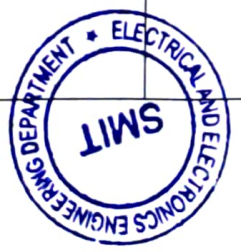
Department of Electrical and Electronics Engineering

Sikkim Manipal Institute of Technology

Course Outcomes

Sl No	Semester	Subject Code	Subject Name	Course Outcomes
1	III	MA1303	ENGINEERING MATHEMATICS-III	CO1: Fourier series, Fourier integral and Fourier transforms used in engineering applications. CO2: Apply a range of techniques to find solutions of standard Partial Differential Equations (PDE), Demonstrate capacity to model physical phenomena using PDE's (in particular Laplace's equation). CO3: Definition of gradient, Divergent, Curl and illustrate geometric meanings in engineering problems. The concept of a vector integration and its applications. CO4: Interpolation and its application, Numerical differentiation. CO5: Numerical Integration, Numerical solution of system of linear equations, Computation of largest eigenvalue by power method.
2		**EE1302**	**CIRCUITS AND NETWORKS**	CO1: Apply laws of electrical theorems to solve an electrical circuit. CO2: Understand the phenomena of



				Resonance and determine circuit parameters. CO3: Apply time domain analysis to first order circuits and understand frequency domain analysis of electric circuits.CO4: Conduct Graph Theory analysis to form mathematical equations of Electric Networks. CO5: Develop various Network parameters of 2-port networks and synthesize LC networks by Foster methods.
3		**EE1308**	MEASUREMENT AND INSTRUMENTATION	CO1: Analyse operating principles of electromechanical indicating and digital instruments for measurement of voltage, current, power and energy. CO2: Analyse the measurement of resistance, inductance and capacitance through various bridge circuits and able to identify the appropriate bridge circuit for measurement of resistance, inductance and capacitance CO3: Design and analysis of signal generators and instrument transformers. CO4: Identify and summarize the

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT SMIT

				important feature of electrical transducers. CO5: Test and determine the specification of a given signal through Cathode Ray Oscilloscope (CRO) and wave analyzers.
4		**EE1303**	**ELECTRICAL MACHINES – I**	CO1: Describe construction, operation and development of phasor diagram of transformer. CO2: Analyze equivalent circuit, losses, efficiency, voltage regulation, and tests on transformer. CO3: Evaluate parallel operation of transformers, operation of auto transformer. CO4: Describe construction, operation, and characteristics of all types of dc machines (both motors and generators). CO5: Analyze the speed control, losses, efficiency, and tests on dc machines.
5		**EE1305**	**DIGITAL ELECTRONICS**	CO1: Learn the basics of number systems and binary codes. CO2: Learn the basics of logic gates. CO3: Apply Boolean algebra for representation of digital logic. CO4: Construct basic combinational circuits using digital logic design procedures. CO5: Apply design procedures to design

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				basic sequential circuits.
6		EE1306	ANALOG ELECTRONICS CIRCUITS	CO1: Learn the basics of semiconductor devices, design of electronic devices and circuits. CO2: Learn the basics characteristics of transistor and it's operation and applications. CO3: Apply Concept of Small signal model, field effect transistors and amplifiers. CO4: Construct negative feedback amplifiers and oscillators. CO5: Construct and analysis of different types of power amplifier.
7	IV	MA1403	ENGINEERING MATHEMATICS-IV	CO1: Basic concepts of probability and its applications in the field of engineering. CO2: Numerical analysis for Engineering Application problems. CO3: Basic concepts of complex numbers and complex variables functions, Analytic function. CO4: Complex integration, Laurent's series and applications. CO5: Z-transforms and its application in solving boundary value problems.
8		EE1402	SIGNALS AND SYSTEMS	CO1: Develop a fundamental understanding of signals and systems and their characteristics

				CO2: Apply Laplace transforms for signal analysis. CO3: Apply mathematical modelling for Time domain representation and analysis of signals and Systems. CO4: Apply mathematical modelling for Frequency domain representation and analysis of signals and systems. CO5: Develop basic understanding of filters, their characteristics and design techniques for analog Filters.
9		**EE1403**	**ELECTRICAL MACHINES – II**	CO1: Describe the construction and operation of three-phase induction motor, single-phase induction motor and induction generator. CO2: Analyze the equivalent circuit, torque equation, parameter identification tests and starters. CO3: Describe the construction and operation of synchronous machines. CO4: Analyze the equivalent circuit, voltage regulation and parallel operation of alternators. CO5: Illustrate concepts of V-curves, hunting and starting methods of synchronous motor.

