EEE ASSOCIATION

# TRONICALS

VOLUME 11 ISSUE 1

## QUANTUM AIDED DEVICE DESIGN

QUANTUM WORLD

2025

# Table of Contents

# MESSAGE FROM THE EDITORIAL TEAM

Dear Readers,

We are delighted to present the latest edition of Tronicals. Each issue is a collective effort, bringing together diverse perspectives and ideas that reflect the energy and creativity of our community.

Electrical and Electronics Engineering has always stood at the cusp of innovation and impact, shaping technologies that drive progress in every sphere of life. This edition highlights not only technical insights but also the curiosity and determination that keep our discipline evolving in exciting directions.

This magazine is not just a compilation of articles, but also a platform where knowledge meets curiosity and technical depth blends with fresh perspectives. We hope it inspires you to look beyond the usual, to explore new ideas, and to engage with the possibilities our field has to offer.

We extend our heartfelt thanks to all contributors and supporters who made this edition possible. Your enthusiasm and commitment continue to shape Tronicals into a space of shared learning and inspiration.

Happy reading,
The Editorial Team

# The Editorial Team

Yashvi Chauhan

Kartik Aashish

Diksha Gulati

Priyanka Kutiyare

Aastha Agarwal

Vedansh

Harini

Lakshmi Priya

Arunima Saha

Gunesh Sharma

Premesh

Priyadarsan

# Message from Head of the Department

# Dr. Sishaj P. Simon

I am delighted to introduce this edition of Tronicals, the biannual magazine of our department. The theme, "Quantum Aided Device Design," resonates like a high-frequency signal with our vision of merging strong fundamentals with forward-looking innovation—an effort that continuously powers the circuits of tomorrow's technologies.

The past year has truly been a well-regulated supply of both inspiration and achievement. Our department has once again registered its presence on a global scale by being ranked in the 501–550 band of the QS World University Rankings by Subject 2025,

reaffirming that our academic current flows strongly in sync with international standards. Adding further capacitance to our credibility, the six-year NBA accreditation of our B.Tech. (EEE) program till AY 2027–28 acts as a long-term stabilizer in our academic circuit, ensuring quality and consistency remain at their peak efficiency.

Our research and innovation have yielded outputs with measurable impact. With 74 publications serving as signal carriers, 2,872 Scopus citations amplifying our academic voltage, five granted patents and three published patents functioning as unique circuit designs, and externally funded projects exceeding ₹200 lakh strengthening our power supply, our faculty and students continue to expand the bandwidth of knowledge. Workshops, consultancy projects, and 40 invited guest lectures have acted as transmission lines, ensuring that this knowledge signal propagates far beyond the classroom with minimal attenuation.

What energizes me most, however, is the dynamic role of our students. Whether through internships, industry-linked projects, association activities, or active participation in research, they truly function as active components in the larger circuit of our department—driving innovation, rectifying challenges, and ensuring current flows seamlessly from ideas to impact. I encourage every student to resonate with this momentum and fine-tune their frequencies to opportunities, for this is the true path to becoming responsible innovators who not only light their own future but also illuminate society.

As we celebrate these achievements, I extend my heartfelt appreciation to the faculty, staff, and students whose combined efforts form the parallel paths that keep this department functioning with such efficiency. As we move forward, I am confident that our department will continue to operate at resonance—emerging as a robust hub of knowledge, innovation, and excellence.

# Message from Faculty Advisor

# Dr. S. Moorthi

On behalf of the EEE Association, I am delighted to extend my warm greeting to the EEE family of NIT Tiruchirappalli. It is my pleasure to serve as the Faculty Advisor for the EEE Association. The EEE Association plays an integral role in organising various technical workshops, events, guest lectures, and an annual technical symposium "Currents", which has garnered enthusiastic participation from students.

As we move on to yet another remarkable year of the EEE Association, it is an opportune moment to reflect on a pivotal force shaping our nation's future. the strategic growth of India's semiconductor industry.

India's focused push for self-reliance in the semiconductor sector marks a pivotal moment for engineering and technological innovation. This strategic initiative is not merely about manufacturing; it is a profound opportunity to drive advancements in VLSI design, power electronics, and microsystems—core domains that are intrinsic to electrical engineering.

The success of this national mission hinges on a foundation of deep technical expertise and research excellence. By fostering innovation in these critical areas, we are not just building an industry; we are powering India's journey toward technological sovereignty and shaping its future as a global leader in the digital age.

Talking about Tronicals, our department's technical magazine that highlights various innovations happening in the fields related to Electrical and Electronics Engineering. It provides information on the recent achievements of our department and students, providing a platform for the readers to get insight into various milestones our department has achieved. I congratulate the editorial team for their consistent efforts and creativity in curating this magazine and wish the readers an insightful experience.

I wish the EEE Association team a successful year ahead and laud their meticulous work, diligence, and enthusiasm.

# VISION AND MISSION OF THE DEPARTMENT

## About

The department of Electrical and Electronics Engineering, NIT Tiruchirappalli was started in 1964. It offers one Under-Graduate programme (B.Tech.), two Post-Graduate programmes (M.Tech. in Power Systems and M.Tech. Power Electronics) and also research programmes (M.S. and Ph.D.) in the various fields of Electrical and Electronics Engineering. After the institute became NIT, the department has grown not only in terms of student and faculty strength but also in improving the laboratory facilities for teaching and research purposes. The department is recognised for excellence in research, teaching and service to the profession.

The faculty members have a strong sense of responsibility to provide the finest possible education for both graduate and undergraduate students. The academic strength of the faculty is reflected by the alumni, many of whom are in the top echelons of industry and academia both in India and abroad.

## Vision

To be a centre of excellence in Electrical Energy Systems.

## Mission

- Empowering students and professionals with state-of-art knowledge and Technological skills.
- Enabling Industries to adopt effective solutions in Energy areas through research and consultancy.
- Evolving appropriate sustainable technologies for rural needs

# B. Tech Programme

## Programme Educational Objectives

The major objectives of the B.Tech. The programme in Electrical and Electronics Engineering is to prepare students:

- for graduate study in engineering
- to work in research and development organisations
- for employment in electrical power industries
- to acquire job in the electronic circuit design and fabrication industries
- to work in IT and ITES industries

## Programme Specific Outcomes

- Apply fundamental knowledge of Electrical , Electronics and Computer Engineering concepts to understand, analyse and solve complex problems in Power Engineering and allied areas.
- Analyse, design and develop Electronics circuits and systems
- Adapt to the changing needs for self and continuous learning, communicate effectively and practise professional ethics for societal benefits.

# Programme Outcomes

The students who have undergone the B.Tech. programme in Electrical and Electronics Engineering (EEE):

- will have an ability to apply knowledge of mathematics and science in EEE systems.
- will have an ability to provide solutions for EEE problems by designing and conducting experiments, interpreting and analysing data, and reporting the results.
- will have comprehensive understanding of the entire range of electronic devices, analog and digital circuits with added state-of-art knowledge on advanced electronic systems.
- will have knowledge and exposure on different power electronic circuits and drives for industrial applications.
- will have in-depth knowledge in transmission and distribution systems, power system analysis and protection systems to pursue a career in the power sector.
- will have a good knowledge in microprocessors/microcontrollers, data structures, computer programming and simulation software.
- will be able to develop mathematical modelling, analysis and design of control systems and associated instrumentation for EEE.
- will be able to systematically carry out projects related to EEE.
- will have an ability to participate as members in various professional bodies as well as multidisciplinary design teams.
- will demonstrate the ability to choose and apply appropriate resource management techniques so as to optimally utilise the available resources.
- will be proficient in English language in both verbal and written forms which will enable them to compete globally.
- will have confidence to apply engineering solutions with professional, ethical and social responsibilities.
- will be able to excel in their professional endeavours through self-education.
- will be able to design and build renewable energy systems for developing clean energy and sustainable technologies.

# M. Tech in Power Systems

## Programme Educational Objectives

The major objectives of the M.Tech. programme in Power Systems are to equip the students with adequate knowledge and skills in Power Systems Engineering and to prepare them for the following career options:

- research programmes in Power Systems Engineering
- employment in power research and development organisations
- to work in electric power industries and energy sectors
- faculty positions in reputed institutions

## Programme Outcomes for Power Systems

A student who has undergone M.Tech. programme in Power Systems (PS) will:

1. An ability to independently carry out research /investigation and development work to solve practical problems
2. An ability to write and present a substantial technical report/document
3. 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.

