



**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

**2022 SCHEME COURSE OUTCOME**

Upon the completion of the course, the students will be able to

COURSE CODE	COURSE NAME	CO	CO STATEMENT
BMATE301	MATHEMATICS-III FOR EE ENGINEERING	CO231.1	Understand that physical systems can be described by differential equations and solve such equations
		CO231.2	Make use of correlation and regression analysis to fit a suitable mathematical model for statistical data
		CO231.3	Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing, and field theory.
		CO231.4	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
		CO231.5	Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field. Demonstrate the validity of testing the hypothesis.
BEE302	ELECTRIC CIRCUIT ANALYSIS	CO232.1	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations.
		CO232.2	Solve complex electric circuits using network theorems.
		CO232.3	Discuss resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.
		CO232.4	Synthesize typical waveforms using Laplace transformation.
		CO232.5	Solve unbalanced three phase systems and also evaluate the performance of two port networks.
BEE303	ANALOG ELECTRONIC CIRCUITS	CO233.1	To provide the knowledge for the analysis of transistor biasing and thermal stability circuits.
		CO233.2	To develop skills to design the electronic circuits like amplifiers, power amplifiers and oscillators
		CO233.3	To understand the importance of FET and MOSFET and FET/MOSFET amplifiers
		CO233.4	Design, analyse and test transistor circuitry as amplifiers and oscillators
		CO233.5	Design and analysis of FET and MOSFET amplifiers



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BEE304	TRANSFORMERS AND GENERATORS	CO234.1	Explain the construction, working and various tests of single phase Transformer.
		CO234.2	Explain the construction, working and parallel operation of three phase Transformer.
		CO234.3	Explain the construction, working of Synchronous Generator.
		CO234.4	Explain the performance analysis of Synchronous Generator.
		CO234.5	Explain the construction, working of solar and wind power generators.
BEEL305	TRANSFORMERS AND GENERATORS LAB	CO235.1	Conduct various tests on transformers and synchronous machines and evaluate their performance.
		CO235.2	Perform the parallel operation on two single phase transformers.
		CO235.3	Verify the performance of synchronous generator.
		CO235.4	Calculate the voltage regulation of an alternator using different methods for comparison.
BEE306A	DIGITAL LOGIC CIRCUITS	CO2361.1	Explain the concept of combinational logic circuits and develop simplified switching equation using Karnaugh Maps and Quine McClusky techniques.
		CO2361.2	Analyse and design combinational circuits as Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator
		CO2361.3	Describe and characterize flip flops
		CO2361.4	Employ the digital circuits for design applications of flip flops, counters, shift registers as sequential control circuits.
		CO2361.5	Design the sequential circuits using SR, JK, D and T flip-flops and Melay and Moore applications. Explain the functioning of Memories
BEE306B	ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	CO2362.1	Explain the significance and methods of Measurements, elements of generalised measurement system and errors in measurements.
		CO2362.2	Measure resistance, inductance and capacitance by different methods.
		CO2362.3	Explain the construction, working and characteristics of various instrument transformers.
		CO2362.4	Explain the working of different Electronic and Digital Instruments.
		CO2362.5	Explain the working of different display devices & recording devices.
BEE306C	ELECTROMAGNETIC FIELD THEORY	CO2363.1	Explain Scalars, Vectors, Cartesian co-ordinate system, relation between different coordinate systems, Coulomb's law, Electric field intensity and its evaluation for different charge conditions.
		CO2363.2	Explain the potential field of a point charge, Potential gradient, Energy density in the electrostatic field and conductor's properties and boundary conditions.



