M. Tech. VLSI DESIGN AND EMBEDDED SYSTEMS

DEPARTMENT OF ELECTRONICS AND COMMUNICATION 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.nitttrc.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 institutions 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 ELECTRONICS AND COMMUNICATION ENGINEERING

The Department of Electronics and Communication Engineering was established in the year 1964. The school offers M.Tech. (VLSI Design and Embedded Systems) 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 Electronics and Communication Engineering such as Virtual Instrumentation, VLSI, Embedded Systems, Signal Processing, System on Chip, Advanced Communication Engineering, E-Vehicle technology, Control & Automation, Digital Twins, Digital Image Processing & Semi- conductor Technologies. 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 school 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 Electronics, Communication and Instrumentation Engineering. The school 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 research 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 postgraduate education.

M. Tech. VLSI DESIGN AND EMBEDDED SYSTEMS

The post graduate course on VLSI Design and Embedded Systems will provide a strong foundation for careers in VLSI, ASIC, SoC Advanced Communication Systems and Embedded systems. The objective of this course is to focus on the fundamental principles of VLSI and Embedded Systems in addition to the Semiconductor Technologies and theirapplictions. The M.Tech. program in VLSI Design and Embedded Sytems is designed to provide a contemporary and dynamic curriculum in this field, blending advanced technologies with traditional ones like VLSI, Embedded Systems, System on Chips, Virtual Instrumentation, Digtal Signal and Image Processing, Digital Twins, E-Vehicle Technolgies, Advanced Communication Systems and Semiconductor Technologies. It offers an extensive understanding of VLSI technologies, Semi-conductor technologies, Embedded Controllers and the various generations in the communication. Additionally, the program covers advanced topics in microcontrollers, virtual instrumentation, digital twins, various generations in communication and latest semi-conductor technologies. Practical projects are undertaken by students during the third and fourth semesters to ensure hands-on experience and relevance to industry needs.

VLSI and embedded system design are both exciting and lucrative career options. With the ever-growing demand for electronic devices, there is a need for skilled professionals who can design and develop these proucts.With the explosive growth of technology, the demand for professionals with skills in VLSI and embedded systems has also grown. The curriculum is structured to provide theoretical skills along with practical experience, 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 expetise to meet the challenges of the industry.

The well-equipped laboratory caters to the research needs of postgrauate students, featuring experimental setups including a FPGA Trainer system, Embedded Controllers like 8051, MSP 430, ARM LPC 2148, Cortex M3, M4 and AT mega 328 AVR Arduino, Raspberri Pi, my Rio, My DAQ, compuer lab equipped with software such as MATLAB, OrCAD, LabVIEW, Xilinx, Multisim, as well as kits for Artificial and Machine learning, and robot control setups.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- To provide students good foundation from engineering fundamentals, mathematical modelling to hardware-software programming intelligence towards latest trends in measurements and control.
- 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 areas.

PROGRAMME 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.
- Ability to design and conduct experiments, perform analysis, applying the knowledge of computing, mathematics, science and electronic engineering for designing VLSI and Embedded Systems.
- Interpret the problems of VLSI and Embedded Systems and investigate solutions and work towards improved solutions.
- Continuously update knowledge with modern tools and technical developments and ensure professional development.

CORE COURSES

- Graph Theory and Optimization Techniques
- Research Methodology and IPR
- Analog IC Design
- Digital CMOS VLSI Design
- Embedded Controllers
- Embedded System Design
- Embedded Systems Laboratory
- Analog and Digital CMOS VLSI Design Laboratory

- Design for Verification using UVM
- FPGA System Design
- Embedded Automation
- VLSI Structures for DSP
- Internet of Things System Design
- Embedded Automation Laboratory

ELECTIVE COURSES

- ASIC Design
- Parallel and Reconfigurable Architectures
- Software for Embedded Systems
- Embedded System Security
- VLSI Testing
- Network on Chip
- Nanotechnology
- Low Power VLSI Design
- Multicore Architecture
- Programming
- Reconfigurable Computing
- Hardware Software Co-Design
- System on Chip
- MEMS and NEMS
- Automotive Electronics
- Embedded Wireless Sensor Networks
- Network Embedded Applications
- RFIC Design
- Sensors and Actuators
- Real Time Operating System
- Embedded Networking
- Deep Learning
- Real Time Embedded Systems
- Pervasive Computing
- Physical Design Automation

