COURSE OUTCOMES FOR 2022 SCHEME

SEMESTER-3

BMATEC301 – AV MATHEMATICS FOR ENGINEERING

Course outcomes: At the end of the course, the student will be able to	
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 such equations
CO5	Make use of correlation and regression analysis to fit a suitable mathematical model for statistical data

BEC302-DIGITAL SYSTEM DESIGN USING VERILOG

Course outcomes: At the end of the course, the student will be able to	
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, D,T 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

BEC303-ELECTRONIC PRINCIPLES AND CIRCUITS

Course outcomes: At the end of the course, the student will be able to	
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

BEC304-NETWORK ANALYSIS

Course outcomes: 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 complexities and to arrive at feasible solutions..
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

BECL305-ANALOG AND DIGITAL SYSTEMS DESIGN LABORATORY

Course outcomes: 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.

BEC306A-ELECTRONIC DEVICES

Course outcomes: At the end of the course, the student will be able to	
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.

BEC306B-SENSORS AND INSTRUMENTATION

Course outcomes: At the end of the course, the student will be able to	
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, Voltmeters and Bridges to measure passive component values and frequency.

BEC306C- COMPUTER ORGANIZATION AND ARCHITECTURE

Course outcomes: At the end of the course, the student will be able to	
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.

BEC306D-APPLIED NUMERICAL METHODS FOR EC ENGINEERS

Course outcomes: At the end of the course, the student will be able to	
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.

BEC358A-LAB VIEW PROGRAMMING

Course outcomes: At the end of the course, the student will be able to	
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.

BEC358B-MATLAB PROGRAMMING

Course outcomes: At the end of the course, the student will be able to	
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.

BEC358C - C++ BASICS

Course outcomes: At the end of the course, the student will be able to	
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 sets.
CO4	Analyse, design and develop solutions to real-world problems applying OOP concepts of C++

BEC358D-IOT FOR SMART INFRASTRUCTURE

Course outcomes: At the end of the course, the student will be able to	
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 smartinfrastructure and communicate effectively and articulate the potential benefits and limitations of IoT for smart infrastructure.

BSCK307 – SOCIAL CONNECT & RESPONSIBILITY

Course outcomes: At the end of the course, the student will be able to	
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 in finding practical solutions to individual and community problems.
CO6	Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

SEMESTER-4

BEC401-ELECTROMAGNETIC THEORY

Course outcomes: 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

BEC402-PRINCIPLES OF COMMUNICATION SYSTEMS

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the principles of analog communication systems and noise modelling.
CO2	Identify the schemes for analog modulation and demodulation and compare their performance.
CO3	Design of PCM systems through the processes sampling, quantization and encoding.
CO4	Describe the ideal condition, practical considerations of the signal representation for baseband transmission of digital signals.
CO5	Identify and associate the random variables and random process in Communication system design

BEC403-CONTROL SYSTEMS

Course outcomes: At the end of the course, the student will be able to	
CO1	Deduce transfer function of a given physical system, from differential equation Representation or Block Diagram representation and SFG representation.
CO2	Calculate time response specifications and analyse the stability of the system
CO3	Draw and analyse the effect of gain on system behaviour using root loci
CO4	Perform frequency response Analysis and find the stability of the system.
CO5	Represent State model of the system and find the time response of the system.

BECL404-COMMUNICATION LABORATORY

Course outcomes: At the end of the course, the student will be able to	
CO1	Illustrate the AM generation and detection using suitable electronic circuits.
CO2	Design of FM circuits for modulation, demodulation and noise suppression
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.

BEC405A-MICROCONTROLLERS

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the difference between Microprocessor and Microcontroller, Types of Processor Architectures and Architecture of 8051Microcontroller.
CO2	Discuss the types of 8051 Microcontroller Addressing modes & Instructions with Assembly Language Programs.
CO3	Explain the programming operation of Timers/Counters and Serial port of 8051 Microcontroller.
CO4	Illustrate the Interrupt Structure of 8051 Microcontroller & its programming
CO5	Develop C programs to interface I/O devices with 8051 Microcontroller.

BEC405B-INDUSTRIAL ELECTRONICS

Course outcomes: At the end of the course, the student will be able to	
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.

BEC405C -OPERATING SYSTEM

Course outcomes: At the end of the course, the student will be able to	
CO1	Explain the goals, structure, operation and types of operating systems.
CO2	Apply scheduling techniques to find performance factors.
CO3	Explain organization of file systems and IOCS.
CO4	Apply suitable techniques for contiguous and non-contiguous memory allocation.
CO5	Describe message passing, deadlock detection and prevention methods.

