KLEF

Department of EEE

Y22 M.TECH ELECTRIC VEHICLE TECHNOLOGY

Course Code	Course Title	CO NO	Description of the Course Outcome
22EE5101	: ELECTRIC VEHICLE POWER TRAIN DESIGN	CO1	Understand the History, Economics, Environmental issues and power train of Electric Vehicles
		CO2	Analyze the dynamics of EV
		CO3	Select and size the power train for 2W
		CO4	Select and size the power train for 4W
22EE5102	Battery Modelling and State Estimation	CO1	Understand the specifications and Li-ion chemistry
		CO2	Understand the key functions of Battery management systems
		CO3	Develop Enhanced Self Correcting (ESC) Model of battery
		CO4	Develop Algorithms for SOC estimation of battery
		CO5	Analyse Modelling and state estimation through experimental techniques
22EE5103	Mechanical design of Vehicle	CO1	Identify different car body and body materials.
		CO2	Identify design features of frame, front axle, and steering system
		CO3	Model Suspension and Wheel system for vehicle
		CO4	Model the braking system for vehicle
		CO5	Experiment with Mechanical design of vehicle
22EE5104	Embedded Controllers and Applications	CO1	Apply Programming of 8051 Microcontroller for general purpose applications
		CO2	Apply programming concepts of 8051 for interfacing peripherals
		CO3	Demonstrate Architecture and Programming of PIC Microcontoller
		CO4	Apply programming concepts of 8051 and PIC Microcontroller for interfacing peripherals
		CO5	Apply programming concepts of the 8051and PIC microcontroller
22EE5211	Advanced Electrical Drives	CO1	Understand the modeling of AC machines
		CO2	Contrast the speed control performance of 3-Phase induction and synchronous motor drive using vector control methods
		CO3	Analyze the dynamic behavior of SRM motor drives under various control methods
		CO4	Distinguish the performance of BLDC Motor drive using various control techniques
		CO1	Apply characteristics of sensors and actuators used for electric vehicle control

22EE5202	FAULT DIAGNOSIS & CONTROL OF ELECTRIC VEHICLE	CO2	Apply usage of microcontroller for digital control of electric vehicle
		CO3	Apply communication protocols for data communication in electric vehicle control system
		CO4	Model fault diagnosis system for electric vehicle
22EE5203	CHARGING STATION DESIGN	CO1	Interpret Power electronic converters for electric vehicle charging
		CO2	Develop control algorithms for various electric vehicle charging modes
		CO3	Demonstrate charging station infrastructure
		CO4	Demonstrate installation of charging station
22EE5204	AI and IoT for Modern Electrical Systems	CO1	Demonstrate IoT devices and tools
		CO2	Operate the cloud system Environment
		CO3	Utilize AI and ML Techniques
		CO4	Utilize AI techniques for electrical systems
22EE51A1	RELIABILITY ENGINEERING	CO1	Understand the system reliability concepts
		CO2	Apply the frequency and duration techniques for component repairable system.
		CO3	Apply the network reliability concepts to generation system reliability analysis.
		CO4	Apply the network reliability concepts to transmission and distribution system reliability analysis.
22EE51A2	Application of Python Programming in Electrical Systems	CO1	Understand Conditionals, Iterables, Regex, Files, Error Handling, Data Structures, Algorithm design and Object-Oriented Python
		CO2	Apply object-oriented programming, Python Standard Library, SciPy's optimization and Signal Processing and Linear algebra
		CO3	Understand Data Analysis using Pandas. Apply supervised Learning and Unsupervised Learning techniques using Scikit-Learn
		CO4	Analyse real world electrical engineering problems using pandapower and PyPSA for power system modeling, analysis and optimization.
		CO5	Analyze the applications of Python programming for electrical engineering applications
22EE51A3 :	ENERGY MANAGEMENT SYSTEMS	CO1	Understand data acquisition components of power system
		CO2	Understand energy data monitoring, reporting and communication
		CO3	Apply supervisory control for energy management
		CO4	Understand Energy management center functions
		CO1	Understand classical optimization techniques, describe clearly the problems with and without constraints, identify its parts and analyze the individual functions, Feasibility study for solving an optimization problem.

22EE51B1 :	OPTIMIZATION TECHNIQUES	CO2	Apply mathematical translation of the verbal formulation of an optimization problem and design algorithms of linear programming problems, the repetitive use of which will lead reliably to finding an approximate solution.
		CO3	Analyze and measure the performance of an algorithm of different methods to solve non-linear programming problems, study and solve optimization problems.
		CO4	Analyze optimization techniques using algorithms. Investigate study, develop, organize and promote innovative solutions for various applications.
22EE51B2	Advanced Control Theory	CO1	Apply the mathematical representation to dynamic systems
		CO2	Apply the techniques to design the controllers
		CO3	Apply the techniques to identify non linear system stability
		CO4	Apply the algorithms for stability analysis
22EE51B3	Model based Design for Electrical Systems	CO1	Apply principle of system model derivation and finite element analysis
		CO2	Model DC machines using computer aided design principles
		CO3	Model advanced motors using computer aided design principles
		CO4	Model electric vehicles using computer aided design principles
22EE52A1	Digital Simulation of Power Electronic Systems	CO1	Design of non-isolated and isolated DC-DC converters
		CO2	Understand the working of Resonant converters
		CO3	Modelling of non-isolated DC -DC converters
		CO4	Design of closed loop controls for switched mode power supplies
22EE52A2	Switched Mode Power Supplies	CO1	Understand Pspice modelling of power semiconductor devices and passive components behaviour with protection circuits.
		CO2	Analyse performance of AC-DC controlled, uncontrolled converters and DC-DC converters using Pspice and MATLAB Simulink model.
		CO3	Evaluate DC-AC converters performance using modern simulation tools.
		CO4	Analyse AC voltage controller and cyclo-converter performance with programming and simulation tools.
22EE52A3	Adaptive Control Systems	CO1	Outline elements of propbability and Stochastic processes
		CO2	Demonstrate parametric and non-parmetric system models
		CO3	Interpret adaptive control techniques to linear systems
		CO4	Apply adaptive control process and asses stability of linear systems

22E52B3	Hybrid & Fuel Cell Vehicles	CO1	Understand the basics of conventional vehicle and history of HEV
		CO2	Discriminate various motors used for HEV
		CO3	Identify various energy storage systems for HEV
		CO4	Understand the function of EMS in HEV