ELECTRONICS AND ELECTRICAL ENGINEERING DEPARTMENT
SMIT

10		**EE1405**	**Generation, Transmission and Distribution of Electrical Power**	CO1: Analyse the detailed outline of the various methods of power generation CO2: Optimize different mechanical parameters of transmission system. CO3: Calculate the different electrical parameters in transmission system. CO4: Categorize the transmission system into different categories and analyse their performance. CO5: Analyse underground transmission system in form of underground cables.
11		**EE1407**	**ELECTROMAGNETIC THEORY**	CO1: Analysis the basic mathematical concepts related to vector calculus and coordinate system CO2: Realize the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density. CO3: Demonstrate the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density. CO4: Demonstrate the concepts related to Faraday's law, induced emf and Maxwell's equations. CO5: Analysis Maxwell's equations to solutions of problems relating to

ELECTRONICS ENGINEERING DEPARTMENT SMIT

				transmission lines and uniform plane wave propagation.
12		**EE 1406**	**ANALOG SYSTEM DESIGN**	CO1: Fundamental principle of semiconductor devices CO2: Analysis and design of electronic devices and circuits. CO3: Different types of amplifiers and their operation. CO4: Elucidate and design the linear and non-linear applications of an opamp and special application ICs. CO5: Explain and compare the working of multivibrators using special application IC 555 and general purpose Opamp.
13	V	**EE1501**	**POWER ELECTRONICS**	CO1: Describe fabrication, structure, characteristics and operation of various power devices. CO2: Design gate drive circuit, firing circuits and protection of various power devices. Also, analyze commutation circuits. CO3: Describe the operation of rectifier circuits its analysis with its applications. CO4: Describe operation of dc-dc converters, ac regulators, and their applications. CO5: Evaluate dc-ac converters, inverters and their applications. Also analyze PWM

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				techniques for inverter control.
14		EE1502	LINEAR CONTROL SYSTEMS	CO1: Modeling and determining transfer function of the physical systems through block diagram reduction and signal flow graphs CO2: Determine the transient and steady-state performance of 1st and 2nd order system. CO3: Determine frequency response of a system & design of PID controllers. CO4: Analysis of stability through root locus plot, Bode plot and Nyquist criterion. CO5: Design of lag, lead, lag-lead compensator using time and frequency domain approach.
15		EE1506	POWER SYSTEM ANALYSIS	CO1: Demonstrate an understanding of the nature of the modern power system, including the behavior of the constituent components and sub-systems CO2: Describe the construction, operation and equivalent circuit of transmission line & Transformers. CO3: Demonstrate an understanding of per unit system its advantages and application in power system. CO4: Apply load flow analysis to an electrical power network and interpret the results of the

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				analysis. CO5: Analyze a network under both balanced and unbalanced fault conditions and interpret the Results.
16		**EE1503**	**MICROPROCESSOR AND MICROCONTROLLER**	CO1: Description of Microprocessor architecture, Memory Mapping CO2: Interfacing Devices- Tristate devices, Buffers. Latches, 74 LS 138, 74 LS 245, 74 LS 148, 74 LS 373 CO3: Instruction cycle, Machine cycles, Timing diagrams. CO4: Interfacing ADC AD558 and InterfacingDAC using status check with 8085. CO5: To have knowledge about microcontroller and its applications.
17		**EE1504**	**DIGITAL SYSTEM DESIGN**	CO1 Ability to identify basic requirements for a design application and propose a cost effective solution. CO2 The ability to identify and prevent various hazards and timing problems in a digital design. CO3 To develop skill to build, and troubleshoot digital circuits. CO4 Explain basic concept of VLSI technology. CO5 Establish the transformations of analog techniques in the digital world.
18		**EE1591**	**DATA STRUCTURES & ALGORITHMS**	**CO1:** Understand the concept of Dynamic

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				memory management, data types, algorithms, Big O Notation CO2: Understand basic data structures such as arrays, linked lists, stacks and queues. CO3: Describe the hash function and concepts of collision and its resolution methods. CO4: Solve problem involving graphs, trees and heaps. CO5: Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.
19	VI	**BA1510**	**INDUSTRIAL MANAGEMENT**	CO1: To provide basic knowledge and application of functions of management CO2: To help students to understand and apply principles of management evolved by pioneers of management. CO3: To enable students to apply basic quantitative techniques for making decisions related to operations management CO4: To help student apply various techniques for optimal production management CO5: To apply concepts of materials management for maintaining optimal inventory
20		**EE1601**	**POWER SYSTEM STABILITY, OPERATION & CONTROL**	CO1: Gain knowledge on different operating states of power system CO2: Evaluate the operational

