# Course Outcomes

## SY BTech Electrical Engineering– Sem I(2022 Pattern)

**Applied Mathematics-III (SMH22601)**
**At the end of this course, students will be able to**

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| **CO.SMH22601.1** | Define L.T, F.T, Z.T, L.D.E, and Vector calculus, and prove their Properties. |
| **CO.SMH22601.2** | Identify methods or techniques to solve particular types of mathematical problems. |
| **CO.SMH22601.3** | Solve electrical engineering problems using appropriate transforms and techniques |
| **CO.SMH22601.4** | Analyze the Real life problem using different mathematical transforms. |

**Analog and Digital Circuits(ELE222002)**
**At the end of this course, students will be able to**

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| **COELE222002.1** | Understand different digital memories and programmable logic families |
| **COELE222002.2** | Describe linear and nonlinear applications of OPAMP with derivations and related graphs |
| **COELE222002.3** | Design different combinational and sequential digital circuits using K-Map. |
| **COELE222002.4** | Design analog circuits based on OPAMP for a given problem. |

**Measurement and Instrumentation (ELE222003)**
**At the end of this course, students will be able to**

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| **COELE222003.1** | Describe the working principles of various measuring instruments. |
| **COELE222003.2** | Explain the construction and working of measuring instruments and transducers with calibration. |
| **COELE222003.3** | Calculate power, energy, and circuit parameters using various measurement techniques. |
| **COELE222003.4** | Select appropriate measuring methods and transducers for the measurement of electrical and physical quantities. |

**Electrical Engineering Materials (ELE222004)**
**At the end of this course, students will be able to**

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| **COELE222004.1** | Define various terminologies used in engineering materials |
| **COELE222004.2** | Understand the significance of different materials for various components and applications |
| **COELE222004.3** | Comment on the behavior of the material under various operating conditions |
| **COELE222004.4** | Analyze the properties of electrical engineering material used in different electrical equipment and appliances. |

**Transformers and Induction Machines (ELE222005)**
**At the end of this course, students will be able to**

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| **COELE222005.1** | State construction and working principle of transformer and induction machines. |
| **COELE222005.2** | Explain various characteristics and torque speed relations of electrical machines. |
| **COELE222005.3** | Calculate equivalent circuit parameters of the given machines |
| **COELE222005.4** | Analyze the performance parameters of machines and compare with standards. |
| **COELE222005.5** | Select machines for appropriate applications. |

**Engineering Ethics (ELE222006)**
**At the end of this course, students will be able to**

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| **COELE222006.1** | Define various terms related to engineering ethics. |
| **COELE222006.2** | Elaborate on safety, rights, and responsibilities related to the workplace, IPR, and environment. |
| **COELE222006.3** | Evaluate the different situations ethically in engineering problems. |

**Measurement and Machines Lab (ELE222007)**
**At the end of this course, students will be able to**

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| **COELE222007.1** | Use measuring instruments, transducers, and various measuring techniques for the measurement of electrical and physical quantities. |
| **COELE222007.2** | Perform speed control and load test of three phase induction motor. |
| **COELE222007.3** | Perform experiment in the group, write a lab report, and present it effectively |
| **COELE222007.4** | Perform parallel operation of transformers and justify load sharing. |
| **COELE222007.5** | Evaluate performance parameters of transformer and induction motor with experimentation. |

**Analog and Digital Circuits Lab (ELE232008)**
**At the end of this course, students will be able to**

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| **COELE232008.1** | Apply and analyze applications of OPAMP in a closed and open loop configuration. |
| **COELE232008.2** | Perform experiment in the group, write a lab report, and present it effectively |
| **COELE232008.3** | Design and implement combinational and sequential circuits. |
| **COELE232008.4** | Design uncontrolled rectifiers with given specifications\ |

**Electrical Engineering Materials Lab(ELE222009)**
**At the end of this course, students will be able to**

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| **COELE222009.1** | Perform testing of various electrical engineering materials as per IS standard |
| **COELE222009.2** | Interpret and analyze the results obtained from testing of materials through experimentation. |
| **COELE222009.3** | Perform experiment in the group, write a lab report, and present it effectively |

**Python for Numerical Methods (ELE222010)**
**At the end of this course, students will be able to**

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| **COELE222010.1** | Choose the correct numerical method depending on the problem definition. |
| **COELE222010.2** | Solve the given complex problem using selected numerical methods. |
| **COELE222010.3** | Develop an algorithm and flow chart for numerical methods. |
| **COELE222010.4** | Write programs for numerical methods using Python with graphical representation. |

