Course Outcomes

COs

2022 Scheme

Course Name	AV Mathematics-III for EC Engineering
Course Code	BMATEC301
CO1	Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing, and field theory.
CO2	To use Fourier transforms to analyze problems involving continuous-time signals
CO3	To apply Z-Transform techniques to solve difference equations
CO4	Understand that physical systems can be described by differential equations and solve
CO5	Make use of correlation and regression analysis to fit a suitable mathematical model for statistical data

Course Name	Digital System Design using Verilog
Course Code	BEC302
CO1	Simplify Boolean functions using K-map and Quine-McCluskey minimization technique.
CO2	Analyze and design for combinational logic circuits.
CO3	Analyze the concepts of Flip Flops (SR, DT and JK) and to design the synchronous sequential circuits using Flip Flops.
CO4	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using Verilog descriptions.

Course Name	Electronic Principles and Circuits
Course Code	BEC303
CO1	Understand the characteristics of BJTs and FETs for switching and amplifier circuits.
CO2	Design and analyze amplifiers and oscillators with different circuit configurations and biasing conditions.
CO3	Understand the feedback topologies and approximations in the design of amplifiers and oscillators.
CO4	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.
CO5	Understand the power electronic device components and its functions for basic power electronic circuits.

Course Name	Network Analysis
Course Code	BEC304
Course Outcomes (Cos): At the end of the course the student will be able to:	
CO1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation.
CO2	Solve problems by applying Network Theorems and electrical laws to reduce circuit.
CO3	Analyse the circuit parameters during switching transients and apply Laplace transform to solve the given network
CO4	Evaluate the frequency response for resonant circuits and the network parameters for two port networks

Course Name	Analog and Digital Systems Design Lab
Course Code	BECL305
Course Outcomes (Cos): At the end of the course the student will be able to:	
CO1	Design and analyze the BJT/FET amplifier and oscillator circuits.
CO2	Design and test Opamp circuits to realize the mathematical computations, DAC and precision rectifiers.
CO3	Design and test the combinational logic circuits for the given specifications.
CO4	Test the sequential logic circuits for the given functionality.
CO5	Demonstrate the basic circuit experiments using 555 timer.

Course Name	Engineering Science Course
Course Code	BEC306A
CO1	Understand the principles of semiconductor Physics
CO2	Understand the principles and characteristics of different types of semiconductor devices
CO3	Understand the fabrication process of semiconductor devices
CO4	Utilize the mathematical models of semiconductor junctions for circuits and systems.
CO5	Identify the mathematical models of MOS transistors for circuits and systems.

Course Name	Sensors and Instrumentation
Course Code	BEC306B
CO1	Understand the material properties required to make sensors
CO2	Understand the principle of transducers for measuring physical parameters.
CO3	Describe the manufacturing process of sensors
CO4	Analyze the instrument characteristics and errors.
CO5	Describe the principle of operation and develop circuits for multirange Ammeters,

Course Name	Computer Organization and Architecture
Course Code	BEC306C
CO1	Explain the basic organization of a computer system.
CO2	Describe the addressing modes, instruction formats and program control statement.
CO3	Explain different ways of accessing an input/ output device including interrupts.
CO4	Illustrate the organization of different types of semiconductor and other secondary storage memories.
CO5	Illustrate simple processor organization based on hard wired control and microprogrammed control.

Course Name	Applied Numerical Methods for EC Engineers
Course Code	BEC306D
CO1	Explain and measure errors in numerical computations
CO2	Test for consistency and solve a system of linear equations.
CO3	Construct a function which closely fits given n- n-points of an unknown function.
CO4	Understand and apply the basic concepts related to solving problems by Numerical differentiation and numerical integration.
CO5	Use appropriate numerical methods to study phenomena modelled as partial differential equations.

Course Name	Social Connect and Responsibility
Course Code	BSCK307
CO1	Communicate and connect to the surrounding.
CO2	Create a responsible connection with the society.
CO3	Involve in the community in general in which they work.
CO4	Notice the needs and problems of the community and involve them in problem –solving.
CO5	Develop among themselves a sense of social & civic responsibility & utilize their knowledge

Course Name	LABVIEW programming
Course Code	BEC358A
CO1	Use LabVIEW to create data acquisition, analysis and display operations
CO2	Create user interfaces with charts, graph and buttons
CO3	Use the programming structures and data types that exist in LabVIEW
CO4	Use various editing and debugging techniques.

Course Name	MATLAB Programming
Course Code	BEC358B
CO1	Understand the syntax of MATLAB for arithmetic computations, arrays, matrices.
CO2	Understand the built in function, saving and loading data, and create plots
CO3	Create program using symbolic computations, Importing and exporting data and files
CO4	Create program using character strings, Command line functions and Built-in functions.

