



# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi, & Permanently Affiliated to J.N.T.U-GV, Vizianagaram)

NAAC "B++" Accredited Institute

Cherukupally (Village), Near Tagarapuvalasa Bridge, Vizianagaram (Dist) -531162.

www.aietta.ac.in, principal@aietta.ac.in

## Department of Electrical and Electronics Engineering

Program: M.Tech-Power Electronics

Regulation: R16

Course Outcomes

No. of Courses: 21

I-I Sem	Course: Electrical Machine Modeling & Analysis
CO-1	Apply knowledge of behavior of DC Motors to model and analyze for different applications.
CO-2	Analyze the characteristics of different types of DC motors to design suitable controllers.
CO-3	Acquire knowledge of reference frame theory for AC machines.
CO-4	Analyze the 2 Phase induction machines using voltage and current equations to differentiate the behavior and to propose the suitability of drives for different industrial applications.
CO-5	Apply knowledge of 2-axis concept to obtain torque equation of Induction and synchronous motors.
I-I Sem	Course: Analysis of Power Electronic Converters
CO-1	Describe the operation of dc-dc, dc-ac, ac-dc and ac-ac power converters.
CO-2	Able to analyze and design switched mode regulator for various industrial applications .
CO-3	Comprehend the concepts of different power converters and their applications
CO-4	Evaluate the effects of various modulation techniques on the quality of input and output waveforms.
CO-5	Deals with the basic concepts of converters, choppers, inverters and their analysis.
I-I Sem	Course: Power Electronic Control of DC Drives
CO-1	Acquire knowledge about fundamental concepts and techniques used in power electronics.
CO-2	Analyze various single phase and three phase power converter circuits and understand their applications
CO-3	Identify basic requirements for power electronics based design application.
CO-4	Develop skills to build, and troubleshoot power electronics circuits.
CO-5	Understand the use of power converters in commercial and industrial applications.
I-I Sem	Course: Flexible AC Transmission Systems
CO-1	Understand various types of power controllers in transmission lines.





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CO-2	Understand the static VAR compensator and its applications.
CO-3	Understand the TCSC controller and its applications.
CO-4	Understand the transient stability and modelling of STATCOM.
CO-5	Learn the concept of coordination of FACTS controllers.
<b>I-I Sem Course: Modern Control Theory (Elective – I)</b>	
CO-1	Develop mathematical models of physical systems.
CO-2	Design optimal controllers for physical systems including power electronic and power systems.
CO-3	Analyze the issues related to the stability of automatic control systems.
CO-4	Design complex nonlinear systems by linearizing them.
CO-5	Design full-state control systems.
<b>I-I Sem Course: Power Quality (Elective – I)</b>	
CO-1	Identify the issues related to power quality in power systems.
CO-2	Address the problems of transient and long duration voltage variations in power systems.
CO-3	Analyze the effects of harmonics and study of different mitigation techniques.
CO-4	Identify the importance of custom power devices and their applications.
CO-5	Acquire knowledge on different compensation techniques to minimize power quality disturbances.
<b>I-I Sem Course: Optimization Techniques(Elective – I)</b>	
CO-1	Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.
CO-2	Use classical optimization techniques and numerical methods of optimization.
CO-3	Describe the basics of different evolutionary algorithms.
CO-4	Enumerate fundamentals of Integer programming technique and apply different techniques.
CO-5	Solve various optimization problems arising from engineering areas.
<b>I-I Sem Course: Energy Auditing, Conservation and Management (Elective – II)</b>	
CO-1	Understand the basic building blocks of various forms of energy and access energy scenario at national or international level.





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CO-2	Understand efficient heat & electricity utilization, saving and recovery in different thermal and electrical system.
CO-3	analyze economics of energy conservation opportunities in electrical and industrial utilities and reporting of energy audit.
CO-4	Analyze, calculate and improve the energy efficiency and performance of electrical and industrial utilities.
CO-5	Apply energy conversation policy regulations in industrial practices.
<b>I-I Sem</b>	
<b>Course: Artificial Intelligence Techniques (Elective – II)</b>	
CO-1	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
CO-2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO-3	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
CO-4	Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
CO-5	Demonstrate proficiency in applying scientific method to models of machine learning.
<b>I-I Sem</b>	
<b>Course: HVDC Transmission (Elective – II)</b>	
CO-1	Understand the various schemes of HVDC transmission.
CO-2	Understand the basic HVDC transmission equipment.
CO-3	Understand the control of HVDC systems.
CO-4	Understand the interaction between HVAC and HVDC system.
CO-5	Understand the various protection schemes of HVDC engineering.
<b>I-I Sem</b>	
<b>Course: Simulation Laboratory</b>	
CO-1	To understand the operation of DC-DC converters.
CO-2	To understand the operation of AC-DC converters.
CO-3	To understand the operation of AC voltage regulators and DC-AC converters by simulation.
<b>I-II Sem</b>	
<b>Course: Switched Mode Power Conversion</b>	
CO-1	Analyze and design switched mode power converters.
CO-2	Acquire proper understanding about soft switching and its applications.