**SY BTech Electrical Engineering– Sem II(2022 Pattern)**
**Electrical Network Analysis (ELE222011)**
**At the end of this course, students will be able to**

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| **COELE222011.1** | Define different laws and theorems related to electrical networks. |
| **COELE222011.2** | Apply theorems and Laplace transform for solving electrical network problems. |
| **COELE222011.3** | Analyze transient response and steady state of AC/DC electrical circuits in time and Laplace domain. |
| **COELE222011.4** | Design the low pass and high pass filters based on the given specification. |
| **COELE222011.5** | Evaluate the different parameters in two-port networks. |

## Microcontroller and Embedded Systems (ELE222012)
**At the end of this course, students will be able to**

**COELE222012.1**  Describe the architecture, hardware, and software features of the microcontroller and embedded systems.

**COELE222012.2**  Write assembly language programs to perform a given task.

**COELE222012.3**  Use operating modes of I/O ports, Timers/Counters, control registers, and various types of interrupts of 8051 and STM32F103.

**COELE222012.4**  Design circuits using STM32F103 and 8051 microcontroller in real-time.

## Power Electronics (ELE222013)
**At the end of this course, students will be able to**

**COELE222013.1**  Select switching devices for a given power converter

**COELE222013.2**  Draw circuit diagrams and waveforms for converter circuits with different loads

**COELE222013.3**  Analyze the operation and performance of power electronics converters

**COELE222013.4**  Design simple power electronics converter circuits

## Power System Engineering (ELE222014)
**At the end of this course, students will be able to**

**COELE222014.1**  Define various terminologies related to load curve, tariff, economical load dispatch, and transmission system.

**COELE222014.2**  Elaborate tariff and allocation of generating units on an economical basis.

**COELE222014.3**  Calculate electrical and mechanical parameters and factors in the power station and transmission system.

**COELE222014.4**  Model and analyze the performance of the overhead transmission line

**COELE222014.5**  Evaluate different types of tariffs and methods of economical load dispatch and unit commitment.

## Design Thinking for Academic Projects (ELE222015)
**At the end of this course, students will be able to**

**COELE222015.1**  Select the topic for the academic project, define the project problem statement, scope, and objectives

**COELE222015.2**  Develop a system block diagram and outline important steps in project planning, execution, and completion

**COELE222015.3**  Apply design thinking strategy in project execution

**COELE222015.4**  Prepare and present project poster, presentation, and report

## Solar Photovoltaic Systems (ELE222016)
**At the end of this course, students will be able to**

**COELE222016.1**  Draw various curves related to solar PV generation.

**COELE222016.2**  Handle software tools for solar PV systems.

**COELE222016.3**  Design solar PV systems for small and large installations.

**Power Electronics Lab (ELE222017)**
**At the end of this course, students will be able to**
**COELE222017.1** Simulate and analyze various power electronic converters with different control techniques
**COELE222017.2** Perform experiment in the group, write a lab report, and present it effectively
**COELE222017.3** Analyze the results of different power electronic converters with various control techniques under varying operating conditions.
**COELE222017.4** Design the magnetic circuit, power circuit, and control circuit of various power electronic converters.

**Electrical Network Analysis Laboratory (ELE232018)**
**At the end of this course, students will be able to**
**COELE232018.1** Verify electrical network theorems through experiments.
**COELE232018.2** Perform experiment in the group, write a lab report, and present it effectively.
**COELE232018.3** Find electrical network parameters and evaluate them for different circuits.
**COELE232018.4** Design different filters for given specifications.

**Microcontroller and Embedded Systems Lab (ELE222019)**
**At the end of this course, students will be able to**
**COELE222019.1** Perform experiment in the group, write a lab report, and present it effectively
**COELE222019.2** Write the program for 8051 in assembly language for the given operations
**COELE222019.3** Write the program by using the timer, interrupt, and serial ports /parallel ports.
**COELE222019.4** Interface the memory and I/O devices to the 8051 microcontroller.

**Project-Based Learning (ELE222020)**
**At the end of this course, students will be able to**
**COELE222020.1** Interact with different audiences in oral, visual, and written forms
**COELE222020.2** Apply knowledge of mathematics, basic sciences, and electricalengineering fundamentals to develop solutions for the project.
**COELE222020.3** Draw information from a variety of sources and be able to filter and summarize the relevant points.
**COELE222020.4** Identify, formulate, and analyze the project problem and provide solutions considering social, economical, and environmental aspects

**Dr. R. K. Munje**
**Professor and Head**