MEENAKSHI COLLEGE OF ENGINEERING
No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai - 600 078

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
M.E POWER ELECTRONICS AND DRIVES
Regulation-21
COURSE OUTCOMES
SEMESTER-I

Course Name : MA4106 Applied Mathematics For Power Electronics Engineers

CO1	Able to apply the concepts of matrix theory in Electrical Engineering problems.
CO2	Able to solve boundary value problems associated with engineering applications.
CO3	Able to solve problems using Laplace transform associated with engineering applications.
CO4	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems
CO5	Able to solve problems using Fourier series associated with engineering applications

Course Name : PX4101 Analysis of Electrical Machines

CO1	Understand the principles of electromechanical energy conversion and characteristics of DC motors
CO2	Know the concepts related with AC machines and modeling of 'n' phase machines
CO3	Interpret the concepts of reference frame theory
CO4	Apply procedures to develop induction machine model in both machine variable form and reference variable forms
CO5	Follow the procedures to develop synchronous machine model in machine variables form and reference variable form.

Course Name : PX4151 Analysis of Power Converters

CO1	Acquire and apply knowledge of mathematics in power converter analysis
CO2	Model, analyze and understand power electronic systems and equipments.
CO3	Formulate, design and simulate phase-controlled rectifiers for generic load and for machine loads
CO4	Design and simulate switched mode inverters for generic load and for machine loads
CO5	Select device and calculate performance parameters of power converters under various operating modes.

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Course Name : PX4102 Modeling And Design Of SMPS

CO1	Analyse and design Non-Isolated DC-DC converter
CO2	Analyse and design Isolated DC-DC converter
CO3	Derive transfer function of different converters
CO4	Design controllers for DC-DC converters
CO5	Design magnetics for SMPS application

Course Name : PX4001 Power Semiconductor Devices

CO1	Identification of suitable device for the application
CO2	Know the advantages of Silicon Carbide devices and Galium Nitride devices.
CO3	Understand the principles and characteristics of Silicon devices, Silicon Carbide devices and Galium Nitride devices.
CO4	Design proper driving circuits and protection circuits
CO5	Construct a proper thermal protective devices for power semiconductor devices

Course Name : PX4161 Power Converters Laboratory

CO1	Comprehensive understanding on the switching behaviour of Power Electronic Switches
CO2	Comprehensive understanding on mathematical modeling of power electronic system and ability to implement the same using simulation tools
CO3	Ability of the student to use arduino/microcontroller for power electronic applications
CO4	Ability of the student to design and simulate various topologies of inverters and analyze their harmonic spectrum
CO5	Ability to design and fabricate the gate drive power converter circuits.

Course Name : PX4111 Analog And Digital Controllers For PE Converters Laboratory

CO1	Identification of suitable analog and digital controller for the converter design
CO2	Know the advantages of gate driver, sensing and protection circuits in power converters.
CO3	Hands on with different controller with strategies for design.
CO4	Design and testing the proper driving circuits and protection circuits.
CO5	Fabrication of analog and digital controllers for various real time applications.

SEMESTER-II

Course Name : PX4201 Analysis of Electrical Drives

CO1	Ability to acquire and apply knowledge of mathematics and converter/machine dynamics in Electrical engineering.
CO2	Ability to formulate, design, simulate power supplies for generic load and for machine loads.
CO3	Ability to analyze, comprehend, design and simulate direct current motor based adjustable speed drives.
CO4	Ability to analyze, comprehend, design and simulate induction motor based adjustable speed drives
CO5	Ability to design a closed loop motor drive system with controllers for the current and speed control operations.

Course Name : PX4202 Special Electrical Machines

CO1	Know the concepts related with stepper motor
CO2	Understand the working and various characteristics of switched reluctance machines.
CO3	Study the working principle and characteristics of permanent magnet brushless DC motors.
CO4	Know the construction, working principles and characteristics of permanent magnet synchronous motor and synchronous reluctance motor.
CO5	Understand the features of axial flux machines in comparison with radial flux machines and to know the principles of axial flux machines.

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Course Name : PX4291 Electric Vehicles And Power Management

CO1	Understand the concept of electric vehicle and energy storage systems.
CO2	Describe the working and components of Electric Vehicle and Hybrid Electric Vehicle
CO3	Know the principles of power converters and electrical drives
CO4	Illustrate the operation of storage systems such as battery and super capacitors
CO5	Analyze the various energy storage systems based on fuel cells and hydrogen storage

Course Name : PX4006 Modern Rectifiers and Resonant Converters

CO1	To understand the standards for supply current harmonics and its significance.
CO2	To design power factor correction rectifiers for UPS applications.
CO3	To analyse and design the resonant converters.
CO4	To derive the state space model of basic and derived DC-DC converters.
CO5	To design an appropriate controller for PWM rectifiers.

Course Name : PS4072 Energy Storage Technologies

CO1	Understand the physics of energy storage
CO2	Model the different energy technologies.
CO3	Recognize the applications of various techniques
CO4	Design and analyze the energy storage technologies.
CO5	Select and apply the appropriate technique based on the application.

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Course Name : PX4211 Power Electronics And Drives Laboratory

CO1	Ability to construct the simulation circuit for the closed loop control of drive systems
CO2	Ability to formulate, design the speed controller for DC motor-based drive system.
CO3	Ability to conduct load tests in an electrical drive system.
CO4	Ability to formulate, design the speed controller for AC motor-based drive system.
CO5	Ability to design the control algorithm for the control of an electrical drive using Microcontroller and Digital signal processor.

Course Name : PX4212 Design Laboratory For Power Electronics Systems

CO1	Ability to independently carryout research and development work in power converters
CO2	Ability to demonstrate a degree of mastery over the design and fabrication of switching regulators.
CO3	Ability to apply conceptual basis required for design and testing of various drive system.
CO4	Ability to interact with industry to take up problem of societal importance as mini-project designed.
CO5	Ability to compare different possible solution to the same practical problem.

SEMESTER-III

Course Name : PS4093 Smart Grid

CO1	Relate with the smart resources, smart meters and other smart devices
CO2	Explain the function of Smart Grid
CO3	Experiment the issues of Power Quality in Smart Grid
CO4	Analyze the performance of Smart Grid
CO5	Recommend suitable communication networks for smart grid applications

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Course Name : PX4012 Renewable Energy Technology

CO1	Demonstrate the need for renewable energy sources
CO2	Develop a stand-alone photo voltaic system and implement a maximum power point tracking in the PV system.
CO3	Design a stand-alone and Grid connected PV system
CO4	Analyze the different configurations of the wind energy conversion systems.
CO5	Realize the basic of various available renewable energy sources