



The Kavery Engineering College

(Approved by AICTE, New Delhi & Affiliated to Anna University)
Mecheri, Mettur Tk. Salem Dt - 636 453.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAMME: M.E. POWER SYSTEMS ENGINEERING

VISION

- ❖ To produce globally competent and socially responsible Electrical and Electronics Engineers to meet the Industry needs.

MISSION

- ❖ To establish quality learning facilities.
- ❖ To produce Quality Electrical Engineers to compete globally.
- ❖ To nurture innovative research on cutting edge technologies.
- ❖ To inculcate the positive attitude and spirit of ethical practices.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- ❖ To prepare the students for successful career in electrical power industry, research and teaching institutions.
- ❖ To provide strong foundation in Power Engineering, necessary for day-to-day operation and planning of Power System.
- ❖ To develop the ability to design various controllers to enhance the stability and power transfer capability of the Power System.
- ❖ To provide knowledge in Renewable Energy Systems, Electric Vehicles and Grid Integrations using Power Converters.
- ❖ To develop a detailed understanding of various tools applied to the operation, design and investigation of modern electric power systems.

PROGRAM OUTCOMES (POs)

- ❖ Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ❖ Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences,



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and engineering sciences.

- ❖ Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- ❖ Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ❖ Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- ❖ The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- ❖ Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- ❖ Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ❖ Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ❖ Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- ❖ Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- ❖ Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- ❖ Ability to apply knowledge of electrical power system principles and techniques for power system applications.



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- ❖ Ability to develop steady-state and dynamic models of various power system components to perform system studies for generation and transmission system expansion planning.
- ❖ Ability to design and develop various indigenous controllers for efficient and economic operation of power system.
- ❖ Ability to design and develop principles, practices and state-of-art techniques to protect the power system.
- ❖ Ability to analyze various electricity market models with distributed energy resources and demand response management.
- ❖ Ability to incorporate interdisciplinary knowledge to address the recent problems in the electrical power industry.

COURSE OUTCOMES (COs)

Regulation	2021
Semester	01
Course Code	MA4107
Course Name	Applied Mathematics for Power Systems Engineers
Course Outcome	<ul style="list-style-type: none">❖ Student can able to apply the concepts of matrix theory in Electrical Engineering problems.❖ Students can be easily understood to solve boundary value problems associated with engineering applications.❖ Able to solve problems using Fourier series associated with engineering applications.❖ Able to understood the basic concepts and also to solve complicated problems using linear programming.❖ Student have capability of solving problems using non - linear programming techniques.

Regulation	2021
Semester	01
Course Code	RM4151



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Course Name	Research Methodology and IPR
Course Outcome	<ul style="list-style-type: none">❖ Understand the research problem and research process.❖ Understand research ethics .❖ Prepare a well-structured research paper and scientific presentations❖ Explore on various IPR components and process of filing.❖ Understand the adequate knowledge on patent and rights

Regulation	2021
Semester	01
Course Code	PS4101
Course Name	Computer Aided Power System Analysis
Course Outcome	<ul style="list-style-type: none">❖ Ability to solve large scale simultaneous linear equations and the ordering schemes for preserving sparsity.❖ Ability to solve large scale power flow problems❖ Ability to solve optimal power flow problem using various solution methods❖ Ability to do fault calculations for various fault conditions on three phase basis❖ Ability to do stability studies under various disturbances using numerical integration methods

Regulation	2021
Semester	01
Course Code	PS4102
Course Name	Power System Operation and Control
Course Outcome	<ul style="list-style-type: none">❖ Students able to❖ Explain about the operation and control of power system and List the past and present status of Indian power sector❖ Develop the static and dynamic model of Load Frequency Control in single and two area system❖ Analyse the problems associated with hydro thermal Scheduling and to construct the algorithm for feasible load management



