PLACEMENT TEAM 2023-24

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Indian Institute of Technology Delhi

Placement Brochure 2023-24

Department of Electrical Engineering

About Us

The Department of Electrical Engineering is one of the largest departments in IIT Delhi and has a distinguished faculty, all holding Ph.D. degrees from renowned institutes in India and abroad. Some of the objectives of the department include providing continuous education programs, training students at the undergraduate and postgraduate levels, research and development in all branches of Electrical Engineering and producing scientists and technologists of the highest caliber.

The Department of Electrical Engineering entitles students and researchers with adequate opportunities, which leads to innovations and strong developments in the field. To aid the development, extensive research facilities including well-equipped laboratories with latest state-of-the-art equipment are provided.

The admission to M.Tech and M.S.(R) programmes consists of shortlisting of students based on GATE (Graduate Aptitude Test in Engineering) Score which is followed by an interview. Such a rigorous process ensures that best of the students are inducted in the department.

The Electrical Engineering Department runs two B.Tech, six M.Tech programmes and M.S.(R) programme specializing in certain areas of Electrical Engineering and are as follows:

- B.Tech. in Electrical Engineering
- B.Tech. in Electrical Engineering Power and Automation
- M.Tech. in Communication Engineering
- M.Tech. in Control and Automation
- M.Tech. in Computer Technology
- M.Tech. in Integrated Electronics and Circuits
- M.Tech. in Power Electronics, Electrical Machines and Drives
- M.Tech. in Power Systems
- M.S.(R) in Electrical Engineering

B.Tech in Electrical Engineering

The department offers BTech,. Degree to eligible students, which is a four-year undergraduate programme. It is one of the most sought-after courses for B.Tech amongst the students. The students have a wide variety of core and elective courses to choose. The branch has more emphasis on communication engineering, micro circuits and electromechanics part. The students undergo field trips, industry oriented practical training and colloquium and final year project as a part of undergraduate program . The research projects are available on almost all fields..

Important Courses

- Signals and System
- Digital Electronics
- Computer Architecture
- Data Structures and Algorithms
- Power Electronics
- Electromagnetics
- Power Engineering
- Machine Intelligence and Learning
- Communication Engineering
- Analog Electronics circuits
- Probability and Stochastics
- Control Engineering
- Operating Systems
- Digital Hardware Design
- Digital Communication
- VLSI

Laboratory Facilities

- Electromechanics Laboratory
- Electromagnetics Laboratory
- Control Engineering Laboratory
- Power Electronics Laboratory
- Power Engineering Laboratory
- Design and System Laboratory
- Communication Engineering Laboratory

On-Going Projects

- A smart, robust, energy efficient and cost competitive wireless charging solution for Indian context.
- High Power, Low Voltage DC-DC Converter for Electric Vehicles.
- EEG Source Localization Assisted Ayurvedic Intervention in Brain Disorder Management

B.Tech in Electrical Engineering Power and Automation

This is one of the most elegantly designed 4-year programs for B.Tech. Students have a wide variety of core and elective courses to choose from, to learn and master the latest technologies and skills required in modern industry and research. This branch consists of all the courses from Electrical Engineering with a special emphasis on Electric Drives, Embedded Systems, Control Systems and Robotics Automation and Electronics for High Power Systems. Students undergo industry oriented practical training and final year projects as a part of the program. The cutting-edge research projects encompass applications of latest technologies including but not limited to AI, IOT to control systems and power systems.

Important Courses

- Signals and System
- Digital Electronics
- Computer Architecture
- Data Structures and Algorithms
- Power Electronics
- Embedded Systems
- Electric Drives
- Machine Intelligence and Learning
- Control Engineering
- Analog Electronics circuits
- Probability and Stochastics
- Power Engineering
- Communication Engineering
- Operating Systems

Laboratory Facilities

- Design and System Laboratory
- Control Engineering Laboratory
- Electric Drives Laboratory
- Power Electronics Laboratory
- Power Engineering Laboratory
- Electromechanics Laboratory

On-Going Projects

- Development of scalable power module for high power EV charging stations.
- Single stage bidirectional current fed converters for high power density EV battery chargers.
- A High-Frequency Modular Capacitive Wireless Power Transfer System for eMobility Applications.

