

M. Tech. POWER ELECTRONICS AND DRIVES



DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH

Institution Deemed to be University under Distinct Category, A Centrally Funded Technical Institute
Ministry of Education, Government of India, Taramani, Chennai - 600 113.
www.nitttr.ac.in

NITTTR, CHENNAI

The National Institute of Technical Teachers' Training and Research, Chennai is a premier institution established in 1964 under the Ministry of Education, Government of India, dedicated to enhancing the quality of technical education in the country. It has been granted the "Institution Deemed to be University" status by the Ministry recently. This recognition acknowledges our 60 years of commitment to providing quality education and training, marking a significant milestone in our journey towards excellence in technical education and research.

Established to improve the standards of technical education, NITTTR offers a range of programs and services tailored to the needs of educators and institutions in the technical education sector. At the core of NITTTR's mission is the training and professional development of technical teachers. Through its various training programs, workshops, and courses, NITTTR equips educators with the necessary skills and knowledge to excel in their roles. These programs cover diverse topics such as curriculum development, teaching methodologies, educational technology, and quality assurance, ensuring that educators stay updated with the latest trends and practices in the field.

In addition to training, NITTTR also conducts research and consultancy activities aimed at improving the overall ecosystem of technical education. The institution engages in cutting-edge research to address key challenges and opportunities in the field, contributing to the advancement of knowledge and innovation. Moreover, NITTTR offers consultancy services to technical institutions seeking guidance on various aspects such as infrastructure development, curriculum design, and pedagogical practices.

NITTTR's commitment to excellence in technical education extends beyond its training and research initiatives. The institution actively promotes collaboration and networking among professionals in the technical education sector, fostering a community of practice where ideas and best practices are shared and exchanged. NITTTR plays a pivotal role in shaping the future of technical education in India. By providing high-quality training, conducting impactful research, and offering expert consultancy services, NITTTR continues to make significant contributions towards the enhancement of technical education standards and the development of a skilled workforce for the nation's growth and prosperity.



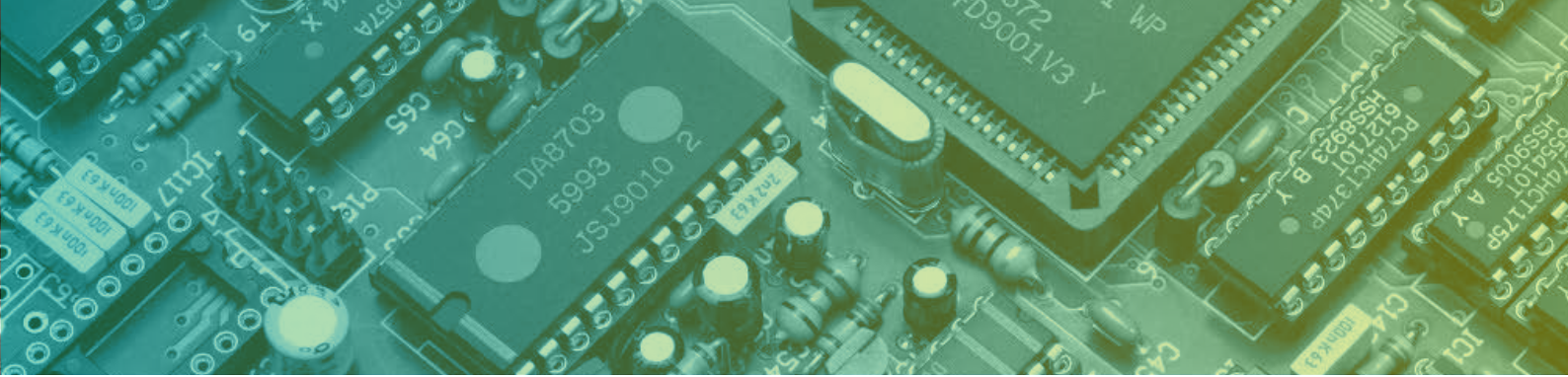


DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

The Department of Electrical & Electronics Engineering was established in the year 1964. The Department offers M.Tech. (Power Electronics and Drives) with regular and modular mode, Ph.D and Integrated Ph.D in Engineering programmes to cater to the ever challenging needs of technical excellence in all areas of electrical engineering such as Integrated electronics and circuits, Tele-communications, Computer technology, Control & Automation, Power systems & Power electronics. Both M.Tech. and Ph.D. programmes attract the Intelligent students from the country and abroad.