# M. Tech Power Electronics

## Programme Educational Objectives

The major objectives of the M.Tech. programme in Power Electronics are to equip the students with adequate knowledge and skills in Power Electronics and to prepare them for the following career options:

- research programmes in Power Electronics and related areas
- employment in R & D organisations related to sustainable technologies
- to work in power electronic circuit design and fabrication industries
- faculty positions in reputed institutions

## Programme Outcomes for Power Electronics

A student who has undergone M.Tech. programme in Power Electronics (PE) will:

1. An ability to independently carry out research /investigation and development work to solve practical problems
2. An ability to write and present a substantial technical report/document
3. 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.

# Currents '25 – Annual Symposium

## of the EEE Department, NIT Trichy

**Date**: March 28–29, 2025 **Venue**: National Institute of Technology, Tiruchirappalli

Currents '25, the annual technical symposium of the Department of Electrical and Electronics Engineering at NIT Trichy, once again lit up the campus with a spirit of innovation, collaboration, and knowledge-sharing. Over the years, Currents has grown into a national platform where academia meets industry, and where young engineers move beyond textbooks to embrace real-world challenges. The 2024–25 edition continued this tradition, bringing together students, alumni, and professionals in a two-day celebration of technical brilliance and creativity.


The symposium opened with an energetic atmosphere as students from across the country took part in competitions that tested both technical expertise and imagination. Events such as Dhruva, the quizzing and aptitude contest, and Code Currents, the programming challenge, pushed participants to think quickly and logically. Capture Currents, the photography competition, gave space for creative expression, while Colloquium encouraged young researchers to present their ideas. Hardware-based contests like Ohm Raider and Bat Maven focused on circuit building and troubleshooting, and Orion and Enigma asked participants to approach real-world problems with fresh solutions. These events reflected the diversity of the EEE community and its ability to combine technical skill with creative thinking.

The workshops at Currents '25 provided hands-on learning experiences that went beyond the classroom. A session on IoT using ESP8266 introduced students to connected devices, while another explored blockchain technology and its potential in engineering systems. The Echo Locator workshop added a creative dimension by linking design thinking with technology. Machine learning modules showed how deep learning can be applied to engineering problems, and hardware and embedded design sessions offered practical exposure to microcontrollers and real-time systems. With over 500 participants, the workshops showed the department's focus on preparing students for the rapidly evolving technological landscape.

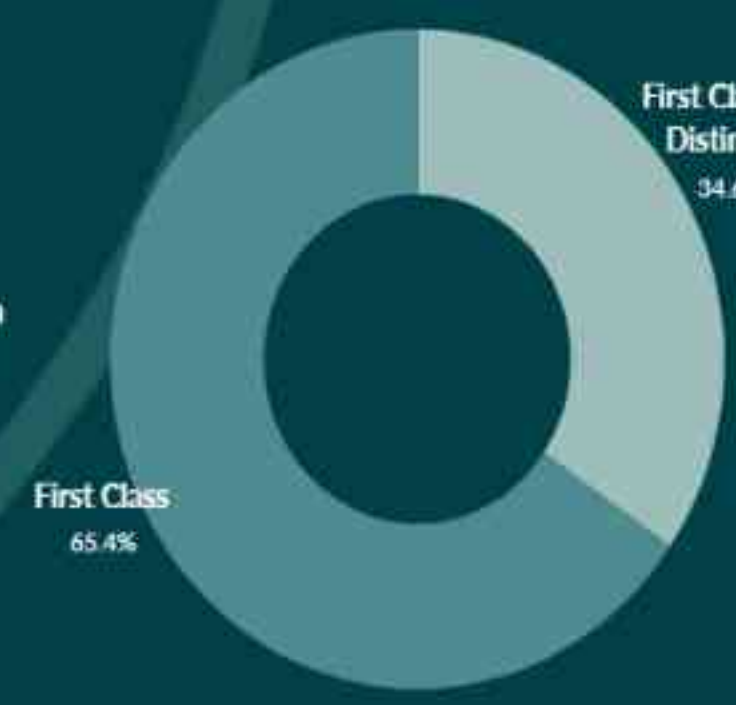
The guest lecture series was another highlight. Charulatha Varadarajan from Intel spoke about opportunities in semiconductor design, while Parthasarathy from Texas Instruments shared his expertise on microcontrollers and embedded systems. Alumni speaker Preethi Raksha, from the batch of 2020, addressed the topic "Beyond the Campus – Alumni Insights," reminding current students of the value of their time at NIT Trichy and the impact they can create in their careers. These lectures offered a balance of academic depth, industry perspective, and personal experience, giving students valuable guidance for the future.

Currents '25 also extended its impact beyond the campus. Earlier in the year, the department organized Light Up 2.0 at MR Palayam Government Higher Secondary School. Around 200 school students took part in the program, where they were introduced to career opportunities and inspired to explore the world of engineering. The enthusiasm of the schoolchildren and the mentorship provided by NIT students showed how outreach initiatives can shape young minds and build connections with the wider community.

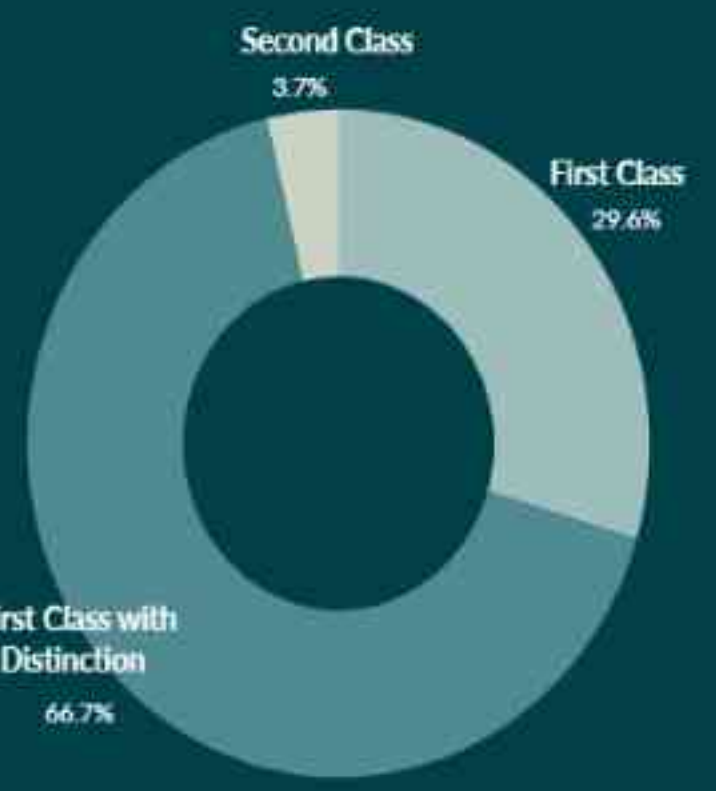
By the end of the two days, the energy and impact of Currents '25 were clear. More than just a symposium, it was a celebration of Electrical and Electronics Engineering: its foundations in circuits and systems, its applications in modern technology, and its potential for solving tomorrow's problems. With its mix of competitions, workshops, guest lectures, and outreach, Currents '25 once again demonstrated that engineering thrives when knowledge meets creativity, and when learning is shared across generations.

# CONVOCATION'25


B. Tech




M. Tech
POWER SYSTEM




M. Tech
POWER ELECTRONICS

# MEDAL WINNERS

Akhilesh Chandrakant Pyaskar
207123005
CGPA 9.44

M. Tech
POWER SYSTEM

Sundaram V
107121110
CGPA 9.54

B. Tech

Nallappagari Tulasi
207123014
CGPA 9.64

M. Tech
POWER ELECTRONICS

# PhD SCHOLARS

| SL. No. | Name | ROLL NUMBER | NAME OF THE GUIDE | TITLE OF THESIS |
|---|---|---|---|---|
| 1 | Merlin Mary NJ | 407119006 14-Nov-2024 | Dr. Shelas Sathyan | Design and Development of Resonant Converters for Two-Stage On-Board Battery Charger |
| 2 | Kesari Hanumanthu | 407119005 23-Dec-2024 | Dr. N. Kumaresan | Modeling, Analysis and Control of SEIGS Associated Power Electronic and Converters for Micro-Hydro Power Plants |
| 3 | Rajesh Velpula | 407119010 30-Jan-2025 | Dr. P. Raja | Design and Testing of Alternative Methods for Detection and Classification of Faults on EHV Transmission Lines |
| 4 | Kumar Muhilan | 407917053 17-Apr-2025 | Dr. S. Senthil Kumar | Performance Enhancement of Solar PV Systems Employing Modules Reconfiguration, Power Electronic Controllers and other Techniques |
| 5 | Vidya P Janaki | 407120010 06-Jun-2025 | Dr. S. Moorthi | Thermotropic Hydrogen Bond Liquid Crystals for Data Storage and Thermistor Applications |
| 6 | Rage Ravitheja | 407119009 16-Jun-2025 | Dr. Karthik Thirumala External Co-guide: Dr. Manoranjan Sahoo | Common Design and Development of Single Stage Boost Inverter Topologies for Photo-Voltaic Applications |

| SL. No. | Name | ROLL NUMBER | NAME OF THE GUIDE | TITLE OF THESIS |
|---|---|---|---|---|
| 7 | Soniya Agrawal | 407321004 10-Jul-2025 | Dr. Sateesh Kumar Kuncham | Investigation on Switched Capacitor based Common-Ground multilevel Inverters for Photovoltaic Applications |