Integrated Electronics and Circuits (IEC)

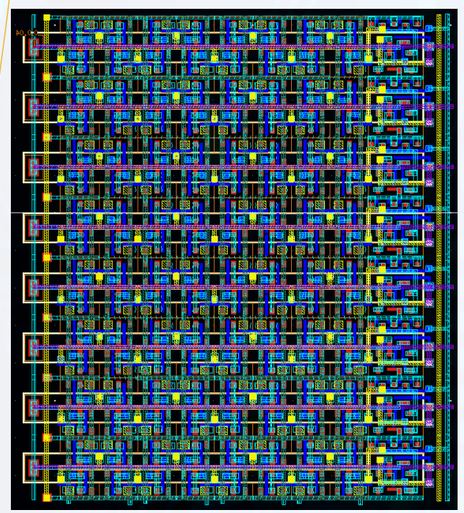
The IEC is one of the constituent groups in the Department of Electrical Engineering at IIT Delhi. Our research areas are closely aligned with various national initiatives, such as the India Semiconductor Mission (ISM), National Mission on Quantum Technologies and Applications (NMQTA), and Electronics System Design and Manufacturing in India (ESDM). The faculty and graduate students conduct research on a multitude of topics, including Quantum & Neuromorphic computing , Machine Learning & AI , Digital, Analog & mixed-signal RF circuit design, Device fabrication ,modelling & characterization, Memory design & Technology, MEMS, sensors & plasmonics . Our group offers one of the EE MTECH (EEN) and majorly contributes to the fully industry sponsored VLSI Design Tools and Technology MTECH (JVL). In addition, we participate in EE , such as PhD (EEZ), MSR (EEY), and BTech (EE1/EE3).

Important Courses

- Micro/Nano Electronics
- MOS VLSI Design
- Analog Integrated Circuits
- Semiconductor Memory Design
- I.C. Technology
- Physical Design Lab
- Mixed Signal Design
- CMOS RF IC Design

Laboratory Facilities

- **Impact and DRDO Labs**: Graduate seating, workstation computing, server racks and access to softwares such as Cadence, Synopsys, Mentor, Xilinx Suites.
- **Characterization Lab**: Semiconductor device characterization facility; probe station, semiconductor parameter analyzer, wafer level measurements.
- **VLSI Measurements Lab**: Advanced measurements facility; DC, analog, mixed-signal and RF measurements upto a few GHz; temperature chamber, dark chamber.



On-Going Research Projects

- CMOS Sub-Terahertz Front End IC Building Blocks for Auto-RADAR and 6G
- 6G Energy-Efficient & Wideband 140 GHz Receiver IC in CMOS
- CMOS Cryogenic Circuits for Quantum Computer Controller
- Design of Charge Recycling ternary RF DAC based transmitter for
- software defined Radios
- Design of Wide band PLL
- Design of high speed high resolution DAC
- Feasibility analysis of precision CTDSM
- NVM for AI, Neuromorphic Computing, Stochastic/Inexact Computing,
- Machine-Learning, Deep-Learning, Cognitive-Computing

Control and Automation

The Control and Automation Group has been an integral part of the department of Electrical Engineering. Our mission is to promote cutting-edge research and innovation in the field of Control Engineering. The Group includes seven eminent faculty members with diverse research interest, exploring the following thrust areas: Nonlinear and Robust control, Robotics and Embedded control, Discrete Ti me Systems and Variable Structure Control, Reinforcement Learning and Adaptive Control, Computational Methods for Modelling Simulation and Control, Distributed Parameter Systems and Biological Systems

Important Courses

- Linear Systems Theory
- Mathematical Methods in Control
- Nonlinear Systems
- Advanced Robotics
- Optimal Control Theory
- Adaptive and Learning Control
- Stochastic Filtering and Identification
- Numerical Linear Algebra and Optimization in Engineering

Laboratory Facilities

- **Analog Control Laboratory**: This lab houses facilities for conducting experiments relating to analog control systems, such as a Linear system simulator, control of AC and DC servomotor, analog control of DC motor, a transducer kit, a process control trainer kit, and a synchro transmitter and transformer
- **Digital Control Laboratory**: This lab houses facilities for conducting experiments on Magnetic Levitation, Twin Rotor MIMO system (which serves as a model of a helicopter), Gyroscope, Inverted Pendulum, PIC microcontroller based digital control.