The department has distinguished faculty, all holding Ph.D. degrees from renowned institutes in India. The faculty members are playing a pivotal role in shaping the department in all the desired aspects and grooming the students at large. The faculty members are members of several national and international scientific bodies. The faculty of the department has been constantly carrying out research on many cutting-edge technologies and regularly publishes in top international journals.

The Department has state-of-the art laboratories in almost all the areas of Electrical, Electronics and Instrumentation Engineering. The Department has the latest simulation tools to cater various specializations and is equipped with facilities for measurement, characterization and synthesis of experimental as well as theoretical results. Well equipped research laboratories are established as per the thrust area of faculty members which provide all necessary facilities to enhance the quality of the teaching-learning process, exploring multidisciplinary researches and consultancy in frontier areas of health care, transport, energy, communication and automation. Since long, specific research works and different training programs / courses related to industrial automation / renewable energy have been conducted successfully. The students are encouraged to take advantage of the growing opportunities by incorporating an internship experience in their final year post graduate education.

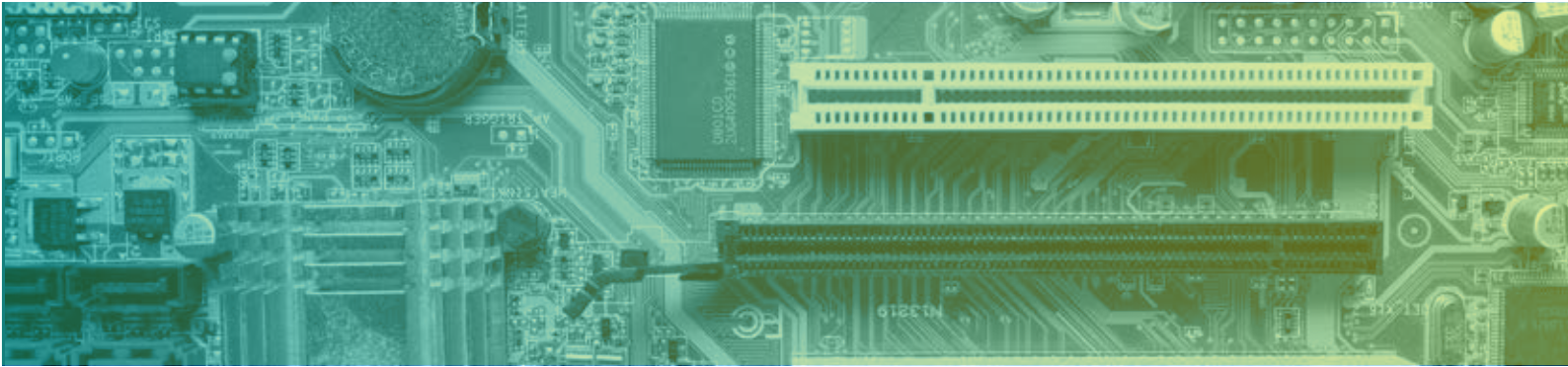


M. Tech. POWER ELECTRONICS AND DRIVES

The post graduate course on Power Electronics and Drives will provide a strong foundation for careers in electrical engineering, power conversion and control systems. The objective of this course is to focus on the fundamental principles of power electronics and its applications. The M.Tech. program in Power Electronics and Drives is designed to provide a contemporary and dynamic curriculum in this field, blending advanced technologies with traditional ones like power semiconductor devices, electronics, electromagnetics, digital signal processors, control theory, EMC, Electronics vehicle and energy technology. It offers an extensive understanding of electric energy conversion through power electronic converters and electric machines. Additionally, the program covers advanced topics in microprocessors and microcontrollers crucial for professionals in the Power Electronics domain. Practical projects are undertaken by students during the third and fourth semesters to ensure hands-on experience and relevance to industry needs..