Course Name	C++ Basics
Course Code	BEC358C
CO1	Write C++ program to solve simple and complex problems
CO2	Apply and implement major object-oriented concepts like message passing, function overloading, operator overloading and inheritance to solve real-world problems.
CO3	Use major C++ features such as Templates for data type independent designs and File I/O to deal with large data set.
CO4	Analyze, design and develop solutions to real-world problems applying OOP concepts of C++

Course Name	IOT for Smart Infrastructure
Course Code	BEC358D
CO1	Define and explain the core concepts and components of IoT and its relevance to smart infrastructure. Identify and evaluate the key technologies and communication protocols used in IoT for smart infrastructure.
CO2	Assess the benefits, challenges, and ethical considerations associated with implementing IoT in smart infrastructure projects and analyse & compare different IoT applications in smart cities, buildings, transportation, and energy management.
CO3	Examine real-world case studies of successful IoT implementations in smart infrastructure and extract lessons learned. Demonstrate an understanding of security and privacy considerations in IoT for smart infrastructure.
CO4	Discuss the impact of emerging technologies, such as artificial intelligence and 5G, on the future of IoT in smart infrastructure. Apply knowledge and critical thinking skills to propose IoT-based solutions for smart infrastructure challenges.
CO5	Work effectively in teams to analyse, design, and present IoT projects related to smart infrastructure and communicate effectively and articulate the potential benefits and limitations of IoT for smart infrastructure.

Course Name	National Service Scheme (NSS)
Course Code	BNSK359
CO1	Understand the importance of his / her responsibilities towards society.
CO2	Analyse the environmental and societal problems/issues and will be able to design solutions for the same.
CO3	Evaluate the existing system and to propose practical solutions for the same for sustainable development.
CO4	Implement government or self-driven projects effectively in the field.
CO5	Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general

Course Name	Physical Education (PE) (Sports and Athletics)
Course Code	BPEK359
CO1	Understand the ethics and moral values in sports and athletics
CO2	Perform in the selected sports or athletics of the student's choice
CO3	Understand the roles and responsibilities of organisation and administration of sports and games

Course Name	Yoga
Course Code	BYOK359

CO1	Understand the meaning, aim and objectives of Yoga.
CO2	Perform Suryanamaskar and able to Teach its benefits.
CO3	Understand and teach different Asanas by name, its importance, methods and benefits.
CO4	Instruct Kapalabhati and its need and importance.
CO5	Teach different types of Pranayama by its name, precautions, procedure and uses

Course Name	Engineering Electromagnetics
Course Code	BEC401
Course Outcomes (Cos): At the end of the course the student will be able to:	
CO1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.
CO2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem.
CO3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations
CO4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits.
CO5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem.

Course Name	Basic signal Processing
Course Code	BEC402
CO1	Understand the basics of Linear Algebra
CO2	Analyze different types of signals and systems
CO3	Analyze the properties of discrete-time signals & systems
CO4	Analyse discrete time signals & systems using Z transforms

Course Name	Principles of Communication Systems
Course Code	BEC403
CO1	Understand the amplitude and frequency modulation techniques and perform time and frequency domain transformations.
CO2	Identify the schemes for amplitude and frequency modulation and demodulation of analog signals and compare the performance.
CO3	Characterize the influence of channel noise on analog modulated signals.
CO4	Define the schemes for sampling, pulse amplitude modulation and pulse code modulation systems.
CO5	Design of circuits used in different stages of communication transmitters and receivers.

Course Name	Communication laboratory
Course Code	BECL404
CO1	Understand the basic concepts of RF transmitters and Receivers.
CO2	Illustrate the AM and FM modulation generation and detection using suitable electronic circuits.
CO3	Design and test the sampling, Multiplexing and pulse modulation techniques using electronic hardware.
CO4	Design and Demonstrate the electronic circuits used for RF transmitters and receivers.

Course Name	8051 Microcontroller
Course Code	BEC405A
CO1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.
CO2	Write 8051 Assembly level programs using 8051 instructions set.
CO3	Explain the Interrupt system, operation of Timers/Counters and Serial port of

	8051.
CO4	Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch.
CO5	Write 8051 C programs to generate square wave on 8051 I/O port pin using interrupt and to send & receive serial data using 8051 serial port. Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.