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	<ul style="list-style-type: none"> ❖ Distinguish between various methods involved in unit commitment and economic dispatch problems ❖ Define about the power system security factors and analyse the algorithms used for optimal power flow
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Regulation	2021
Semester	01
Course Code	PS4151
Course Name	System Theory
Course Outcome	<ul style="list-style-type: none"> ❖ Students able to ❖ Understand the concept of State-State representation for Dynamic Systems ❖ Explain the solution techniques of state equations ❖ Realize the properties of control systems in state space form ❖ Identify non-linearities and evaluate the stability of the system using Lyapunov notion ❖ Perform Modal analysis and design controller and observer in state space form

Regulation	2021
Semester	01
Course Code	PX4151
Course Name	Analysis of Power Converters
Course Outcome	<ul style="list-style-type: none"> ❖ After completing the above course, students will be able to ❖ Acquire and apply knowledge of mathematics in power converter analysis ❖ Model, analyze and understand power electronic systems and equipments. ❖ Formulate, design and simulate phase controlled rectifiers for generic load and for machine loads ❖ Design and simulate switched mode inverters for generic load and for machine loads ❖ Select device and calculate performance parameters of power converters



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	under various operating modes
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Regulation	2021
Semester	01
Course Code	PS4111
Course Name	Power System Laboratory - I
Course Outcome	<ul style="list-style-type: none">❖ Acquire expertise in usage of simulation software as applied to power system❖ Apply tools to simulate the mathematical model of power network for power system Analysis❖ Analyze the power system through various numerical methods under normal and Abnormal conditions

Regulation	2021
Semester	01
Course Code	PX4161
Course Name	Power Converters Laboratory
Course Outcome	<ul style="list-style-type: none">❖ Comprehensive understanding on the switching behaviour of Power Electronic Switches❖ Comprehensive understanding on mathematical modeling of power electronic system and ability to implement the same using simulation tools❖ Ability of the student to use arduino/microcontroller for power electronic applications❖ Ability of the student to design and simulate various topologies of inverters and analyze their harmonic spectrum❖ Ability to design and fabricate the gate drive power converter circuits. Analyze the three-phase controlled rectifiers and isolated DC-DC converters for designing the power supplies

Regulation	2021
Semester	01



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Course Code	AX4092	
Course Name	Disaster Management	Audit Courses - I
Course Outcome	<ul style="list-style-type: none">❖ Ability to summarize basics of disaster❖ Ability to explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.❖ Ability to illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.❖ Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.❖ Ability to develop the strengths and weaknesses of disaster management approaches	

Regulation	2021	
Semester	02	
Course Code	PS4201	
Course Name	Advanced Power System Protection	
Course Outcome	<ul style="list-style-type: none">❖ Students able to❖ Familiarize the underlying principle of digital techniques for power system protection❖ Design the relaying scheme for protection of power apparatus using digital techniques❖ Evaluate and interpret relay coordination❖ Develop PC based algorithm for short circuit studies❖ Compare the performance of modern protection schemes with the conventional scheme	

Regulation	2021	
Semester	02	
Course Code	PS4202	
Course Name	Power System Dynamics	



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Course Outcome	<ul style="list-style-type: none">❖ Students will be able to❖ Analyze the mathematical modeling and inductance calculations in a synchronous machine.❖ Develop the transfer function model for excitation, speed governing and turbine systems.❖ Analyze the small signal stability of SMIB power systems.❖ Analyze the small signal stability of SMIB and Multi-machine power systems with damping controllers.❖ Describe feedback controllers for small signal stability enhancement in power systems
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Regulation	2021
Semester	02
Course Code	PS4203
Course Name	Power System Transients
Course Outcome	<ul style="list-style-type: none">❖ Ability to analyse various sources of transients❖ Ability to compute possible over voltages in power systems❖ Ability to predict over voltages in power system using travelling wave theory❖ Ability to compute over voltages using EMTP with multiple sources❖ Ability to coordinate the insulation level of the power system

Regulation	2021
Semester	02
Course Code	PS4204
Course Name	Restructured Power System
Course Outcome	<ul style="list-style-type: none">❖ Students will be able to:❖ Describe the requirement for deregulation of the electricity market and the principles of market models in power systems.❖ Analyze the methods of congestion management in deregulated power system❖ Analyze the locational marginal pricing and financial transmission rights❖ Analyze the ancillary services management



