

DAV Institute of Engineering & Technology

Department of Electrical Engineering

Course Outcomes

Upon successful completion of this course, the student will intend to apply the various outcome as:

Course code: BTEE-101-18

Course Title: Basic Electrical Engineering

Course Outcomes:

- CO1.** Have the knowledge of DC circuits, AC Circuits, basic magnetic circuits, working principles of electrical machines, and components of low voltage electrical installations
- CO2.** Be able to analyze of DC circuits, AC Circuits
- CO3.** Understand the basic magnetic circuits and apply it to the working of electrical machines
- CO4.** Be introduced to types of wiring, batteries, and LT switchgear.

Course code: BTEE-301-18

Course Title: Electrical Circuit Analysis

Course Outcomes:

- CO1.** Apply network theorems for the analysis of electrical circuits.
- CO2.** Obtain the transient and steady-state response of electrical circuits.
- CO3.** Analyze circuits in the sinusoidal steady-state (single-phase and three-phase). Analyze two port circuit behavior.
- CO4.** Synthesize networks and filters.

Course code: BTEE-302-18

Course Title: Analog Electronics

Course Outcomes:

- CO1.** Understand the characteristics of transistors.
- CO2.** Design and analyze various rectifier and amplifier circuits.
- CO3.** Design sinusoidal and non-sinusoidal oscillators.
- CO4.** Understand the functioning of OP-AMP and design OP-AMP based circuits.

Course code: BTEE-303-18

Course Title: Electrical Machines-I

Course Outcomes:

- CO1.** Understand the concepts of magnetic circuits.
- CO2.** Understand the operation of DC machines.
- CO3.** Analyze the differences in operation of different DC machine configurations.
- CO4.** Analyze single phase and three phase transformers circuits.

Course code: BTEE-304-18

Course Title: Electromagnetic Fields

Course Outcomes:

- CO1. To understand the basic laws of electromagnetism.
- CO2. To obtain the electric and magnetic fields for simple configurations under static conditions.
- CO3. To analyse time varying electric and magnetic fields.
- CO4. To understand Maxwell's equation in different forms and different media.
- CO5. To understand the propagation of EM waves.

Course code: BTEE-305-18

Course Title: Engineering Mechanics

Course Outcomes:

- CO1. Understand the concepts of co-ordinate systems.
- CO2. Analyse the three-dimensional motion.
- CO3. Understand the concepts of rigid bodies.
- CO4. Analyse the free-body diagrams of different arrangements.
- CO5. Analyse the free-body diagrams of different arrangements.

Course code: BTEE-401-18

Course Title: Digital Electronics

Course Outcomes:

- CO1. Understand working of logic families and logic gates.
- CO2. Design and implement Combinational and Sequential logic circuits.
- CO3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- CO4. Be able to understand memories.

Course code: BTEE-402-18

Course Title: Electrical Machines – II

Course Outcomes:

- CO1. Understand the concepts of rotating magnetic fields.
- CO2. Understand the operation of AC machines.
- CO3. Analyse performance characteristics of AC machines.
- CO4. To understand the difference between the synchronous machines and asynchronous machines.

Course code: BTEE-403-18

Course Title: Power Electronics

Course Outcomes:

- CO1. Understand the differences between signal level and power level devices.
- CO2. Analyse controlled rectifier circuits.
- CO3. Analyse the operation of DC-DC choppers.
- CO4. Analyse the operation of voltage source inverters.

Course code: BTEE-404-18

Course Title: Signals and Systems

Course Outcomes:

- CO1. Understand the concepts of continuous time and discrete time systems.
- CO2. Analyse systems in complex frequency domain.
- CO3. Understand sampling theorem and its implications.
- CO4. Understand mathematical tools to be able to apply in state variable modeling

Course code: BTAM-302-18

Course Title: Mathematics-III (Probability and Statistics)

Course Outcomes:

- CO1. Have basics knowledge about measure of central tendency, skewness, kurtosis and moments and their applications in engineering fields.
- CO2. Familiarize the student with expectations of discrete and continuous random variable.
- CO3. Familiarize probability techniques and random variables and detailed knowledge of probability distribution with so as to use it with any date of engineering problem formulation.
- CO4. Have basic idea about statistics including correlation, regression and then up to advanced level with testing of large samples that is important in solving problems related to engineering.
- CO5. To fit the given data into curves by various methods which forms an important application in engineering.