BEC405-DATA STRUCTURES USING C

Course outcomes: At the end of the course, the student will be able to	
CO1	Master the implementation and application of key data structures in programming.
CO2	Demonstrate the ability to analyze algorithm efficiency and optimize code.
CO3	Solve complex problems by applying algorithmic strategies and techniques.
CO4	Design and implement algorithms for tasks involving searching, sorting, and graph traversal.
CO5	Utilize data structures and algorithms to enhance software performance and scalability

BECL456A -MICROCONTROLLERS LAB

Course outcomes: At the end of the course, the student will be able to	
CO1	Write an Assembly language / C program in 8051for solving simple problems that manipulate input data using different instructions.
CO2	Develop Testing and experimental procedures on 8051 Microcontroller, Analyse their operation under different cases
CO3	Develop Programs for 8051 Microcontroller to implement Real world problems.
CO4	Develop Microcontroller applications using external hardware interface.

BEC456B-PROGRAMMABLE LOGIC CONTROLLER (PLC)

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the PLC and how to construct PLC ladder diagrams.
CO2	Illustrate an application with programming.
CO3	Describe characteristics of registers and conversion examples.
CO4	Apply PLC functions to timing and counting applications.
CO5	Analyse the analog operation of PLC and demonstrate the robot applications with PLC.

BECL456C-OCTAVE PROGRAMMING

Course outcomes: At the end of the course, the student will be able to	
CO1	Develop proficiency in octave coding and debugging complex program flow
CO2	Understand the concepts of Matrices and apply the octave programming concepts to solve the Matrices
CO3	Acquire practical knowledge and apply the octave programming skills to solve Electric circuits
CO4	Develop a Octave program to analyze the continuous and discrete signals
CO5	Understand the concept memory and to represent data and address using Octave Programming.

BECL456D-DATA STRUCTURES LAB USING C

Course outcomes: At the end of the course, the student will be able to	
CO1	Develop proficiency in coding and debugging complex algorithms and data structures.
CO2	Acquire practical problem-solving skills by applying data structures and algorithms to real-world programming challenges
CO3	Develop a C program to perform arithmetic operation using data structure and operators.
CO4	Understand the concept of graph theory and develop a C program for searching an element
CO5	Develop a C program to check the given graph is connected using different algorithms.

BBOK407-BIOLOGY FOR ENGINEERS

Course outcomes: At the end of the course, the student will be able to	
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.

BUHK408 -UNIVERSAL HUMAN VALUES (UHV)

Course outcomes: At the end of the course, the student will be able to	
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.

SEMESTER-5

BEC501- TECHNOLOGICAL INNOVATION AND MANAGEMENT ENTREPRENEURSHIP

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business.
CO2	Describe the functions of Managers, Entrepreneurs and their social responsibilities
CO3	Understand the components in developing a business plan, along with the integration of CSR-Corporate Social Responsibility.
CO4	Describe the importance of small scale industries in economic development and institutional support to start a small scale industry and understand the concepts of Creativity and Innovation and Identification of Business Opportunities.
CO5	Awareness about various sources of funding and institutions supporting entrepreneurs.

BEC502-DIGITAL SIGNAL PROCESSING

Course outcomes: At the end of the course, the student will be able to	
CO1	Analyse the different types of signals and systems used in digital signal processing.
CO2	Compute the response of an LTI system using time and frequency domain techniques.
CO3	Understand the components in developing a business plan, along with the integration of CSR-Corporate Social Responsibility.
CO4	Design of digital FIR filters for the given specifications using different window methods.
CO5	Design of digital IIR digital filters using bilinear transformation method..

BEC503-DIGITAL COMMUNICATION

Course outcomes: At the end of the course, the student will be able to	
CO1	Apply the concept of signal conversion to vectors in communication transmission and reception.
CO2	Perform the mathematical analysis of digital communication systems for different modulation techniques.
CO3	Apply the Source coding and Channel coding principles for the discrete memoryless channels.
CO4	Compute the code words for the error correction and detection of a digital data using Linear Block Code, Cyclic Codes and Convolution Codes.
CO5	Design encoding and decoding circuits for Linear Block Code, Cyclic Codes and Convolution Codes.