Sponsored/On-Going Research Projects

- Modelling and Control of Electromagnetic Levitation Systems.(Sponsored by Science and Research Engineering Board, DST INDIA)
- Design of an embedded processor for smart cammera systems.
- Investigation of finite-time optimal and robust non-singular control techniques with applications to nonlinear systems.
- Data driven Soft Robotics in Agriculture.(Joint project with CSIR-CMERI)
- Advanced control systems for LIGO.(Sponsored by Inter-University Centre for Astronomy and Astrophysics, INDIA)
- Learning Based Adaptive Model Predictive Control .
- Control of Soft Exo-suit for Upper Arm Augmentation.(Sponsored by DRDO underJATC)

Computer Technology (C. Tech.)

The Computer Technology programme is one of the top five Masters programmes in the entire institute. The group pursues research in broad areas of Pattern Recognition, Machine Learning, Data Analytics, Neural Networks, Artificial Intelligence and Soft Computing, Multimedia Systems, Music and Audio Processing, Computer Networking, Sensor Networks, Graph Theory, Computer Vision and Image Analysis, Systems Biology, Bioinformatics, Embedded Systems, Parallel and Distributed Processing, Big Data Analysis, CAD for VLSI, Biometrics. The group comprises of faculty members, and Ph.D., M.S. (Research), M.Tech. and dual-degree students.

Important Courses

- Computer Architecture
- Operating Systems
- Machine Learning
- Embedded Systems & Applications
- Algorithm Design and Analysis
- Multimedia Systems
- Computer Vision
- Computational Perception and Cognition

Laboratory Facilities

- **Multimedia Labs**: Research areas involve Computer Vision Multimedia Systems, Computational Intelligence
- **Embedded Systems Lab**: High configuration workstations, FPGA Development Platforms and workstations, Programmable sensor motes.
- **Information Technology Lab**: VMware, Xilinx ,circuit maker, pspice, EE servers with open mozix cluster architecture http, mail server.
- **Protocol Testing and Developing Lab**: 7 workstations and few of them containing very high RAM as some Projects deals with very

.

On-Going Projects

- Neurocomputing and Cognitive Intelligence (Development of application oriented AI System)
- 3D Motion Perception in children with Eye-motion Disorders
- Developing reinforcement based AI model for improvising the predictive skills of individual with autism
- Large Language Models for Text and Multimodal Content
- AI for Mental Health
- Wearable Soft Robotics for Upper Limb Muscle Power Augmentation with BMI Interface
- Compression of Deep Neural Networks using Variational Information Bottleneck
- Application of Machine Learning in Analog Design

Communication Engineering

Communication Engineering in IIT Delhi is one of the most demanding and research-oriented branches in the country. It is the largest research group of Electrical Engineering Department. Our main research areas are: Statistical Signal Processing, Wireless Communications, Cyber-Physical System, Communication Networks, Queueing Theory, Coding Theory, Wireless Security, Cognitive Radio, Array Signal Processing, Optical Communications & Networks, Fiber & Integrated Photonics, Photonic Switching, Nonlinear & Quantum Optics. The group consists of faculty members, M.Tech., PhD and Post-Doc students..

Important Courses

- Signal Theory
- Digital Communications
- Microwave Theory and Techniques
- Detection and Estimation Theory
- Wireless Communications
- MIMO Communication Systems
- Optical Communication Systems
- Coding Theory
- Advanced Digital Signal Processing
- Statistical Signal Processing
- Sensor Array Signal Processing
- Wireless Optical Communications
- Advanced Information Theory