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		C02363.3	Explain the Poisson's and Laplace Equations, Biot - Savart's law, Ampere's circuital law and Stokes theorem.
		C02363.4	Explain the Magnetic force, Force between differential current elements. Force and torque on a closed circuit, Nature of magnetic materials and Magnetic boundary conditions.
		C02363.5	Explain the Faraday's law, Displacement current. Maxwell's equations, Wave propagation in free space and in dielectrics
BEE306D	PHYSICS OF ELECTRONIC DEVICES	C02364.1	Understand the principles of semiconductor physics.
		C02364.2	Understand the principles and characteristics of different types of semiconductor devices .
		C02364.3	Understand the fabrication process of semiconductor devices.
		C02364.4	Utilize the mathematical models of MOS transistors for circuits and systems.
		C02364.5	Identify the mathematical models of MOS transistors for circuits and systems.
BEEL358A	SCILAB / MATLAB FOR TRANSFORMERS & GENERATORS	C02371.1	Evaluate the performance of transformers from the test data obtained.
		C02371.2	Connect & operate two single phase transformers of different KVA rating in parallel
		C02371.3	Connect single phase transformers for three phase operation and phase conversion.
		C02371.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
		C02371.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus
BEEL358B	555 IC LABORATORY	C02372.1	Design and analyse multivibrator circuits using IC 555 Timer
		C02372.2	Design and analyse the various application of 555 timer.
		C02372.3	Design & analyze Sequential timer using IC-555
BEEL358C	CIRCUIT LABORATORY USING P-SPICE	C02373.1	Simulate & verify the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations.
		C02373.2	Simulate & verify Kirchhoff's Current Law & Kirchhoff's Voltage Law
		C02373.3	Simulate using PSPICE and verify complex electric circuits using network theorems.
		C02373.4	Use PSPICE to simulate series and parallel resonance circuits to verify the importance of initial conditions and their evaluation.
		C02373.5	Solve unbalanced three phase systems and also evaluate the performance of two port networks



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BEEL358D	ELECTRICAL HARDWARE LABORATORY	CO2374.1	Verify KCL and KVL for DC circuits & AC Circuits.
		CO2374.2	Compare Power Factor for different types of lamps
		CO2374.3	Demonstrate the measurement of impedance of an electrical circuit and power consumed by 3 phase load
		CO2374.4	Analyse two way & three way control of lamps
		CO2374.5	Interpret the suitability of earth resistance measurements
BEE401	ELECTRIC MOTORS	CO241.1	Understand the construction and operation, characteristics, Testing of DC Motors and determine losses and efficiency.
		CO241.2	Understand the construction and operation, classification and types of Three phase Induction motors.
		CO241.3	Describe the performance characteristics and applications of three phase Induction motors.
		CO241.4	Demonstrate and explain Speed Control methods of three phase induction motor and types of single phase induction motors.
		CO241.5	Understand the construction and operation, V and inverted V curves of synchronous motors. Construction and operation of Universal motor, AC servomotor, Linear induction motor, PMSM, SRM and BLDC motors.
BEE402	TRANSMISSION AND DISTRIBUTION	CO242.1	Explain the structure of electrical power system, its components, advantages of high voltage AC and DC transmission, various conductors used for transmission, sag and its calculation. Explain various types of insulators and methods to improve string efficiency.
		CO242.2	Explain the various transmission line parameters, their effects on transmission of electricity.
		CO242.3	Evaluate the parameters that influence the performance of transmission line and to calculate performance parameters of various transmission lines
		CO242.4	Explain corona and its effects, underground cable and its construction, classification, limitations and specifications.
		CO242.5	Evaluate different types of distribution systems.
BEE403	MICROCONTROLLERS	CO243.1	Outline the 8051 architecture, registers, internal memory organization, addressing modes.
		CO243.2	Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port programming.
		CO243.3	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and timer/counter programming
		CO243.4	Summarize the basics of serial communication and interrupts, also develop 8051 programs for serial data communication and interrupt programming.
		CO243.5	Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC motor control
BEEL404	ELECTRIC MOTORS LAB	CO244.1	Perform tests on DC Machines to determine their characteristics.