BEC515A -INTELLIGENT SYSTEMS AND MACHINE LEARNING ALGORITHMS

Course outcomes: At the end of the course, the student will be able to	
CO1	Apply knowledge of agent architecture, searching, and reasoning techniques for different Applications.
CO2	Compare various Searching and Inferencing Techniques.
CO3	Develop knowledge base sentences using propositional logic and first-order logic
CO4	Understand the concept of Machine Learning and Concept Learning.
CO5	Apply the concept of ML and various classification methods in a project

BEC515B-DIGITAL SWITCHING AND FINITE AUTOMATA THEORY

Course outcomes: At the end of the course, the student will be able to	
CO1	Make use of mapping tool to synthesize threshold logic.
CO2	Analyse effects of hazards and fault diagnosis in digital logical circuits
CO3	Examine the capabilities of Finite State Machines by minimization Procedures
CO4	Model the structures of sequential machines
CO5	Develop the methods of state identification and fault detection
CO6	Design the fault detection algorithm

BEC515C -DATA STRUCTURES USING C++

Course outcomes: At the end of the course, the student will be able to	
CO1	Distinguish between procedures and object-oriented programming.
CO2	Apply advanced data structure strategies for exploring complex data structures.
CO3	Compare and contrast various data structures and design techniques in Performance.
CO4	Implement data structure algorithms through C++. Incorporate data structures into the applications such as binary search trees, AVL, and B Trees
CO5	Implement all data structures like stacks, queues, trees, lists, and graphs and compare their Performance and trade-offs.

BEC515D -SATELLITE AND OPTICAL COMMUNICATION

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
CO2	Describe the Electronic hardware systems associated with the satellite subsystem and earth station.
CO3	Describe the communication satellite with the focus on national satellite system.
CO4	Classification and characterization of optical fibers with different modes of signal propagation.
CO5	Describe the constructional features and the characteristics of optical fiber and optical devices used for signal transmission and reception.

BECL504 -DIGITAL COMMUNICATION LAB

Course outcomes: At the end of the course, the student will be able to	
CO1	Design the basic digital modulation and demodulation circuits for different engineering applications
CO2	Design of optimum communication receivers for AWGN channels.
CO3	Illustration of different digital modulations using the signals and its equivalent vector representations
CO4	Implement the source coding and channel coding procedures using suitable software.

BRMK557-RESEARCH METHODOLOGY & IPR

Course outcomes: At the end of the course, the student will be able to	
CO1	To know the meaning of engineering research.
CO2	To know the procedure of the literature Review and Technical Reading
CO3	To understand the fundamentals of the patent laws and drafting procedure
CO4	Understanding the copyright laws and subject matters of copyrights and designs
CO5	Under standing the basic principles of design rights

BESK508-ENVIRONMENTAL STUDIES

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale
CO2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment as legislation.
CO3	Apply their ecological knowledge to illustrate and grasp the problem and describe the realities that managers face when dealing with complex issues.

SEMESTER-6

BEC601-EMBEDDED SYSTEM DESIGN

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3.
CO2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
CO3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO4	Understand the hardware software co-design and firmware design approaches.
CO5	Explain the need of real time operating system for embedded system applications.

BEC602- VLSI DESIGN AND TESTING

Course outcomes: At the end of the course, the student will be able to	
CO1	Apply the fundamentals of semiconductor physics in MOS transistors and analyze the geometrical effects of MOS transistors
CO2	Design and realize combinational, sequential digital circuits and memory cells in CMOS logic
CO3	Analyze the synchronous timing metrics for sequential designs and structured design basics.
CO4	Understand designing digital blocks with design constraints such as propagation delay and dynamic power dissipation.
CO5	Understand the concepts of Sequential circuits design and VLSI testing

BEC613A-MULTIMEDIA COMMUNICATION

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the basics of multimedia Communication and applications
CO2	Analyze media types to represent them in digital form.
CO3	Apply the compression techniques on text, images, audio and video.
CO4	Understand multimedia information networks.

BEC613B-DATA SECURITY

Course outcomes: At the end of the course, the student will be able to	
CO1	Explain traditional cryptographic algorithms of encryption and decryption process.
CO2	Use symmetric and asymmetric cryptography algorithms to encrypt and decrypt the data
CO3	Apply concepts of modern algebra in cryptography algorithms.
CO4	Explain message authentication using HASH functions, MAC functions and Digital signatures.
CO5	Explain how symmetric and asymmetric encryption algorithms can be used to distribute keys

BEC613C-DIGITAL IMAGE PROCESSING

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand image formation and the role of human visual system plays in the perception of grey and color image data.
CO2	Compute various transforms on digital images.
CO3	Conduct an independent study and analysis of Image Enhancement techniques.
CO4	Apply image processing techniques in the frequency (Fourier) domain.
CO5	Design image restoration techniques.