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				constraints (equipment and stability), control objectives and their implementation, under normal and abnormal states of a power system. CO3: Analyse the different techniques of frequency and voltage control in power system. CO4: Power system stability is an important issue after this course the students get a clear pictureabout the different stability issues in power system and the control measures to make the grid stable. CO5: Acquire the basic knowledge on different electricity market models practiced all over the World.
21		**EE1602**	**ADVANCED CONTROL THEORY**	CO1: To design any physical system in state space domain. CO2: To analyse the stability criterion of any system in state space. CO3: To model and control any non-linear system. CO4: To evaluate a controllable and observable system. CO5: To model and control any discrete system.
22		**EE1605**	**RENEWABLE ENERGY SYSTEMS**	**CO1** Analyze and evaluate fundamental aspects of renewable energy resources, their uses, applications and limitations. **CO2** Concepts in solving numerical problems pertaining to

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				solar radiation geometry, solar thermal system and solar photovoltaic cell. **CO3** Explore the concepts involved in wind energy conversion system and hdro power by studying its components, types and performance. **CO4** Illustrate ocean energy and explain the operational methods of their utilization. **CO5** Familiarization with hybrid energy systems to meet the future energy demand.
23		**EE1640**	**Latest Trends in Electrical and Electronics Engineering**	**CO1:** Analyze the renewable energy, advanced embedded system, and their application CO2: Design the fuzzy logic for use in different engineering applications and concept of control system. CO3: Illustrate the fundamentals of Neural network and concept of some advanced power converters. CO4: Illustrate the vector controlled induction motor using different reference frames, namely-stator, rotorand synchronous rotating reference frames. CO5: Illustrate the concept of PLC and biomedical instrumentation with suitable examples.
24	VII	**EE1702**	**SWITCHGEAR AND PROTECTION**	**CO1:** Analyze operation and performance of relay for power system protection.

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				CO2: Design protection system for different components of power system. CO3: Design and analyze different over voltage protection system in power system. CO4: Analyze different types of fuse and grounding techniques in power system. CO5: Analyze different types of circuit breaker.
25		**EE1705**	**ELECTRICAL DRIVES**	**CO1:** Evaluate the thermal model of electric motors and analysis the closed loop control of electric drives. CO2: Analyze the performance characteristics of dc motor drives under steady-state and transient conditions. CO3: Design of various drive components/systems and methods for control the speed of dc motor drives. CO4: Analyze the performance characteristics of ac motor drives under steady-state and transient conditions. CO5: Illustrate the vector controlled induction motor using different reference frames, namely-stator, rotorand synchronous rotating reference frames.
26		**EE1738**	**HIGH VOLTAGE ENGINEERING**	CO1: Understand the various physical phenomena and factors that governs the breakdown of gaseous dielectric.

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				CO2: Understand the various physical phenomena and factors that governs the breakdown of solid dielectric and liquid dielectric. CO3: Realise various circuits to generate high voltage and high currents for testing and measurement purposes.CO4: Understand various circuits and methods to Measure high voltage. CO5: Understand the methods of various testing process and apparatus in power system.
27		**EE1744**	**DIGITAL SIGNAL PROCESSING**	CO1: Develop a fundamental understanding of digital signal processing and time domain analysis of discrete time systems. CO2: Apply discrete Fourier transform for analysis of discrete time signals and systems. CO3: Apply z-transform for analysis of discrete time signals and systems. CO4: Design FIR digital filters. CO5: Design IIR digital filters.
28		**EE1724**	**MACHINE LEARNING**	CO1: Explain the application of machine learning, the general step wise process to machine learning and different methods of learning. CO2: Categorize the data based on gain using decision tree. CO3: Explain the use of instance based

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
SMIT

				learning, linear regression, logistic regression and support vector machines to segregate the data. CO4: Analyse artificial neural network model and its advance version as deep learning. CO5: Distinguish between different types of clustering techniques.

ELECTRONICS AND ELECTRICAL ENGINEERING DEPARTMENT
SMIT

04/07/2022
HOD I/C, EEE

Prepared By.
(Anirban Sengupta)