# PROJECTS

| Titile | Funding Agency | Amount | Duration -Role | Collaborators |
|---|---|---|---|---|
| SPARC (Govt. of India Sustainable Energy System for Achieving Novel Carbon Neutral Energy Communities (SUSTENANCE) OST, Gol | SPARC (Govt. of India MHRD) | 118,60,000 (-110.6 lakhs) | July 2021- Dec 2024 Coinvestigator | Dr. G. Saravana Ilango, Dr. M. Jaya Bharatha Reddy, Dr S. Senthil Kumar Dr. Manoranjan Sahoo, Dr Shelas Sathyan, Dr. M. Brindha (NIT TiruchirappalliMHRD) |
| Pilot implementation of Energy Blockchain and P2P Transactive Market | CPRI | 19,44,000 (-19 44 lukts) | March 2023 March 2025 Coinvestigator | Dr. Karthik Thirumala, Dr. Vivek Mohan (NIT Calicut), Auroville Consulting (Auroville) Epixel Solutions (Palakkad) |

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- Soniya Agrawal, K. Sateesh Kumar, Manoranjan Sahoo, "A Five-Level Switched Capacitor Based Common-Ground Inverter for Photovoltaic Applications", International Transactions of Electrical Energy System, WILEY, 6 March 2025. [DOI: 10.1002/cta.4504]

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S. Gangolu, R. K. Panda, Soumendra Sarangi, "Variance Based Cyber Attack Detection Add-on for Line Differential Scheme", 5th IEEE SeFet 2025, International, 9 July 2025.

P. Kaliappan, M. P. Selvan, "Protection Coordination Study and Recommendations for a Real Time Operational Wind Farm with Type-1 and Type-4 Wind Turbine Generators", 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE 2025), International, 28 February 2025. [DOI: 10.1109/SSDEE64538.2025.1096827]

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- Anil Marneni, N. Babu, Senthil Kumar Subramaniam, Pravin Murugesan, J. Jude Prakash, "Design, analysis and testing of three-phase isolated SiC-based high current DC-DC converter for arc welding power supply", Electrical Engineering, Springer, 19
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Veeramani Veerakgoundar, Senthilkumar Subramaniam, "An efficient and compact voltage feed-forward DAB-based bidirectional DC–DC converter for onboard EV charger", Computers and Electrical Engineering, Elsevier, March 2025. [DOI: 10.1016/j.compeleceng.2024.109979]

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- K. Saneep, K. Sundareswaran, P. Srinivasa Rao Nayak, Sishaj P. Simon, T. Mithun, Gireesh V. Puthusserry, "PSO Assisted Support Vector Machine Algorithm Towards State of Charge Estimation of Li-ion Batteries", PECTEA 2025, International, 18 June 2025. [DOI: 10.1109/PECTEA61788.2025.11076267]

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Divya Bharathi Raj, Venkata Kirthiga Murli, "Optimizing Electric Vehicle Charging Stations and Distributed Generators in Smart Grids: A Multi-Objective Meta-Heuristic Approach", IEEE Latin America Transactions, IEEE, Accepted 17 July 2025.

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**B. Vinod Kumar, Aneesa Farhan M. A.,** "Optimizing Electric Vehicle Charging Station Placement for Energy Loss Reduction in IEEE-118 Distribution Systems", *3rd International Conference on Smart Systems for Applications in Electrical Sciences (ICSSES-2025)*, International, 21–22 March 2025. [DOI: 10.1109/ICSSES64899.2025.11009752]

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- V. N. Panchalai, Sateesh Kumar Kuncham, N. Kumaresan, R. Ramesh, "Switched Mode Power Amplifier for Underwater Imaging Sonar System," IEEE International Conference on Power Electronic Converters in Transportation and Energy Applications (PECTEA-2025), International, Jun 18–21, 2025.

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V. N. Panchalai, K. Sateesh Kumar, N. Kumaresan, R. Ramesh, "Switched Mode Power Amplifier for Underwater Imaging Sonar System", IEEE PECTEA, National, 22 January 2025.

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- Saravana Kumar Avudaiappan, Rakesh Namani, G. Saravana Ilango, Subhash Joshi Tharayparambil George, Manju Ayyappanpillai Sulochana, "A 10 kVA dynamic voltage restorer real time implementation in textile industry to address the power quality issues", International Journal of Emerging Electric Power Systems, De Gruyter, 21 April 2025. [DOI: 10.1515/ijeeps-2024-0370]

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# PATENT

- Name of applicant: NIT, Tiruchirappalli
  Title: A Switching Mechanism for a Plurality of Photovoltaic Panels
  Inventors: Sarath N, Sishaj P Simon, K. Sundareswaran, P. Srinivasa Rao Nayak
  Granted on: 07/03/2025,
  Patent Number: 562062

- Name of applicant: NIT, Tiruchirappalli
  Title: A Photovoltaic System with Photovoltaic Panels arranged in a Cubicle Structure
  Inventors: Sishaj P Simon, P. Srinivasa Rao Nayak, K. Sundareswaran, Ajay Kumar Prajapat, Sarath N
  Granted on: 11/07/2025,
  Patent Number: 568625

- Name of applicant: National Institute of Technology Tiruchirappall
  Title: A Transformation-less Inventor for a photovoltaic source .
  Inventors: K Sateesh Kumar, Soniya Agrawal, Manoranjan Sahoo
  Granted on: 21/02/2025,
  Patent Number: 560877

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- Development of Unintentional Islanding Protection Scheme with LVRT & Frequency Ride-Through, ANRF (SERB), 2022–2025

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- Wireless Sensor Node for Online Data Transfer of Parameters from Electrical Machines and Drives, NaMPET, 2021–2025

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# WHY ANALOG ELECTRONICS STILL MATTER IN DIGITAL WORLD

Despite the rapid digitalization that has characterized the past few decades, analog technology has not only remained relevant but has also maintained its essential significance. From the warmth of vinyl records to the tactile feedback of mechanical watches, analog technologies offer a richness of experience that their digital counterparts attempt to emulate but cannot fully capture. This combination of physicality and functionality speaks to something fundamentally human—an appreciation for the tangible and the authentic.

Photography beautifully illustrates the harmony of analog and digital. Shooting on film is like painting with light—each frame carries grain, texture, and a soulful depth shaped by patience and imperfection. I contrast, digital photography offers immediacy, flexibility, and limitless creative editing. When combined, the synergy is powerful: photographers often shoot on film but digitize negatives, preserving the warmth of analog while unlocking the precision of digital tools. This blend produces images that resonate with both nostalgia and innovation, capturing the essence of the past while being refined through modern technology to create truly timeless works of art.

While digital has effectively solved processing challenges for the last 50 years, Moore's Law is finally approaching a brick wall in the laws of physics. It's pushing engineers to think outside the current digital data-processing
paradigm and become more creative aboutdesigning efficiency into the always-on system.

