equalization, various polarization techniques and different diversities.	
<b>CO4</b>	To construct and analyze the GSM system.	
<b>CO5</b>	To understand the various protocols used in wireless networking and study other wireless access protocol.	
<b>CO6</b>	To understand various wireless LAN networks technology.	

<b>Course Name: Wireless Sensor Network (Elective-2)</b>		<b>Code: BEETE804</b>
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<b>At the end of course Students will</b>	
<b>CO1</b>	Understand wireless sensor network environment and its various applied areas.
<b>CO2</b>	Understand sensor network architecture, sensor networking principles and protocols and case studies.
<b>CO3</b>	To impart sensor network protocols & routing schemes in Wireless Sensor Networks.
<b>CO4</b>	To demonstrate a computing science approach, in terms of design spaces for sensor networks & sensor transport control protocols.
<b>CO5</b>	Understand the concept of middleware for sensor networks; sensor specific programming languages.
<b>CO6</b>	Demonstrate wireless sensor network solutions with practical implementation examples and case studies; and the way these will impact on the engineering product enterprise process.

<b>Course Name: Embedded System (Elective-2)</b>		<b>Code: BEETE804</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand basics of Embedded System, Various design metrics and design challenge of Embedded System	
<b>CO2</b>	Understand hardware and software architecture of processor and various types of memory	
<b>CO3</b>	Understand the internal organization, various operation modes and programming of ARM processor.	
<b>CO4</b>	Understand the different Communication Protocol and Buses in Embedded System	
<b>CO5</b>	Understand the various concepts regarding Real Time Operating System	
<b>CO6</b>	To design Embedded System based on RTOS	

<b>Course Name: Robotics &amp; Automation (Elective-3)</b>		<b>Code: BEETE805</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	The course has been so designed to give the students an overall view of the mechanical components of robot and artificial intelligence.	
<b>CO2</b>	Explore Logic and knowledge representation.	
<b>CO3</b>	Speech synthesis and speech recognition concluding to working of robot brain.	
<b>CO4</b>	Effectively utilization of Image processing and various techniques for the same in robotics	
<b>CO5</b>	Efficient mechanism of various types of sensors	
<b>CO6</b>	Understanding Robot level programming languages and their types.	

<b>Course Name: Satellite Communication (Elective-3)</b>		<b>Code: BEETE805</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the working principle of satellite communication system and orbital aspects and components of a satellite communication system.	
<b>CO2</b>	Design and analyze the link budget of a satellite communication system and study of satellite orbits and launching.	
<b>CO3</b>	Describe multiple access techniques in Satellite Communication	
<b>CO4</b>	Understand propagation and rain effect on satellite.	
<b>CO5</b>	Study of error correction and detection codes related to Satellite Communication.	
<b>CO6</b>	Understand the different components in satellite communication earth stations.	