Instrumentation holds a pivotal role in various industries. This program equips students with comprehensive knowledge in instrumentation and control industries, paving the way for careers in system-level modeling, analysis, design, and integration of motor drives, as well as measurement and control of complex industrial and electrical processes. The curriculum is structured to provide theoretical knowledge along with practical skills, preparing students to tackle industry challenges effectively. The curriculum structure and the research lab facilities in the Department provide students the knowledge base and practical expertise to meet the challenges of the industry.

The well-equipped laboratory caters to the research needs of postgraduate students, featuring experimental setups like power electronic trainer system PLC training kit, NI-DAQ, with working models and a computer lab equipped with software such as MATLAB, OrCAD, LabVIEW, Xilinx, Multisim, RSLOGIX, RSLINX as well as kits for Artificial and Machine learning, and robot control setups.



PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- To provide students good foundation from engineering fundamentals, mathematical modelling to hardware- software programming intelligence towards latest trends in power electronics & drives.
- To provide students, the ability to develop smart solutions for the purpose of system automation.
- To promote student awareness, for life-long learning and introduce them to professional ethics and code of practice.
- To encourage students to work in interdisciplinary and frontier area.

PROGRAM OUTCOMES (POs)

- An ability to independently carry out research/investigation and development work to solve practical problems.
- An ability to write and present a substantial technical report/document.
- Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
- Apply knowledge of basic science and engineering in design and testing of power electronic systems and drives.
- Interact with Industry in a professional and ethical manner to meet the requirements of societal needs and to contribute sustainable development of the society.
- Implement cost effective and cutting-edge technologies in power electronics and drives system.

CORE COURSES

- Analysis of Electrical Machines
- Analysis of Power Converters
- Analysis of Inverters
- Power Converters Laboratory
- Analog and Digital Controllers for PE Converters Laboratory
- Analysis of Electrical Drives
- Special Electrical Machines



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ELECTIVE COURSES

- Power Semiconductor Devices
- System Design Using Microcontroller
- Electromagnetic Field Computation and Modelling
- Soft Computing Techniques
- Modern Rectifiers and Resonant Converters
- Advanced Power Converters
- Control of Power Electronic Circuits
- Power Quality
- DSP Based System Design
- Machine Learning and Deep Learning
- Io T for Smart Systems
- Power Quality
- DSP Based System Design
- Machine Learning and Deep Learning
- Io T for Smart Systems
- Energy Storage Technologies



AREAS FOR SHORT-TERM TRAINING PROGRAMS

- AI Applications in Electrical and Electronics Engineering
- Applications of AI Techniques in Power Systems
- Arduino Projects using Tinkercad
- Circuit creation analysis simulation and PCB Design using Multisim
- Design of Electrical & Electronic Systems for wind & solar
- Design of Electrical and Electronic systems for wind and solar
- Electric Vehicle Systems and Control
- Electric Vehicle Technology & Lithium ion Batteries
- Electrical Machines for EV applications
- Industrial Automation using PLC, Pneumatics and Robotics
- Industrial Instrumentation and control
- Intelligent Control and Automation
- Internet of things (IoT) using Arduino and Raspberry Pi
- IoT Applications for sensors and Actuators
- Measurement and Control for System Automation
- Modeling and simulation using MATLAB and SCILAB
- Modern software Tools usage in Electrical and Electronics Engineering
- Programmable Logic Controller Systems using micro 820 controllers
- Role of wide band gap devices in Power Electronics Engineering
- Sensors and Instrumentation
- Smart Grid and Renewable Energy
- Soft Computing Techniques for Engineering Applications
- Switch Gear Protection, PLC and SCADA

FACILITIES OF DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING





THE DIRECTOR

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