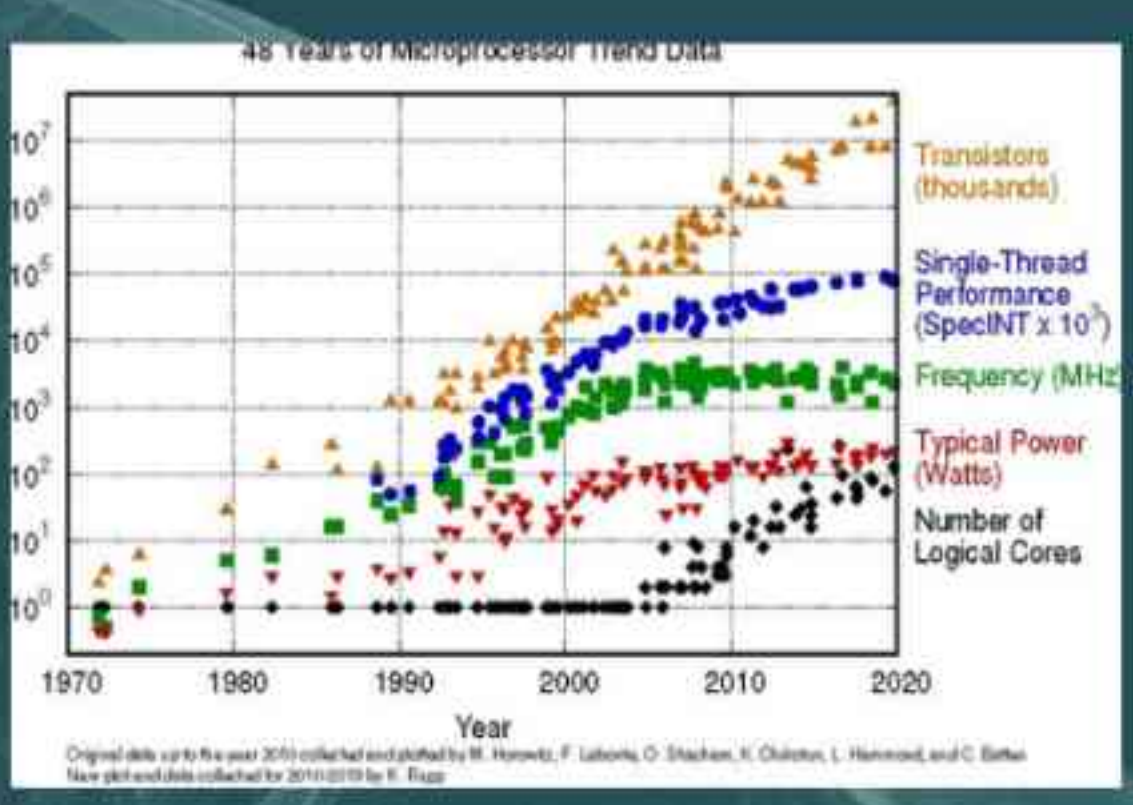
## Comparing Processing: Analog Amplification vs Digital Conversion

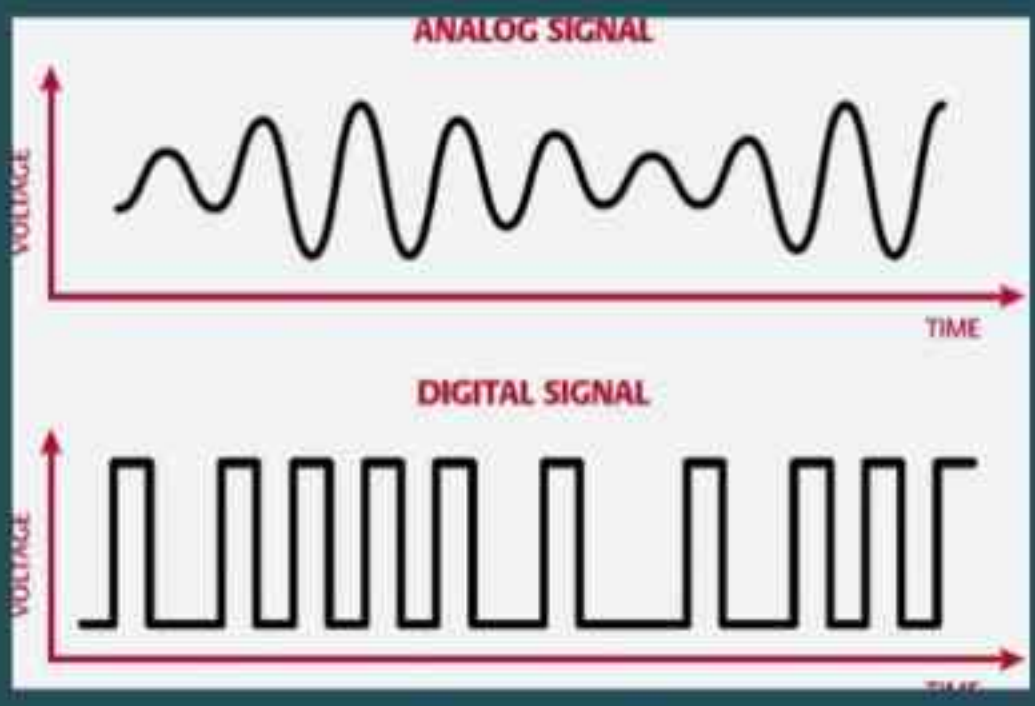
Fundamentally, we need to use digital more strategically, engaging digital chips to do heavy processing only when necessary. This frees us to use analog chips to perform a first round of analysis that determines whether a specific event, such as voice or an acoustic trigger, is present while the sound data are still in their natural analog state.

The core difference between analog front ends and digital cores is how information is manipulated, stored, and restored. Understanding the continuum versus discretization helps engineers select the right tool for each task.

## From Amplifiers to ADCs and DACs

Analog amplification boosts weak sensor signals with precision and minimal distortion, preserving phase and waveform shape as long as the noise floor is controlled. When the signal leaves the analog realm, an analog-to-digital converter (ADC) quantizes it into binary words, enabling robust processing, storage, and remote analysis. A digital-to-analog converter (DAC) then reconstitutes a continuous signal for final actuation. In practice, the ADC/DAC interface defines the boundary between eras of operation— continuous sensing and discrete processing. The choice of sampling rate, resolution, and conversion architecture (successive approximation, sigma-delta, or pipeline) directly shapes accuracy, latency, and power consumption in real devices.



## Precision, Bandwidth, and Practical Limits

Analog precision hinges on thermal noise, component matching, and amplifier linearity. As you push bandwidth, you encounter trade-offs with noise and stability, especially in high-frequency designs where parasitics dominate. Digital systems sidestep some of these issues by regenerating signals at each stage, but require front-end integrity to avoid clipping and aliasing. The practical limit stems from the analog-to-digital converter (ADC) and its counterpart, the DAC. ADC Resolution, sampling rate, and effective number of bits (ENOB) govern how faithfully a signal is captured; beyond that, digital processing may offer diminishing returns unless calibration and redundancy are
introduced.

## Hybrid Designs in Practice

Hybrid designs leverage the best of both worlds: a low-noise analog front end protects signal fidelity, while digital processing enables error correction, data fusion, and adaptive control. Examples include radio receivers with analog preamplifiers followed by digital demodulation, and sensor networks where local ADCs feed compact microcontrollers for on-device interpretation. Such architectures require careful interface design, including impedance matching, anti- aliasing filters, and clock synchronization. They also benefit from software-defined approaches that reduce hardware rework, enabling rapid prototyping and iterative testing.

## Conclusion: The Synthesis of Analog and Digital Systems

For engineers, success lies in choosing the right mix: acknowledging the strengths of continuous signals and the robustness of digital processing. The future belongs to thoughtful, hybrid designs that respect physical realities while embracing programmable flexibility. The goal is reliable performance across diverse operating conditions and markets. By appreciating the intrinsic differences between analog and digital domains, practitioners can craft systems that remain accurate, scalable, and adaptable as technologies evolve.

The overarching lesson is clear: the most effective electronics are those that seamlessly bridge continuity and discreteness, enabling intelligent interaction with the real world.

# India's Leap into IoT Forensics: A New Era of Crime Investigation

In September 2025, Gujarat became one of the first states in India to set up a forensic system built for the Internet of Things (IoT). Announced in the state assembly by Minister of State for Home Harsh Sanghavi, this move is a big step toward modernizing crime investigations in the country. Until now, police mainly depended on fingerprints, eyewitnesses, CCTV footage, call records, and laptops. But with the rise of smart devices, important clues are often hidden in places we don't usually notice. This new system now gives investigators the ability to bring that hidden data into the courtroom

IoT forensics is the process of collecting and studying information from connected devices. Traditional forensics usually looks at one device, like a hard drive or a phone, but IoT forensics covers many more. It includes fitness trackers, medical monitors, cars, and even industrial machines. These devices record data quietly in the background, and that data can turn into valuable evidence. For example, a smartwatch might show a person's heartbeat just before death, or a car chip could prove if the driver used the brakes before a crash

The new tool in Gujarat can pull information from vehicle systems, wearable devices, medical monitors, and other electronics. It can trace GPS movements, detect the impact of a crash, record system errors, and even identify which devices were connected to the car at the time. This makes investigations much more reliable. In one recent case, officials did not just depend on CCTV video to guess the speed of a car in a hit-and-run. Instead, they checked the car's own semiconductor chip, which gave them the exact details.

This technology is important because crimes today are closely linked with technology. Traditional methods are not enough to handle such cases. IoT forensics adds an extra layer of truth to investigations. It gives hard data that cannot be easily twisted or changed. It also puts India among a select group of countries that are adopting advanced forensic tools, showing that the country is serious about using electronics and data for justice.