Course code: BTEE-501-18

Course Title: Power Systems-I (Apparatus and Modelling)

Course Outcomes:

- CO1. Understand the concepts of power systems.
- CO2. Understand the various power system components.
- CO3. Evaluate fault currents for different types of faults.
- CO4. Understand the generation of over-voltages and insulation coordination.
- CO5. Understand basic protection schemes.
- CO6. Understand concepts of HVDC power transmission and renewable energy generation.

Course code: BTEE-502-18

Course Title: Control Systems

Course Outcomes:

- CO1. Understand the modelling of linear-time-invariant systems using transfer function and state-space representations.
- CO2. Understand the concept of stability and its assessment for linear-time invariant systems. Design simple feedback controllers.

Course code: BTEE-503-18

Course Title: Microprocessors

Course Outcomes:

- CO1. Study of 8085 and 8086 Microprocessors
- CO2. Do assembly language programming.
- CO3. Do interfacing design of peripherals like 8255, 8253,8279,8251 etc.
- CO4. Develop systems using different microprocessors.

Course code: BTEE-504A-18

Course Title: Electrical Engineering Materials – PE-1

Course Outcomes:

- CO1. To Understand the basic concepts of materials.
- CO2. To use simplified materials selection concepts for design purposes.
- CO3. To Understand the properties of Materials.

Course code: BTEE-504B-18

Course Title: Switchgear and Protection – PE-1

Course Outcomes:

- CO1. Understand power system protection.
- CO2. Understand the main components used in power system protection for electric machines, transformers.
- CO3. Understand the bus bars, overhead and underground feeders.
- CO4. Understand the earthing protection.

Course code: BTEE-504C-18

Course Title: Electrical Machine Design – PE-1

Course Outcomes:

- CO1. Understand the construction and performance characteristics of electrical machines.
- CO2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines
- CO3. Understand the principles of electrical machine design and carry out a basic design of an ac machine.
- CO4. Use software tools to do design calculations.

Course code: BTEE-404-18

Course Title: Renewable Energy Sources – PE-1

Course Outcomes:

- CO1. To Understand the Need, importance and scope of non-conventional and alternate energy resources.
- CO2. To understand role significance of solar energy and wind energy
- CO3. To understand the role of ocean energy in the Energy Generation.
- CO4. To get the utilization of Biogas plants and geothermal energy
- CO5. To understand the concept of energy Conservation

Course code: BTEE-601-18

Course Title: Power Systems – II (Operation & Control)

Course Outcomes:

- CO1. Use numerical methods to analyze a power system in steady state.
- CO2. Understand stability constraints in a synchronous grid.
- CO3. Understand methods to control the voltage, frequency and power flow.
- CO4. Understand the monitoring and control of a power system.
- CO5. Understand the basics of power system economics.

Course code: BTEE-602-18

Course Title: Power Generation and Economics

Course Outcomes:

- CO1. Understand the load curves, load-duration Curve.
- CO2. Understand the power plant economics and tariff
- CO3. Explore the significance of economic operation of steam plants
- CO4. Understand the hydro-thermal coordination.

Course code: BTEE-603A-18

Course Title: Electromagnetic Waves – PE-2

Course Outcomes:

- CO1. Analyse transmission lines and estimate voltage and current at any point on transmission line for different load conditions.
- CO2. Provide solution to real life plane wave problems for various boundary conditions.
- CO3. Analyse the field equations for wave propagation in special cases such as lossy and low loss dielectric media.
- CO4. Visualize TE and TM mode patterns of field distributions in a rectangular wave-guide.
- CO5. Understand and analyse radiation by antennas.

Course code: BTEE-603B-18

Course Title: Power System Dynamics and Control – PE-2

Course Outcomes:

- CO1. Understand the problem of power system stability and its impact on the system.
- CO2. Analyse linear dynamical systems and use of numerical integration methods.
- CO3. Model different power system components for the study of stability.
- CO4. Understand the need and plan the methods to improve stability.