BEC613D -FPGA BASED SYSTEM DESIGN USING VERILOG

Course outcomes: At the end of the course, the student will be able to	
CO1	Apply the concept of Programmable logic devices to implement digital design.
CO2	Design and implementation of Advanced logic design using Verilog HDL
CO3	Understand the concept of SM Chart and design complex digital circuits using SM Chart.
CO4	Performing the Floating-point arithmetic operations and designing of Memories
CO5	Designing and performance evaluation of advanced digital design using FPGAs

BEC654A-DIGITAL SYSTEM DESIGN USING VERILOG

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the Verilog HDL design flow.
CO2	Describe the basic concepts of Verilog HDL programming.
CO3	Write Verilog programs in Gate, Dataflow, Behavioral, and structural modeling levels of Abstraction
CO4	Write the programs more effectively using Verilog Tasks and Functions.
CO5	Perform Timing and Delay Simulation.

BEC654B -CONSUMER ELECTRONICS

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the functioning and classification of various types of microphones and loudspeakers.
CO2	Demonstrate knowledge of the optical recording and playback processes in audio compact disc systems.
CO3	Analyse the principles of colour television and modern display technologies.
CO4	Evaluate the working of cable television systems and miscellaneous consumer devices.
CO5	Explore advancements in consumer electronics, such as mobile phones, computing devices, and home appliances.

BEC654C- ELECTRONIC COMMUNICATION SYSTEMS

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the scheme and concepts of radiation and propagation of communication signals through air.
CO2	Understand the AM and FM modulation techniques and represent the signal in time and frequency domain relations.
CO3	Understand the process of sampling and quantization of signals and describe different methods to generate digital signals
CO4	Describe the basic digital modulation techniques, channel capacity, source coding technique and the channel coding.
CO5	Compare the different wireless communication systems and describe the structure of cellular communication.

BEC654D-BASIC VLSI DESIGN

Course outcomes: At the end of the course, the student will be able to	
CO1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.
CO2	Draw the basic gates using stick and layout diagrams with knowledge of physical design concepts.
CO3	Interpret Memory elements along with timing considerations
CO4	Demonstrate knowledge of FPGA based system design
CO5	Interpret testing and testability issues in VLSI Design
CO6	Analyze CMOS subsystems and architectural issues with the design constraints.

BECL606 -VLSI DESIGN AND TESTING LAB

Course outcomes: At the end of the course, the student will be able to	
CO1	Design and simulate combinational and sequential digital circuits using Verilog HDL.
CO2	Understand the synthesis process of digital circuits using EDA tool.
CO3	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level netlist.
CO4	Design and simulate basic CMOS circuits like inverter, NOR gate and any Boolean expression
CO5	Perform RTL_GDSII flow and understand the stages in ASIC design.

BEC657A -FPGA BASED SYSTEM DESIGN LAB USING VERILOG

Course outcomes: At the end of the course, the student will be able to	
CO1	Familiarize with the EDA tool to write HDL programs to understand simulation and synthesis of digital design.
CO2	Design, Simulation and Synthesis of Combinational circuits using EDA tool
CO3	Design, Simulation and Synthesis of Sequential Circuits using EDA tool
CO4	Interfacing DAC to FPGA device to generate different waveforms using Verilog HDL
CO5	Interfacing Stepper motor to FPGA device to count the number of rotations of a stepper motor.

BEC657B-SYSTEM MODELLING USING SIMULINK

Course outcomes: At the end of the course, the student will be able to	
CO1	Create Simulink models to perform analog and digital computations.
CO2	Implement the Combinational Digital circuits and Sequential Digital Circuit models using Simulink
CO3	Implement analog and digital systems using the transfer functions in s-domain and z-domain respectively
CO4	Demonstration of analog and digital communication modulation and demodulation using Simulink.

BEC657C-IOT (INTERNET OF THINGS) LAB

Course outcomes: At the end of the course, the student will be able to	
CO1	Explain the Internet of Things and its hardware and software components.
CO2	Interface I/O devices, sensors & communication modules
CO3	Remotely monitor data and control devices.
CO4	Develop real-life IoT-based projects.

BEC657D-PYTHON PROGRAMMING FOR MACHINE LEARNING APPLICATIONS

Course outcomes: At the end of the course, the student will be able to	
CO1	Apply machine learning algorithms to real life problems.
CO2	Able to make use of different machine learning approaches.

BIKS609 -INDIAN KNOWLEDGE SYSTEMS

Course outcomes: At the end of the course, the student will be able to	
CO1	Provide an overview of the concept of the Indian Knowledge System and its importance
CO2	Appreciate the need and importance of protecting traditional knowledge.
CO3	Recognize the relevance of Traditional knowledge in different domains.
CO4	Establish the significance of Indian Knowledge systems in the contemporary world.