At the same time, the system comes with challenges. IoT devices are made by thousands of companies, each with its own design. This makes it hard to follow one standard method of analysis. There are also privacy concerns, since devices like smartwatches and medical monitors store very personal details, and using that data raises ethical questions. Security is another challenge, as forensic evidence must be stored safely to avoid hacking or tampering. Investigators also need special training in electronics, networks, and embedded systems, areas that are not usually part of police training

The use of IoT forensics will not be limited to solving crimes. Insurance companies could use it to check the truth behind accident claims. Factories can check machine records

Even with these difficulties, IoT forensics in India is expected to grow quickly. Experts believe that soon there could be a national framework for such investigations, supported by both government and research institutions. For students of Electrical and Electronics Engineering, this is especially exciting. It shows how skills in circuit design, embedded systems, and sensor networks can directly support law enforcement, healthcare, and even governance.

after accidents to improve safety, and cybersecurity teams can use it to spot if devices were tampered with. Overall, IoT forensics is a fast-growing field that links engineering with many parts of society

India's move into IoT forensics is more than just a new tool for police. It shows how evidence, technology, and justice are becoming deeply connected. The chips and sensors we use every day are no longer just machines; they are silent witnesses that can speak when needed. The challenge now is to use their voices responsibly and fairly. For young engineers, this is a reminder that their classroom learning can reach far beyond technical labs. The systems they build today may one day decide not just how a car moves or when a heartbeat stops, but whether justice is delivered.

# Attention Mechanisms in Electrical Waveform Analysis

## Introduction: Smarter Electrical Systems with AI

Modern electrical grids are becoming increasingly complex with renewable integration, dynamic loads, and distributed generation. This complexity generates massive volumes of data — from voltage waveforms to power quality indices. Traditional tools like Fourier and Wavelet transforms remain valuable but struggle with non-stationary signals, noise, and real-time demands.

Artificial Intelligence (AI), especially Transformer models powered by attention mechanisms, is changing the game. By "focusing" on the most relevant portions of a waveform, these models can spot patterns, predict failures, and classify events with unprecedented speed and accuracy — even in real time.

## What Are Transformers and Attention Mechanisms?

At the core of this shift is the attention mechanism, a deep learning technique that assigns weights to different parts of an input sequence. Think of a waveform as a string of data points: attention highlights the spikes, distortions, or transients that matter most, while downplaying the rest.

Unlike RNNs or LSTMs, which process data step by step, Transformers process entire sequences in parallel. This allows them to capture both short-lived surges and long-term load dependencies efficiently — a crucial advantage in power systems.

## Applications in Electrical Waveform Analysis

- Fault Detection and Classification
- Transformers can quickly identify and classify faults such as single-line-to-ground, double-line-to-ground, or three-phase faults, cutting analysis time and improving reliability.
- Harmonic Analysis and Power Quality
- Harmonic distortion reduces equipment life and grid stability. Attention-based models detect even subtle harmonics under noisy conditions, outperforming FFTs and enabling proactive intervention.
- Transient Event Detection
- Events like switching surges, capacitor bank switching, or lightning strikes can be detected and localized in milliseconds — supporting faster, more effective protection systems.
- Predictive Maintenance
- By analyzing historical waveforms, AI predicts issues like insulation breakdown, motor faults, or partial discharge before catastrophic failure, enabling planned maintenance and minimizing downtime.

## Advantages Over Conventional Techniques

**Traditional Methods**

Depend on manual feature extraction (RMS, THD, etc.)
Perform poorly under noisy or incomplete data
Struggle with long sequences (RNNs, LSTMs)
Slower in real-time monitoring

**Transformer-Based Models**

Learn features directly from raw waveforms
Robust to noise; focus on key waveform segments
Efficiently capture long-range dependencies
Parallel processing enables near real-time results

## Integration with Smart Grids and IoT

As smart grids evolve, AI models are moving closer to the edge — running directly on smart meters, substation controllers, and IoT gateways. Compact Transformer variants like TinyBERT and DistilBERT enable real-time waveform monitoring even on resource-constrained devices, reducing latency and easing the load on central servers.

## Future Scope: Explainable and Trustworthy AI

A key challenge with AI is interpretability. Attention models offer a partial solution: their attention weights can be visualized, showing which parts of a waveform drove the decision. This helps engineers validate results and build trust. Future research may blend attention-based learning with physics-driven power system models, creating hybrid approaches that are both accurate and transparent.

## Conclusion: Towards Intelligent, Resilient Grids

Attention-based AI marks a leap forward for electrical waveform analysis. From fault detection to power quality monitoring, these models make grids faster, more reliable, and more efficient. As energy systems become smarter and more decentralized, intelligent waveform analysis will be essential for achieving resilience, efficiency, and carbon neutrality.

The future of waveform analysis is not just automated — it is attentive.

# Quantum-Aided Materials and Device Design: Shaping the Future of Technology

## Quantum Computing Meets Materials Science

The integration of quantum computing with materials and device design is opening up possibilities that were unimaginable just a decade ago. Traditional computational methods often struggle to simulate the complex interactions of electrons in advanced materials, leading to long development cycles and trial-and-error experimentation. Quantum-assisted approaches, however, exploit the principles of quantum mechanics to simulate matter at the atomic and subatomic level with unmatched precision.

By accurately modeling quantum interactions, researchers can design novel materials—such as high-temperature superconductors, ultralight alloys, and nanostructured composites—faster and more efficiently. This accelerates innovation across industries, from energy storage and electronics to aerospace and biomedicine.

## Smarter Device Design with Quantum Assistance

**Beyond materials, quantum-aided simulations are revolutionizing device design. For instance:**

- **Semiconductors: Quantum computing enables accurate modeling of electron transport, band gaps, and defects in next-generation chips, leading to smaller, faster, and more energy-efficient devices.**
- **Batteries: By simulating ion transport at a quantum level, new electrode and electrolyte materials are being identified that promise safer, longer-lasting, and faster-charging batteries.**

## Thermal Stability and Performance Advantages

One of the biggest challenges in device and materials engineering is ensuring thermal stability. Quantum-aided design allows researchers to predict how materials behave under extreme heat, stress, or radiation. For example:

Nanomaterials for Steel Industry: Simulations can identify nanoparticle coatings that withstand furnace temperatures while absorbing pollutants.

Power Electronics: Quantum models predict semiconductor breakdown points at high voltages, guiding the development of robust components for electric vehicles and renewable energy systems.

This predictive capability ensures longer device lifespans, lower failure rates, and better sustainability compared to conventional trial-and-error methods.

## Cost Effectiveness and Industrial Impact

While quantum computing resources are still expensive, their long-term impact on cost reduction is profound. By cutting down material discovery times from years to months, and by minimizing wasted experimentation, industries can achieve:

- Faster time-to-market for new technologies.
- Lower R&D expenditure.
- Optimized use of rare or expensive raw materials.

For industries like steelmaking, aerospace, and electronics, these savings could be transformative, leading to greener and more economical production.

## Conclusion: A Quantum Leap for Innovation

Quantum-aided materials and device design represents more than a technological upgrade—it is a paradigm shift. By combining the predictive power of quantum computing with the creativity of engineers and scientists, industries can accelerate innovation while ensuring sustainability and cost efficiency.

As quantum technology continues to mature, it will unlock new frontiers of design, giving us materials and devices that are not only stronger and smarter but also tailored for a sustainable, net-zero future.

The age of quantum-assisted design has arrived—and it is set to redefine the blueprint of tomorrow's technology.

# ALUMNI INTERVIEW

## JENNIE ANGELA JOSE SHIRLEY

**(BATCH OF 2024)**

**1.Looking back, how would you describe your time at NIT Trichy, and how did it shape your career path?**

Even though I shouldn't be starting off with this, one of the first things that really put things off for, at least not just for me, but for all of our batch was COVID. So, we had to start the first year right during that time and we didn't have orientation events that people normally have in their first year. And that kind of set us back a lot in terms of making friendships and getting to know people.

So, it was kind of difficult to get to know people. But I think soon we all found friends who we were comfortable around and I think that was one of the best things that I've had through the four years because right now I can confidently say I have friendships that will last for a lifetime.

And in terms of studies, we also had a lot of opportunities to showcase ourselves. And in EEE the grueling labs and hardware projects are instrumental in shaping the confidence you tend to have when you graduate out as a student. So, in essence, it shaped me a lot.

**2. Were there any specific professors or mentors at NIT Trichy who had a significant impact on your journey?**

Yeah, I've actually had a lot of professors who have encouraged me. Starting from first year, Nagamini Ma'am used to encourage me a lot. Even though it was online, I've had conversations with her. And she always talked about meeting up in classes and discussing questions and all that. But unfortunately, I couldn't have that because we were still online. And then there was a faculty from Chemistry department, Dr. Jyoti Lakshmi who gave a lot of encouragement as well.