Course code: BTEE-603C-18

Course Title: Electrical Drives – PE-2

Course Outcomes:

- CO1. Understand the characteristics of dc motors and induction motors.
- CO2. Understand the principles of speed-control of dc motors and induction motors.
- CO3. Apply the knowledge of power electronics to understand the working of dc-dc converters.
- CO4. Apply the knowledge of control system for the speed control of electrical machines.
- CO5. Understand the working of AC and DC drives

Course code: BTEE-603D-18

Course Title: Wind and Solar Energy Systems – PE-2

Course Outcomes:

- CO1. Understand the global energy scenario and the consequent growth of the power generation from renewable energy sources.
- CO2. Understand the basic physics of wind and solar power generation.
- CO3. Apply the knowledge of electrical machines to generate electrical power from wind
- CO4. Understand the power electronic interfaces for wind and solar generation.
- CO5. Understand the issues related to the grid-integration of solar and wind energy systems.

Course code: BTEE-604A-18

Course Title: High Voltage Engineering – PE-3

Course Outcomes:

- CO1. Understand the basic physics related to various breakdown processes in solid, liquid, and gaseous insulating materials.
- CO2. Knowledge of generation and measurement of D.C., A.C., & Impulse voltages.
- CO3. Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.
- CO4. Knowledge of how over-voltages arise in a power system, and protection against these over-voltages.

Course code: BTEE-604B-18

Course Title: Power System Reliability – PE-3

Course Outcomes:

- CO1. Understand the basic quantitative reliability analysis
- CO2. Understand the reliability modeling and analysis of electric power systems.
- CO3. Knowledge of reliability assessment for elements of transmission system.
- CO4. Understand the risk analysis in power system planning.

Course code: BTEE-604C-18

Course Title: Line-Commutated and Active PWM Rectifiers – PE-3

Course Outcomes:

- CO1. Analyse controlled rectifier circuits.
- CO2. Understand the operation of line-commutated rectifiers – 6 pulse and multi-pulse configurations.
- CO3. Understand the operation of PWM rectifiers – operation in rectification and regeneration modes and lagging, leading and unity power factor mode.

Course code: BTEE-604D-18

Course Title: Energy Efficient Systems – PE-3

Course Outcomes:

- CO1. Understand the basic electricity billing and electrical load management
- CO2. Understand the refrigeration and air conditioning system
- CO3. Knowledge of light source, choice of lighting, luminance requirements, and energy conservation avenues.
- CO4. Understand the diesel generating system and energy efficient technologies.

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Laboratory Outcomes

Upon successful completion of this course, the student will intend to apply the various outcome as:

Course code: BTEE-102-18

Course Title: Basic Electrical Engineering Laboratory

Laboratory Outcomes:

- CO1. The ability to use common electrical measuring instruments and understand the fundamentals of electrical engineering.
- CO2. The ability to make electrical connections, and measure power, power factor using appropriate equipments.
- CO3. Have the knowledge of electrical machines, components and their ratings.
- CO4. Understand the operation of transformers and electrical machines.

Course code: BTEE-311-18

Course Title: Analog Electronics Laboratory Laboratory

Laboratory Outcomes:

- CO1. Understand the use and importance of various types of equipments used in the laboratory.
- CO2. Ability to make circuits on bread-board.
- CO3. Analyze, take measurements to understand circuit behavior and performance under different conditions.
- CO4. Troubleshoot, design and create electronic circuits meant for different applications.
- CO5. Evaluate the performance electronic circuits and working small projects employing semiconductor devices.

Course code: BTEE-312-18

Course Title: Electrical Machines – I Laboratory

Laboratory Outcomes:

- CO1. Analyze three-phase transformer/system connections.
- CO2. Evaluation of equivalent circuit parameters, efficiency and voltage regulation by performing various tests on transformer.
- CO3. Analyze parallel operation of transformers.
- CO4. Analyze performance characteristics of DC generators.

Course code: BTEE-411-18

Course Title: Measurements and Instrumentation Laboratory

Laboratory Outcomes:

- CO1. Design and validate DC and AC bridges.
- CO2. Analyze the dynamic response and the calibration of few instruments.
- CO3. Learn about various measurement devices, their characteristics, their operation and their limitations.
- CO4. Understand statistical data analysis.
- CO5. Understand computerized data acquisition.