AREAS FOR SHORT-TERM TRAINING PROGRAMS

- Advanced Communication Systems
- Biomedical Electronics and Telemedicine
- Biomedical Engineering and IoT in Healthcare
- Cyber Physical Systems (CPS)
- Data Communication & Networking
- Digital and Mobile Communication Engineering
- Digital Design using VHDL and Implementation using FPGA
- Embedded Systems - Arm Controller and RTOS
- Embedded Systems using 8051 Micro Controller
- Engineering Application using MATLAB Programming
- Graphical System Design using LabVIEW
- Industry 4.0
- Internet of Things (IoT) and its Applications
- LabVIEW Programming
- MATLAB and LabVIEW Programming for Engineering Applications
- MATLAB Programming
- 8051 Micro Controller and its applications
- PIC 16F877A Microcontroller and its applications
- Quality Assurance of Technical Institutions through Accreditation
- Simulations in Electronics
- Verilog Programming
- VHDL Programming
- Wireless Communication

FACILITIES OF
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
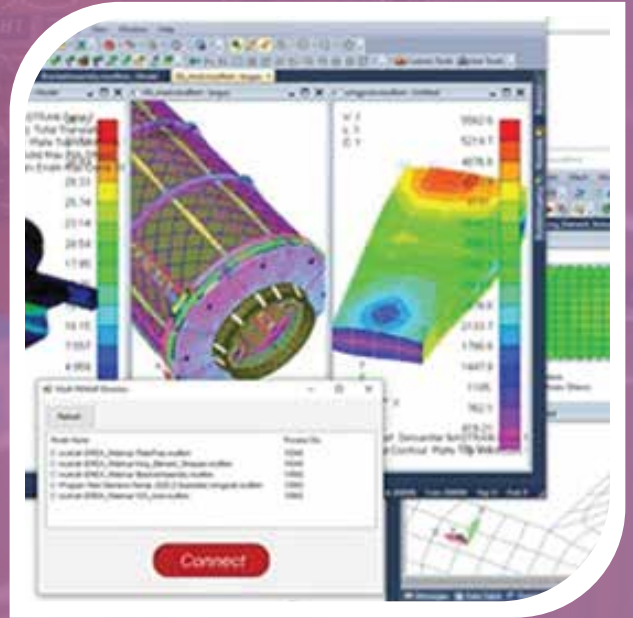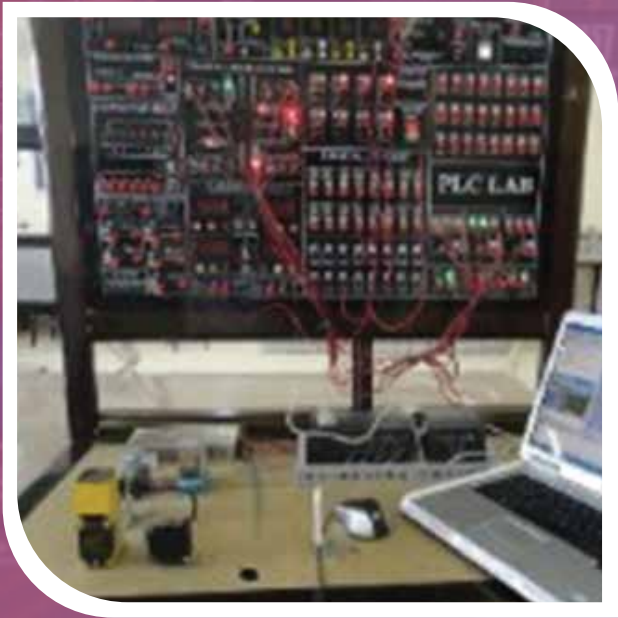
THE DIRECTOR

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.

📞 2254 5441 / 406 ✉ director@nitttrc.ac.in / admission@nitttrc.edu.in 🌐 www.nitttrc.ac.in

𝕏 **nitttr_chennai**   📷 **nitttr.chennai**   f **Nittr Chennai**   in **NITTTR Chennai**   ▶ **NITTTR Chennai**