And Karthik Sir, definitely, because I really liked his courses, particularly Networks and Linear systems. He is always approachable and encourages asking questions and doubts a lot and he always helps us clear all of them. And I also started working with JBR Sir from third year on a lot of projects. He was a beacon of support all through that process, helping me go through research work and giving me ideas on how to proceed. So, yes it's a whole bunch of professors but if I have to explicitly mention I would like to thank them.

**3. You had a stellar academic record throughout your 4 years here at NITT. How were you able to manage this workload while also being a part of clubs like Film Society and Pixelbug?**

So, EEE itself is a very technical course, in terms of having a lot of circuital things going on. And I did not really want to go for an equally technical club or anything of that sort even though RMI and Spider are really good clubs but they were not something that I wanted. I wanted to be part of something that was a bit more cultural and something that I could develop my skills in besides what my course taught me.

And photography was something I've had a passion in for a very long time. So right from schooling, I wasn't a very avid photographer. But then growing up, I slowly kind of got a lot more interested in that. So, both these were clubs dealt with that.
And to be honest, I wasn't always present in the club activities. So, if there was something going on in class, I always informed my seniors or whoever was in charge of a particular event. So, I am also thankful that I had people who were quite understanding.

**4. So, your research interests encompass smart grids, wide-area monitoring systems, electric vehicles. You have also published papers in journals like IEEE and IET. What are the skills that you think up and coming academics should have to excel in this field?**

I think perseverance is something that is important because you expect a lot of results when you're trying to start on something. But then things go down. I mean, very quickly. So, sometimes everything looks like it's going to work one moment and the next moment you'll be clueless because what you thought would work would not work anymore and new ideas don't really come as quickly as you'd like them to. So, I think sometimes you just need to learn to take a break and give it some time and start over things with a fresh mind. That is something that I truly believe somebody who is working in an academic field should have because it's easy to get saturated and overwhelmed with a lot of things going on. And it's important to not lose yourself when you're trying to find things that are bigger than that.

**5.So, you have done internships both in the industry and academia, most notable being the prestigious DAAD scholarship. Could you take us through your experiences in both these worlds and how one can decide between these two career paths?**

Yeah, definitely. So, let's say you go to a company, you, in most cases, don't really have a lot of idea about the internals of things. In the first two weeks or so, they get you acquainted with things that are going on in terms of not just technical stuff, but in terms of the dynamics of the company. And then you're assigned tasks, subsequent to which you get feedback from the company.
And then in R&D, you just try to develop something that can be a feasible product for the company. So, in an academic setting, either you can publish papers or come up with research that can be used by industries in some way or the other which is essentially, just trying to help humankind with some new things they could work on.
So, in essence, the kind of experience you have in both of these is different because let's say in universities, you'll mostly be working in labs or trying to come up with tangible results for something and then trying to prove that. But in industries, you mostly go about with the designing stage first, and then you try to test it and then you go to the lab. So, of course, it depends on the nature of the project you take, but then it's a bit different because in an academic setting, there isn't a lot of people who will hold you accountable or responsible if something goes wrong. But in a corporate setting, you'll probably have a more stakeholders involved.

**6. So currently you are pursuing your masters in Electrical Engineering at TU Delfts. What differences do you find between engineering courses in India and abroad?**

So, in terms of how the teaching is carried out, they're pretty much the same, except that people are more present here We always had the 75% attendance policy. But here they don't have that. Essentially, if a person wants to attend classes, he or she is responsible for it. In India because they have that cap on it, the institution also holds itself a bit responsible for a student being present in the class or not. But here, because they don't have it, if something goes wrong with the student, it is the student's fault. It's not the faculty or the institution's fault.

But we also have our own platform called Brightspace where the faculty put in all the slides. But in India, we didn't really have a common place where every material that is taught by the professor is sent to us. So, if you go to the class, you'll get the material and if not, you just missed that. So, that was a difference. Also in my Bachelor's, I felt that some people were not really very present when you were working on something. But here, in general, most people are. So that is something. It's not essentially the institution's difference, but more of the peer group. But in terms of opportunities for research, it is similar both here in Netherlands and in India.

**7. What are your plans for the future after completing your MS?**

This is something I've been getting a lot lately, but then I think I'll leave it for later as well. Because right now I'll be starting my thesis later this year. And I want to kind of see if I would be able to hold on for three years working in the same field. If I think I can I would go for a PhD. And if not, I would go for a job because a PhD is quite a bit of a commitment and working on the same or similar tasks can be monotonous at times.

**8. What message would you like to share with someone who is undecided between going for academia or industry?**

I think it's okay to be undecided at some points in life and also to pursue whatever you think is right at the moment. Because at some point in time, let's say you don't like something, you can always go back in choosing the other thing. And in terms of like corporate world or in terms of academia, you actually have a lot of flexibility. Even I faced this dilemma during Bachelor's. So, sometimes when I used to select projects that I could work on, I feared them putting me into a very niche field. So sometimes that gets overwhelming because then you don't know if you are in the right track or not and sometimes you don't really know who you can ask questions to. So, I think it's just okay to go with whatever you think is right at the moment. And then should you have problems about it later and if you feel you would do better in another thing, just pursue it as it comes.

# INTERNSHIP EXPERIENCES

## TEXAS INSTRUEMENT- RUTUJA MUKUND BIDWAI


**1. Where did you intern?**

-Texas Instruments, Bangalore

**2. How did you find out about the opportunity, and what did you do to secure it?**

-I learned about the WISH program through a senior during a yoga contest. This sparked my interest in focusing more on digital electronics, as I was already inclined toward the digital domain. To prepare myself, I studied Database Management, Data Structures and Algorithms (DSA), and Python programming. I also supplemented my learning through YouTube channels like "All About Electronics" and "Neso Academy." After being accepted into the WISH program, I successfully completed an online test and personal interview, followed by a month-long assessment that included hands-on lab sessions and a design thinking project to secure the internship at Texas Instruments.

**3. What was something about the process/experience that you found challenging or unexpected?**

-Although I was selected for the Digital domain, I was assigned to the Embedded Processors team specializing in Functional Safety. This required me to quickly adapt and learn comprehensive aspects of functional safety standards and protocols for Failure Mode Analysis. Additionally, I had to develop skills in frontend and backend development, create graphical user interfaces, and integrate API calls for chatbot functionality; all of which were new territories for me.

**4. Describe your project and your experience doing it.**

-My project focused on automating Failure Mode Analysis creation for Intellectual Properties (IPs) with the assistance of Large Language Models. The experience was both fascinating and challenging, as it required me to merge my technical knowledge with cutting-edge AI technology. I thoroughly enjoyed the learning curve and the opportunity to work on such an innovative solution that could streamline critical safety analysis processes.

**5. What did you do during your free time?**

-During my leisure time, I explored various activities including rock climbing, attending stand-up comedy shows, poetry sessions, and practicing yoga. These activities helped me maintain a well-rounded lifestyle and provided excellent stress relief.

**6. How was your work-life balance like? What are you most grateful for?**

-I am deeply grateful for my mentors who guided me through numerous learning opportunities, and for my family and friends who provided unwavering support throughout this journey. Since I was initially unfamiliar with functional safety standards and failure mode analysis, and had to learn GUI developmentand API integration from scratch, I invested considerably more time in work compared to my peers. However, this additional effort was instrumental in my professional growth and skill development.

# QUALCOMM-TAARUN ADHITHIYA KB


**1. Where did you intern?**

-I did my internship in Qualcomm India Pvt. Ltd. during the summer of 2025.

**2. How did you find out about the opportunity, and what did you do to secure it?**

-I got this opportunity through the Training and Placement Department of NIT, Trichy. The process basically consisted of resume shortlisting, an OT and an interview. The Online Test had questions related to C programming, Digital Electronics, Static Timing Analysis, Computer Organization & Architecture and Aptitude. The interview was a purely technical interview, where we discussed my projects and previous internship experience and then moved on to questions on C, Verilog, basic digital electronics and Static timing analysis.

**3. What was something about the process/ experience that you found challenging or unexpected?**

-Initially during my internship, I found it difficult to learn and adapt to the new softwares which were used by our validation team. It was completely different from what I have used here in college for my projects. But, constant inputs and guidance from my mentor and resources provided by my manager helped me get used to it very quickly.

**4. Describe your project and your experience doing it.**

-At Qualcomm, I was part of the SOC System Validation and Emulation team, where our primary role is to emulate the SOC design in FPGA and validate the connectivity between various blocks in the design. I was asked to learn about Trace32 which is a debugging tool used for validation and C programming to do the project I was allotted. My project was to develop test codes and validate the connectivity between the Clock Controller and all other blocks in the SOC.