Course code: BTEE-412-18

Course Title: Digital Electronics Laboratory

Laboratory Outcomes:

- CO1. To understand of basic electronic components and circuits
- CO2. Understanding verify truth tables of TTL gates
- CO3. Design and fabrication and realization of all gates and basic circuits
- CO4. Design the truth tables and basic circuits
- CO5. Testing of basic electronics circuits

Course code: BTEE-413-18

Course Title: Electrical Machines-II Laboratory

Laboratory Outcomes:

- CO1. Construct equivalent circuits induction motors by routine tests.
- CO2. Comprehend the requirement of starting and speed control methods of induction motors in the various applications of industry.
- CO3. Construct equivalent circuits of synchronous generator and motor.
- CO4. Apply knowledge to show utility of alternator, synchronous motors and synchronous condenser for various applications in power system.
- CO5. Construct characteristic curves for induction and synchronous machines
- CO6. Understand the concept of parallel operation of three phase alternators.

Course code: BTEE-414-18

Course Title: Power Electronics Laboratory

Laboratory Outcomes:

- CO1. Understand the properties and characteristics of thyristors.
- CO2. Understand the different types of waveforms of inverter and chopper circuits.
- CO3. Analyze speed and direction control of single phase and three phase electric motors using ac and dc drive.
- CO4. Understand the effect of free-wheeling diode on pf with RL load.
- CO5. Check the performance of a choppers, and inverter.

Course code: BTEE-511-18

Course Title: Power Systems – I Laboratory

Laboratory Outcomes:

Hands-on experiments related to the course contents of BTEE501-18.

- CO1. Understand the concepts of power systems.
- CO2. Understand the various power system components.
- CO3. Evaluate fault currents for different types of faults.
- CO4. Understand the generation of over-voltages and insulation coordination.
- CO5. Understand basic protection schemes.
- CO6. Understand concepts of HVDC power transmission and renewable energy generation.

Visits to power system installations (generation stations, EHV substations etc.) are Exposure to fault analysis and Electro-magnetic transient program (EMTP) and Numerical Relays are suggested.

Course code: BTEE-512-18

Course Title: Control Systems Laboratory

Laboratory Outcomes:

Hands-on experiments related to the course contents of BTEE502-18

- CO1. Understand the modelling of linear-time-invariant systems using transfer function and state-space representations.
- CO2. Understand the concept of stability and its assessment for linear-time invariant systems. Design simple feedback controllers.

Course code: BTEE-513-18

Course Title: Microprocessors Laboratory

Laboratory Outcomes:

Hands-on experiments related to the course contents of BTEE503-18

- CO1. Study of 8085 and 8086 Microprocessors
- CO2. Do assembly language programming.
- CO3. Do interfacing design of peripherals like 8255, 8253,8279,8251 etc.
- CO4. Develop systems using different microprocessors.

Course code: BTEE-611-18

Course Title: Electronics Design Laboratory

Laboratory Outcomes:

- CO1. Understand the practical issues related to practical implementation of applications using electronic circuits.
- CO2. Choose appropriate components, software and hardware platforms.
- CO3. Design a Printed Circuit Board, get it made and populate/solder it with components.
- CO4. Work as a team with other students to implement an application.

Course code: BTEE-612-18

Course Title: Power Systems-II Laboratory

Laboratory Outcomes:

Hands-on and computational experiments related to the course contents of BTEE-601-18. This should include programming of numerical methods for solution of the power flow problem and stability analysis.

- CO1.** Use numerical methods to analyze a power system in steady state.
- CO2.** Understand stability constraints in a synchronous grid.
- CO3.** Understand methods to control the voltage, frequency and power flow.
- CO4.** Understand the monitoring and control of a power system.
- CO5.** Understand the basics of power system economics.

Visit to load dispatch centre is suggested.

Course code: BTEE-513-18

Course Title: Project -1

Laboratory Outcomes:

- CO1.** Apply and verify basic scientific principals and technologies.
- CO2.** Identify the scope of interdisciplinary knowledge
- CO3.** Make and design a prototype which is preferably a working model