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		CO244.2	Control the DC Motors using different methods. Pre-determination the performance characteristics of DC Machines.
		CO244.3	Conduct load test on single-phase and three-phase Induction Motor and draw performance characteristics.
		CO244.4	Conduct test on Induction Motor to determine performance characteristics.
		CO244.5	Conduct test on synchronous motor to draw performance curves.
BEE405A	ELECTRICAL POWER GENERATION AND ECONOMICS	CO2451.1	Explain the basics of hydro electric power plant, merits and demerits of hydroelectric power plants, site selection, arrangement and elements of hydro electric plant.
		CO2451.2	Explain the working, site selection and arrangement of Steam, Diesel and Gas Power Plants.
		CO2451.3	Explain the working, site selection and arrangement of Nuclear Power Plants.
		CO2451.4	Explain the importance of different equipments in substation, Interconnection of power stations and different types of grounding.
		CO2451.5	Explain the economics of power generation.
BEE405B	OPAMPS AND LIC	CO2452.1	Describe the characteristics of ideal and practical operational amplifier.
		CO2452.2	Design filters and signal generators using linear ICs.
		CO2452.3	Demonstrate the application of Linear ICs as comparators and rectifiers.
		CO2452.4	Analyze voltage regulators for given specification using op-amp and IC voltage regulators.
		CO2452.5	Summarize the basics of PLL and Timer.
BEE405C	ENGINEERING MATERIALS	CO2453.1	Explain wave particle duality, tunnelling phenomenon, electron theory of metals.
		CO2453.2	Explain the free electron theory of conduction in metals.
		CO2453.3	Explain the polarization under static fields, behavior of dielectrics in alternating fields, Inorganic materials, organic materials, ), resins and varnishes, liquid insulators.
		CO2453.4	Explain the mechanism of conduction in semiconductors.
		CO2453.5	Explain the magnetic materials, their classification and magneto materials.
BEE405D	OBJECT ORIENTED PROGRAMMING	CO2454.1	Discuss the basic Object Oriented concepts.
		CO2454.2	Able to understand and design the solution to a problem using object-oriented programming concepts.
		CO2454.3	Achieve code reusability and extensibility by means of Inheritance and Polymorphism
		CO2454.4	Identify and explore Data types, variables and arrays, operators, control statements, classes, objects, methods of Inheritance in JAVA
		CO2454.5	Implement the features of C++ including templates,



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			exceptions and file handling for providing programmed solutions to complex problems.
BEE456A	BASICS OF –VHDL LAB	C02461.1	Write the VHDL/Verilog programs to simulate combinational circuits in data flow, behavioral, gate level abstractions.
		C02461.2	Describe sequential circuits like flip-flops, counters, in behavioral descriptions and obtain simulated waveforms.
		C02461.3	Use FPGA/CPLD kits for downloading Verilog codes and check output.
		C02461.4	Synthesize combinational and sequential circuits on programmable ICs and test the hardware.
		C02461.5	Interface the hardware programmable chips and obtain the required output.
BEEL456B	SCILAB / MATLAB FOR ELECTRICAL AND ELECTRONIC MEASUREMENTS	C02462.1	Use SCILAB / MATLAB to design & Analyze different bridge circuits to for the measurement of resistance and inductance.
		C02462.2	Use SCILAB / MATLAB to design & Analyze single phase and three phase circuits for the measurement of frequency.
		C02462.3	Simulate three phase circuits for measurement of Power, Energy to understand the adjustments, calibration & errors in energy meters.
		C02462.4	Understand methods of extending the range of instruments & instrument transformers using Silsbees Deflection Method.
		C02462.5	Design & analyse Q Meter and different electronic digital instruments for true value measurement.
BEEL456C	PCB DESIGN LABORATORY	C02463.1	Understand PCB designing concepts and materials used for making PCB.
		C02463.2	Understand the Development Tools.
		C02463.3	Understand PCB Designing Practice in Electronic circuits
		C02463.4	Understand Post Designing & PCB Fabrication Process and Hardware testing.
		C02463.5	Design and develop PCB for various Electronic Circuits.
BEEL456D	ARDUINO AND RASPBERRY PI BASED PROJECT	C02464.1	Explain the concepts of Internet of Things and its hardware components
		C02464.2	Explain the concepts of Internet of Things and its software components
		C02464.3	Interface I/O devices, sensors & communication modules
		C02464.4	Remotely monitor data and control devices
		C02464.5	Develop real life IoT based projects.

**HEAD OF THE DEPARTMENT**  
**Electrical & Electronics Engineering**