**5. What did you do during your free time?**

-I mostly spent my leisure time by socializing with people from different teams and playing various indoor games. I also tried learning the internal architecture of the chips that they were designing at that point of time. Internal hackathons were also conducted for the intern batches across all the locations.

**6. How was your work-life balance like? What are you most grateful for?**

-The work allotted to me was not very time consuming or hectic. I was given enough time by my manager to firstly learn and understand about the project and the softwares and only then I was allotted my actual project work.

If anyone is interested in the domain of Digital Electronics, they should have a very clear understanding of basic Digital Electronics, Static Timing Analysis and Verilog with focus on VLSI and other domain specific topics like Cache, SRAM, DRAM, etc. Above all these things, try to do a project or an internship in digital electronics or Verilog to make a strong resume in this domain.

# SWISS RE-NANDA KUMAR


**1. Where did you intern?**

-Swiss Re Global Business Solutions India Private Ltd, Hyderabad.

**2. How did you find out about the opportunity, and what did you do to secure it?**

a. It was an on-campus internship opportunity, the whole process being managed by the TnP cell of NIT Trichy.

b. The online assessments during the process were completely dependent on the aptitude and also required a good understanding in the field of Computer Science fundamentals. Data structures and algorithms were also a necessity, although the level of the questions were somewhat in the basic-easy level.

c. A week before the start of the process, a thorough practice of the aptitude from the website Indiabix.com and revision of my CS fundamentals helped me a lot during the assessment.

**3. What was something about the process/ experience that you found challenging or unexpected?**

a. The Interview rounds were held online, which was kinda challenging, because I believe that only during the offline rounds can you make a lasting impression on the interviewer.

b. During my internship, the company was completely focused on securing the devices that the interns were using, as the data is very important and with also increasing cyber attacks, we were continuously trained with how to detect those kinds of attacks and notify the higher-ups immediately.

**4. Describe your project and your experience doing it.**

a. It was a lot of fun working with the team in Swiss Re. in Swiss Re, being a re-insurance organization, it is responsible for assessing the risks and determining how much premium must be given to the clients, with the help of the applications designed within the team. They have their Kubernetes

Service on Azure platform, which securely hosts the API endpoints required for the calculation. The Swiss Re team decided to sell these endpoints to some of their clients. For this, they needed to ensure that the API endpoints and their Open API specification files (the swagger files). Thus, they wanted

an application which could easily test all these requirements and be user-friendly, so that the business-oriented users, who work on the finance side of the organisation can easily use it. This became the scope of my project.

b. While working on this application, it was really exciting, because it strengthened my knowledge on the field of APIs. I used ReactJs, a javascript library along with ExpressJS (for back-end) for creating this application. I received a lot of support while working on this project. My buddy/mentor and

my Line Manager were available throughout the internship for me and constantly supported me in this project.

**5. What did you do during your free time?**

a. During my free-time while in the office, I spent most of my time connecting with other people in the organisation. Cafeteria was the best option, as that's where many employees go to get some cool-headed time, and it is easily the best place to strike up a conversation. Connecting with many employees helped me gain a better understanding of the organisation and also learn about what area they are working in right now. The employees were completely friendly, they were always available for all the interns, which made building connections even easier.

b. During my free-time after the office, I maintained my daily work log, noting what all happened in the office and all my learnings of the day. This really helped during my Interim presentation and the Final presentation, as I could just use the work log to identify the key concepts I have learned and mention it in the organisation.

**6. How was your work-life balance like? What are you most grateful for?**

a. I truly loved the work culture, the employees were so friendly, it felt as if there were no barriers between the higher band people and us interns. We could easily strike up a conversation with them to gain more knowledge.

b. Apart from this, my Line Manager made sure I got all the exposure to corporate-life before I finished my internship. He arranged meetings with the officials in other countries in higher positions which were really helpful for me.

c. I also loved the fact where they stressed that - "All work and no play makes Jack a dull boy". They conducted the Sports Mania, a sports competition for all the employees to participate and win prizes. This was really cool, as this allowed the employees to have a fun time apart from their daily work.

d. Apart from sports, they also conducted various sessions which were focused on spreading knowledge and information within the organisation.

# BNY-YASHVI CHAUHAN

**1. Where did you intern?**

-I completed my summer internship at BNY's Pune office.

**2. How did you find out about the opportunity, and what did you do to secure it?**

-This was an on-campus opportunity. I had taken Data Structures and Algorithms as a program elective, which gave me a decent foundation. To prepare, I practiced problems on LeetCode, which helped build confidence. I also studied OOP concepts and CS fundamentals through online resources. More than anything, it came down to being prepared, staying honest in interviews, and showing a genuine willingness to learn about areas I was less familiar with.

**3. What was something about the process/ experience that you found challenging or unexpected?**

-Working in a corporate environment is very different from college life. You need to ask questions, network, and make the most of the opportunities given to you. The most challenging part was realizing that I was fully responsible for completing my tasks. If I got stuck, it was up to me to reach out to my leads or teammates for help. The good part was that support was always available if you asked for it. Another unexpected aspect was seeing how humble and open to learning even senior members of the team were. Since my project involved AI and ML technologies, I often had experienced colleagues approach me to understand the work I was doing.

**4. Describe your project and your experience doing it.**

My project involved automating log monitoring of Splunk records for an application built on stand-alone Spring Boot modules. Earlier, this monitoring relied on KornShell scripts running on Linux hosts, which was repetitive and inefficient. I was tasked with developing an optimized Retrieval-Augmented Generation (RAG) AI Agent that automated the process, validated exceptions as valid or invalid, and converted natural language prompts into SPL queries. Through this project, I gained exposure to the application of AI in large financial institutions and also learned more about BNY Mellon's role in the global finance sector.

**5. What did you do during your free time?**

My favorite part of the office was undoubtedly the free coffee. Pune was a new city for me, and I enjoyed exploring its food, architecture, and natural scenery. I visited several historically significant sites, and it was exciting to see places where one of my favorite movies had been shot. Apart from exploring the city, I also spent time improving my technical skills, since the tech stack I worked with (Angular and Spring Boot) was new to me.

**6. How was your work-life balance like? What are you most grateful for?**

The work-life balance was excellent. While only three days of return-to-office were required, I chose to go in every day, as did most interns, which made the experience more engaging. I was fortunate to have a very supportive manager and mentor. With access to tools like GitHub Copilot, the focus of my internship was on understanding problems clearly, seeking feedback, and delivering tangible outcomes. The achievement I am most grateful for was getting my merge request approved into production after some failed pipeline attempts, and managing to do it without breaking production!

# VISA-MINAKASHI YADAV

**1. Where did you intern?**

I interned at Visa, as part of their CMS PD Team.

**2. How did you find out about the opportunity, and what did you do to secure it?**

I came to know about the internship through my campus placement process. To secure it, I prepared thoroughly by focusing on data structures and algorithms, problem-solving, and core computer science fundamentals. I also brushed up on my projects and development skills, which gave me confidence during the interviews.

**3. What was something about the process/ experience that you found challenging or unexpected?**

The most challenging yet rewarding part was adapting to a completely new tech stack. My project required Angular, which I hadn't worked with before. At first, it felt overwhelming, but with consistent learning, practice, and support from my team, I was able to overcome that challenge. This experience taught me how quickly I can adapt to new technologies when needed.

**4. Describe your project and your experience doing it.**

My project was in collaboration with the team's ongoing product development. I was responsible for contributing to features that involved frontend development using Angular. Through this, I learned not only the technical side of working with a modern frontend framework but also how to integrate my work with the larger product roadmap. The experience gave me confidence in both technical execution and collaborative teamwork.

**5. What did you do during your free time?**

I visited different cafés, tried out local food, and enjoyed endless cups of tea. I also explored parts of the city, which helped me connect with the culture and lifestyle there.

**6. How was your work-life balance like? What are you most grateful for?**

The work-life balance was really good. I never felt overburdened, and I had time for myself after office hours. What I am most grateful for is the supportive team environment—my mentors and colleagues were always approachable and willing to help whenever I faced obstacles.

# BAJAJ AUTO LTD-NIVEDITA DHAR

**1. Where did you intern?**

Bajaj auto Ltd and Bajaj auto technology Ltd

**2. How did you find out about the opportunity, and what did you do to secure it?**

Through the college internship group . I asked my supersenior and seniors for guidance. Referred to Raja sir's notes and PS Bhimbra to brush up on electrical machine concepts. I solely focused on machines and TND. But I would recommend juniors to prepare power electronics well in advance as well( especially since it's a 5th sem subject). I made proper short notes on all the topics I had covered and referred to them before the interview.

**3. What was something about the process/ experience that you found challenging or unexpected?**

Preparing for topics that are only taught in 5th sem ( power electronics).