SEMESTER-7

BEC701-MICROWAVE ENGINEERING AND ANTENNA THEORY

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the use and advantages of microwave transmission
CO2	Analyze various parameters related to transmission lines.
CO3	Identify microwave devices for several applications.
CO4	Analyze various antenna parameters and their significance in building the RF system
CO5	Identify various antenna configurations for suitable applications.

BEC702-COMPUTER NETWORKS & PROTOCOLS

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the concepts of networking thoroughly.
CO2	Identify the protocols and services of different layers.
CO3	Distinguish the basic network configurations and standards associated with each network.
CO4	Discuss and analyze the various applications that can be implemented on networks.

BEC703-WIRELESS COMMUNICATION SYSTEMS

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the wireless channel models for slow and fast fading environment.
CO2	Understand the different multiple access technologies used in wireless communications.
CO3	Understand the system architecture and the functional standard specified in LTE 4G.
CO4	Describe the of MIMO transmitter and receiver process using coding examples.

BEC714A-APPLICATION SPECIFIC INTEGRATED CIRCUIT

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the concepts of ASIC design methodology, data path elements, logical effort
CO2	Analyze the design of ASICs suitable for specific tasks, perform design entry and explain the physical design flow.
CO3	Design data path elements for ASIC cell libraries and compute optimum path delay.
CO4	Create floor plan including partition , routing using algorithms and EDA tools
CO5	Design CAD algorithms and explain how these concepts interact in ASIC design.

BEC714B -COMPUTER AND NETWORK SECURITY

Course outcomes: At the end of the course, the student will be able to	
CO1	Explain the various types of attacks on computer and network security from malicious logic and intruders
CO2	Explain how to analyze the various vulnerabilities in the system which can compromise the security.
CO3	Explain how auditing is essential to detect intrusion or suspicious activities in the system.
CO4	Explain the process involved to provide security with respect to network, system, user and program.

BEC714C-AUTOMOTIVE ELECTRONICS

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the basics of Automobile dynamics and design electronics.
CO2	Acquire an overview of automotive components, subsystems and basics of Electronic Engine Control in today's automotive industry.
CO3	Use available automotive sensors and actuators while interfacing with microcontrollers/microprocessors during automotive system design.

BEC714D -RADAR COMMUNICATION

Course outcomes: At the end of the course, the student will be able to	
CO1	Explain the principles of Radar.
CO2	Analyze the tracking in radar and modelling of Radars.
CO3	Analyze the limitations, interference and propagation of Radar waves.
CO4	Describe the Radar transmitter and receiver, and modern Radars.

BEC 755A- E-WASTE MANAGEMENT

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the environmental impacts of e-waste
CO2	Distinguish the role of various national and internal act and laws applicable for e-waste management and handling
CO3	Analyse the e-waste handling methods & restrictions
CO4	Analyze the e-waste recycling techniques

BEC755B-AUTOMOTIVE ENGINEERING

Course outcomes: At the end of the course, the student will be able to	
CO1	Describe the basics of Automobile dynamics and design electronics.
CO2	Acquire an overview of automotive components, subsystems and basics of Electronic Engine Control in today's automotive industry.
CO3	Use available automotive sensors and actuators while interfacing with microcontrollers/microprocessors during automotive system design.

BTE755C-EMBEDDED SYSTEMS APPLICATIONS

Course outcomes: At the end of the course, the student will be able to	
CO1	Understand the fundamental concepts and characteristics of embedded systems, including their classification and modern trends.
CO2	Analyse the architecture and hardware components of MCUs and their role in embedded systems.
CO3	Apply knowledge of sensors, ADCs, and actuators for interfacing and control in embedded systems.
CO4	Evaluate real-world embedded system applications such as mobile phones, automotive electronics, RFID, and robotics.
CO5	Develop an understanding of the embedded design process, from concept to bulk manufacturing, including testing and product design.

BEC755D -SENSORS AND ACTUATORS

Course outcomes: At the end of the course, the student will be able to	
CO1	Discuss the fundamental concepts related to sensors and measurement, functional elements of measurement system, I/O Characteristics of measurement system.
CO2	Interpret and analyse the static and dynamic characteristics of instruments.
CO3	Elucidate the working principle and usage of different transducers for temperature, and displacement measurement.
CO4	Discuss the principle and working of strain, force and torque measurement.
CO5	Analyze the signal conditioning and signal conditioning equipment.