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	❖ Differentiate the framework of US and Indian power sectors
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Regulation	2021	
Semester	02	
Course Code	PS4092	
Course Name	Renewable Energy And Grid Integration	Professional Elective I
Course Outcome	<ul style="list-style-type: none"> ❖ Relate the power generation of different renewable energy sources to grid impact and grid codes ❖ Explain the design principles of solar energy management systems ❖ Understand the power conversion system of wind generators ❖ Analyze the different Maximum Power Point tracking Techniques ❖ Build grid connected and stand alone renewable energy management system 	

Regulation	2021	
Semester	02	
Course Code	PS4005	
Course Name	Wind And Solar Energy Systems	Professional Elective II
Course Outcome	<ul style="list-style-type: none"> ❖ Upon Completion of this course, the students will be able to ❖ Understand the basics of wind energy conversion systems & solar energy conversion systems. ❖ Implement the appropriate power extraction techniques. ❖ Apply power electronics to the renewable energy systems. ❖ Understand the grid integration techniques, and power quality issues. ❖ Apply the technology & techniques in variety of applications. 	

Regulation	2021	
Semester	02	
Course Code	PS4211	
Course Name	Power System Laboratory – II	
Course Outcome	❖ Apply advanced tools to simulate the model of power network for power	



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	<p>system problems</p> <ul style="list-style-type: none"> ❖ Acquire expertise in usage of modern techniques for Power System Issues ❖ Apply soft computing techniques to Power System problems and evaluate the solution ❖ Analyze the solution obtained through soft computing techniques <p>Suggest suitable technique as applicable to power system problem</p>
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Regulation	2021	
Semester	03	
Course Code	PS4351	
Course Name	HVDC and FACTS	
Course Outcome	<ul style="list-style-type: none"> ❖ Learners will be able to refresh on basics of power transmission networks and need for FACTS controllers ❖ Ability to design series and shunt compensating devices for power transfer enhancement ❖ Learners will understand the significance about different voltage source converter based FACTS controllers ❖ Learners will attain knowledge on AC/DC system coordinated control with FACTS and HVDC link ❖ Learners will be capable to explore the MMC converter applications FACTS and MTDC system 	
Regulation	2021	
Semester	03	
Course Code	PS4071	Professional Elective III
Course Name	Energy Management And Auditing	
Course Outcome	<ul style="list-style-type: none"> ❖ Upon Completion of this course, the students will be able to ❖ Understand the present energy scenario and role of energy managers. : Comprehend the Economic Models for cost and load management. ❖ Configure the Demand side energy management through its control techniques, strategy and planning. ❖ Understand the process of energy auditing. 	



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	❖ Implement energy conservation aspects in industries.
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Regulation	2021	
Semester	03	
Course Code	PS4009	
Course Name	Industrial Power System Analysis And Design	Professional Elective IV
Course Outcome	<ul style="list-style-type: none"> ❖ Students will be able to: ❖ perform motor starting studies. ❖ To model and carry out power factor correction studies. ❖ Perform harmonic analysis and reduce the harmonics by using filters. ❖ Carry out the flicker analysis by proper modeling of the load and its minimization. ❖ Design the appropriate ground grid for electrical safety 	

Regulation	2021	
Semester	03	
Course Code	OME434	
Course Name	Electric Vehicle Technology	Open Elective
Course Outcome	<ul style="list-style-type: none"> ❖ Students will be able to do Mathematical Modelling of an Electric Vehicle ❖ Design and Build Your Own EV Powertrain ❖ To create a head start for students into emerging technologies, 	

Regulation	2021	
Semester	03	
Course Code	PS4311	
Course Name	Project Work I	
Course Outcome	<ul style="list-style-type: none"> ❖ At the end of the course the students will have a clear idea of their area of work and they will be in a position to carry out the remaining phase II work in a systematic way. 	



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Regulation	2021
Semester	04
Course Code	PS4411
Course Name	Project Work II
Course Outcome	❖ On completion of the project work students will be in a position to take up any challenging practical problem in the field of engineering design and find better solutions to it.