Course Name	Industrial Electronics
Course Code	BEC405B
CO1	Explain different types of industrial power devices such as MOSFET, BJT, IGBT etc, there structure, and its operating characteristics.
CO2	Design and analyse the power electronic circuits such as switch mode regulators, inverters, controlled rectifiers and ac voltage controllers.
CO3	Explain various types of MEMs devices used for sensing pressure, temperature, current, voltage, humidity, vibration etc..
CO4	Familiarize with soft core processors such as ASIC and FPGA.
CO5	Familiarize with computer hardware, software, architecture, instruction set, memory organization, multiprocessor architecture.
CO6	Apply protective methods for devices various industrial power devices based on thermal requirements and develop protective methods for the circuits against various electrical parameters.

Course Name	Operating Systems
Course Code	BEC405C
CO1	Explain the goals, structure, operation and types of operating system.
CO2	Apply scheduling techniques to find performance factors.
CO3	Explain organization of file system and IOCS.
CO4	Apply suitable techniques for contiguous and non contiguous memory allocation.
CO5	Describe message passing, deadlock detection and prevention methods.

Course Name	Control Systems
Course Code	BEC405D
CO1	Develop the mathematical model of mechanical and electrical systems.
CO2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.
CO3	Determine the time domain specifications for first and second order systems.
CO4	Determine the stability of a system in the time domain using Routh Hurwitz
CO5	Determine the stability of a system in the frequency domain using Nyquist and bode plots.

Course Name	Embedded C basics
Course Code	BEC456A
CO1	Write C programs in 8051for solving simple problems that manipulate input data using different instructions.
CO2	Develop testing and experimental procedures on 8051Microcontroller, analyse their operation under different cases.
CO3	Develop programs for 8051Microcontroller to implement real world problems.
CO4	Develop microcontroller applications using external hardware interface.

Course Name	PCB Design
Course Code	BEC456B
CO1	Define the detailed circuit diagram and prerequisite before the actual PCB layout.
CO2	Understand the process of PCB production and Material selection

CO3	Understand the PCB fabrication by transferring the conductor pattern on base material
CO4	Know about the Plating techniques, Etching process and multilayer PCB board construction
CO5	Understand about new streams in PCB technology and modern facilities for PCB design

Course Name	DAQ using LabVIEW
Course Code	BEC456C
CO1	Build temperature indicating instruments using LabVIEW (NIDAQ)
CO2	Interface peripheral devices/instruments to LabVIEW
CO3	Build LabVIEW modules to sense and process audio inputs
CO4	Apply programming structures, data types, and the analysis and signal processing algorithms in LabVIEW

Course Name	Risk Management in IOT Implementation
Course Code	BEC456D
CO1	Students will be able to explain the core concepts and applications of the Internet of Things and its impact on industries and society. Students will be able to identify and assess risks and challenges in IoT implementations, applying appropriate methodologies and techniques.
CO2	Students will be able to develop comprehensive risk management strategies and mitigation plans tailored to specific IoT projects. Students will be able to implement security controls and best practices to protect IoT devices, networks, and data from potential threats and vulnerabilities.
CO3	Students will be able to analyse and comply with relevant regulations, standards, and ethical considerations to ensure responsible and secure IoT implementations.

Course Name	Biology For Engineers
Course Code	BBOK407
CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
CO3	Corroborate the concepts of biomimetics for specific requirements.
CO4	Think critically towards exploring innovative biobased solutions for socially relevant problems.

Course Name	Universal human values course
Course Code	BUHK408
CO1	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO2	They would have better critical ability.
CO3	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
CO4	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Course Name	National Service Scheme (NSS)	
Course Code	BNSK459	
Course Outcomes (Cos): At the end of the course the student will be able to:		
CO1	Understand the importance of his / her responsibilities towards society.	
CO2	Analyse the environmental and societal problems/issues and will be able to design solutions for the same.	
CO3	Evaluate the existing system and to propose practical solutions for the same for sustainable development.	
CO4	Implement government or self-driven projects effectively in the field.	
CO5	Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.	

Course Name	Physical Education (PE) (Sports and Athletics)
Course Code	BPEK459
CO1	Understand the ethics and moral values in sports and athletics
CO2	Perform in the selected sports or athletics of the student's choice
CO3	Understand the roles and responsibilities of organisation and administration of sports and games

Course Name	Yoga
Course Code	BYOK459
Course Outcomes (Cos): At the end of the course the student will be able to:	
CO1	Understand the meaning, aim and objectives of Yoga.
CO2	Perform Suryanamaskar and able to Teach its benefits.
CO3	Understand and teach different Asanas by name, its importance, methods and benefits.
CO4	Instruct Kapalabhati and its need and importance.
CO5	Teach different types of Pranayama by its name, precautions, procedure and uses