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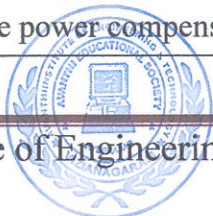
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CO-3	Learn deep knowledge in pulse width modulated techniques.
CO-4	Analyze various types of switched mode dc- dc converters.
CO-5	Analyze inverters and resonant converters and its switching techniques.
<b>I-II Sem Course: Power Electronic Control of AC Drives</b>	
CO-1	Explain operation of induction motor and analyse speed control of AC drives by VSI fed drives.
CO-2	Understand vector control of induction motors.
CO-3	Understand operation of traction drives.
CO-4	Analyse control schemes to synchronous motor drives.
CO-5	Understand control of switched reluctance motor & stepper motor.
<b>I-II Sem Course: Digital Controllers</b>	
CO-1	Know the interfacing circuits for input and output to PIC micro controllers and DSP processors.
CO-2	Know how to write ALP for DSP processors.
CO-3	Design PWM controls for power electronic circuits using FPGA.
CO-4	Understand the different types of FPGA and configurations.
CO-5	Understand the architecture of DSP processor and their interface.
<b>I-II Sem Course: Renewable Energy Systems(Elective-III)</b>	
CO-1	Identify alternate energy sources.
CO-2	Classify and analyze different renewable energy systems.
CO-3	Adopt different alternate energy sources for power generation.
CO-4	Adopt optimally usage of different sources and interconnection with grid.
CO-5	Adopt the alternative energy sources for power generation.
<b>I-II Sem Course: Reactive Power Compensation &amp; Management</b>	
CO-1	Learn various load compensations.
CO-2	Obtain the mathematical model of reactive power compensating devices.
CO-3	Get application of reactive power compensation in electrical traction & arc furnaces.







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CO-4	Know the role of reactive power compensation at electric traction systems and Arc furnaces.
CO-5	Know the mathematical modeling of reactive power compensating devices.
<b>I-II Sem Course: Electrical Distribution Systems (Elective – III)</b>	
CO-1	Analyze a distribution system.
CO-2	Design equipment for compensation of losses in the distribution system.
CO-3	Design protective systems and co-ordinate the devices.
CO-4	Understand of capacitive compensation.
CO-5	Understand of voltage control.
<b>I-II Sem Course: Smart Grid Technologies (Elective – IV)</b>	
CO-1	Understand smart grids and analyse the smart grid policies and developments in smart grids.
CO-2	Develop concepts of smart grid technologies in hybrid electrical vehicles etc.
CO-3	Understand smart substations, feeder automation, GIS etc.
CO-4	Analyse micro grids and distributed generation systems.
CO-5	Analyse the effect of power quality in smart grid and to understand latest developments in ICT for smart grid.
<b>I-II Sem Course: Special Machines (Elective – IV)</b>	
CO-1	Analyze the characteristics of different types of PM type brushless DC motors and design suitable controllers.
CO-2	Apply the knowledge of sensors used in PMSM which can be used for controllers and synchronous machines.
CO-3	Analyze the different controllers used in electrical machines to propose the suitability of drives for different industrial applications.
CO-4	Classify the types of DC linear motors and apply the knowledge of controllers to propose their application in real world.
CO-5	Evaluate the steady state and transient behavior linear induction motors.
<b>I-II Sem Course: Programmable Logic Controllers &amp; Applications (Elective – IV)</b>	
CO-1	Understand the PLCs and their I/O modules.
CO-2	Develop control algorithms to PLC using ladder logic etc.
CO-3	Manage PLC registers for effective utilizations in different applications.



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CO-4	Handle data functions and control of two axis and their axis robots with PLC.
CO-5	Design PID controller with PLC.
<b>I-II Sem</b>	<b>Course: Power Converters &amp; Drives Laboratory</b>
CO-1	To analyse the working of phase controlled convertors.
CO-2	To analyse the working of AC voltage controllers.
CO-3	To analyse the working of DC-DC convertors and PWM inverters.



  
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