Laboratory Facilities

- **Wireless Communication Laboratory**: This lab is equipped with multitudes of antennas and antenna arrays along with other supporting resources like spectrum analyzer, modulator and demodulators,etc. and has 4 complete SDR kits to easily test different types of modulation schemes using software without need of configuring the hardware.
- **5G Massive MIMO Laboratory**: India's first 5G massive mimo equipment has been set up in this lab.
- **Internet of Things(IOT) lab**: It has various facilities to carry research in areas such as Cyber security, sensor data processing, network architecture and embedded intelligence.
- **Multichannel Signal Processing (MSP) Lab:** Here, the research group uses theoretical and experimental array processing techniques for source locali zation, tracking, separation and reconstruction. The area of applications includes bio-medical signal processing, speech and radar communications.
- **Microwave Lab:** The research of this lab mainly focuses on RF and microwave circuits. Students also gain hands-on experience on microwave circuit fabrications and their operation in real-time circuits.

On-Going Projects

- Investigation on Interference and Power Management Strategies in Cooperative Relay Communications.
- Performance of a Cooperative Link with Energy Harvesting Nodes and a Data-Buffer Equipped Relay.
- Media Based Modulation for Uplink Transmission by Energy Harvesting Nodes.
- Performance of Cluster-based Cooperative Multi-hop relaying with energy harvesting nodes.
- Performance Analysis of IRS NOMA Wireless Aided downlink.
- Performance Analysis of NOMA network using SWIPT based Energy Harvesting (EH) Full Duplex Relay(FDR).

Power Systems

The Power Systems group is part of Power Engineering Group at IIT Delhi. The research interests of the the Power Systems group include Power Systems Analysis and Control, Power Generation, HVDC, FACTS, Distribution Automation, Power Quality, Energy Systems, Energy Audit and Energy Conservation, Renewable Energy (Wind, Small Hydro, and PV), Electrical Machines and Drives.

Important Courses

- Power System Analysis
- Advanced Power Systems Protection
- Power System Dynamics
- Advanced Power System Optimization
- Power Systems Lab
- Power System Reliability

Laboratory Facilities

- Power Systems Lab: This lab hosts facilties for Power Instrumentation, data acquisition, and energy audit and computing facilities with state-of-art software.
- Smart Grid Lab: Hardware implementation of projects, real time simulator

On-Going Projects

- Smart Grid: Selective data transmission scheme for wide area smart grid communication network
- Electricity Pricing
- PMU Application: Phase Measurement Unit implementation.
- Power System Dynamic Studies of MicroGrid: For Solar and Wind Energy

Power Electronics, Electrical Machines and Drives

The Power Electronics, Electrical Machi nes and Drives group is an integral part of the Electrical Engineering Department at IIT Delhi. The group provides extensi ve research facilities including well-equipped laboratories with latest state of art equipment. Faculty is actively involved in teaching at undergraduate and postgraduate level through courses covering latest trends in Power Electronics, Electric Machines and Drives, providing hands on laboratory experience. The faculty members have been awarded a number of international and national awards and constitute editorial boards of leading journals and programme committees of several conferences worldwide. The group has research collaboration with several industries, power utilities and R&D organizations in India and abroad.

Important Courses

- Modelling of Electrical Machines
- Power Electronic Converters
- Electric Drive System
- Advanced topics in Power Electronics
- Digital Control of Power Electronics and Drive systems
- Power Quality
- High Power Converters

Laboratory Facilities

- **PG Power Electronics Lab**: Various types of converters including rectifiers, AC controllers and inverters are available for extensive experimentation along with equipment such as DSP controllers, power quality analyzers and CROs.
- **PG Machines Lab**: It provides research facilities for electrical machines like induction machines, synchronous machines, DC machi nes and in addition to these, special electrical machines like stepper motors, BLDC motors, switched reluctance motors, and also sets of generalized machines are also present. The laboratory also houses technologies like solar simulators, Opal RT Real time simulators, etc.
- **PG Drives Lab**: It provides research facilities on drive systems with converter fed dc and ac drives and their operation and control.

On-Going Projects:

- Development of simulation model and optimization of coil design for resonant bidirectional wireless power transfer system
- An efficient EV Power train for long range Electric Vehicles.
- Ultra Compact Traction Inverter for EV application
- An efficient EV Power train for long range Electric Vehicles

PAST RECRUITERS

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Microsoft
cadence
infineon
GLOBALFOUNDRIES
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