**4. Describe your project and your experience doing it.**

My project was to find effective solutions to replace copper windings with aluminium windings in Traction motor vehicles. I approached it in a simple manner- first winding the effect of aluminium on the performance and then trying to reduce the losses through cost effective methods. I finalised on adopting aluminium hairpin windings to match the performance requirements. Since my project required designing and validating, I had an opportunity to work in Ansys MotorCAD. It was as amazing experience and I was able to learn something new and useful. Moreover, I had great support and guidance from my team, making my intern experience an enriching one.

**5. What did you do during your free time?**

Mostly I would *try* to prepare for placements but I would end up doom scrolling. I would go out with my friends during the weekends and would watch movies or webseries. And yeah mostly sleep.

**6. How was your work-life balance like? What are you most grateful for?**

I had a good work life balance, even on the days leading up to my reviews. Everything was mostly chill and I wasn't very stressed. I am most grateful for my mentor and guide. They were patient and understanding and were always ready to help me out.

# ITC LTD -AASTHA AGARWAL

**1. Where did you intern?**

I interned at ITC Limited,in the Foods and Beverages Division, where I got to see how large-scale businesses operate from the inside. The problem statement i was
given with aimed to solve a real life on site issue and I was given full freedom and responsibility to solve it and work for the improvement of the plant backed by data analysis. It was exciting to work in such a dynamic environment that balanced both technical and managerial aspects.

**2. How did you find out about the opportunity, and what did you do to secure it?**

I found out about the opportunity through my institute's placement cell (TnP). To secure it, I prepared thoroughly by focusing on both my technical foundation and management foundation, also focusing on experiences in leadership and problem-solving. What helped the most was staying calm in interviews and being genuine about my interests.

**3. What was something about the process/ experience that you found challenging or unexpected?**

The most challenging part was adjusting quickly to an industrial environment where even small errors could have big consequences. I had to apply classroom knowledge in new ways, which stretched my learning curve. What surprised me most was how approachable everyone was—the guidance I got from colleagues made the tough parts easier to handle.

**4. Describe your project and your experience doing it.**

At ITC, my main projects revolved around optimising the changeover process and improving the sheeting and weight-variation process. In the changeover project, I explored the application of modular lugs, which made the setup more flexible and reduced downtime during product switches. For the sheeting project, I worked on analysing data and experimenting with process parameters to minimise weight variation, while also proposing control logic to make the process more reliable and less dependent on manual intervention. These projects gave me a deeper understanding of how small technical improvements can create large-scale efficiency gains, and it was fulfilling to see ideas move from analysis to practical solutions.

**5. What did you do during your free time?**

To be honest, I didn't get much free time since my project touched so many areas and there was always something new to work on or learn. The pace kept me on my toes, but the whole learning process was really enlightening and made the effort worth it. On Sundays, though, I'd take a break and head out with friends to explore different places—that little bit of fun and adventure really helped me recharge for the

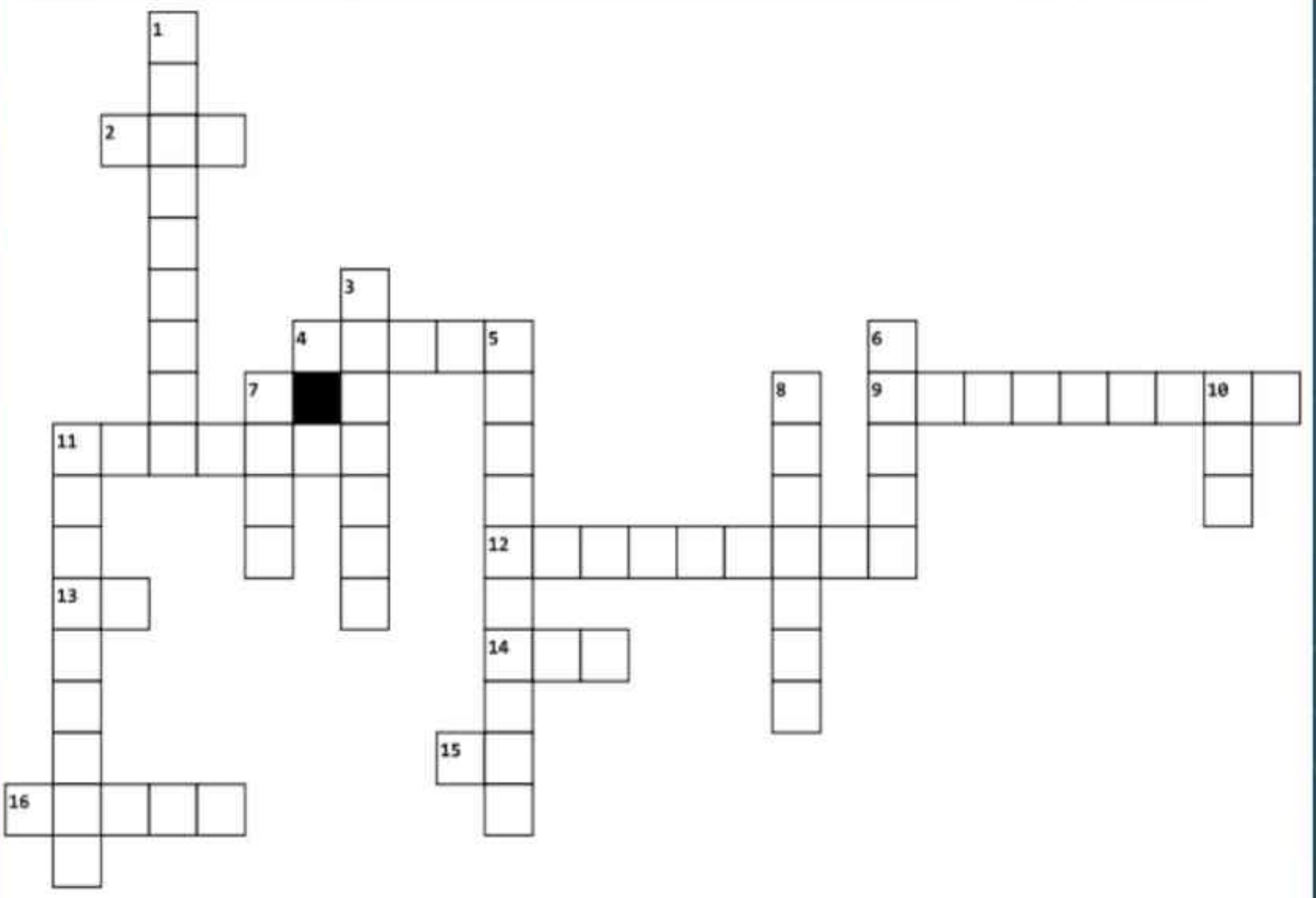
**6. How was your work-life balance like? What are you most grateful for?**

I had busy weekdays and relaxed weekends, everything summing up to an amazing experience for the two months. What I am grateful for is the guidance I received from my mentors and the friendships I built along the way—they made the whole experience not just about work, but about growing and enjoying the journey too.

# DEPARTMENT'S ACHIEVEMENT (AY 2024-2025)

| SL. No. | Details | Total Nos. | | | |
|---|---|---|---|---|---|
| 1 | Journal Articles | SCI | SCIE | Scopus | Q1 |
| | | 20 | 20 | 50 | 18 |
| 1 | Research Citations | Scopus | | 2872 | |
| 1 | Books/Chapters | Books | | Chapters | |
| | | 2 | | 8 | |
| 1 | Sponsored Projects | Numbers | | Amount(in Lakhs) | |
| | | 4 | | 200.64 | |
| 1 | Consultancy | Numbers | | Amount(in Lakhs) | |
| | | 1 | | 5.9 | |
| 1 | Patents | Granted | Published | Filed | |
| | | 4 | 3 | - | |
| 1 | Technical events Attended by Department | Conference | Seminar | Workshop | |
| | | - | - | 4 | |
| 1 | Technical events Attended by Faculty and Students | Conference | Seminar | Workshop | |
| | | 55 | 3 | 13 | |
| 1 | Guest Lectures | Delivered | | Organized | |
| | | 40 | | 4 | |
| 1 | Fellowship / Internships in Abroad | Faculty | | Students | |
| | | - | | 7 | |
| 1 | Procurement of Equipment | Number | | Amount(in Lakhs) | |
| | | 113 | | 63.88 | |
| 1 | Ph.D.graduation | Full time | | Part | |
| | | 5 | | 3 | |

# Crossword




**Across**

**2.** The "brain" of a computer, abbr.

**4.** A machine that runs on electromagnetic induction

**9.** A material that does not conduct electricity easily

**11.** A path for an electric current

**12.** A sudden, unwanted surge of current (2 words, no space)

**13.** Abbreviation for alternating current

**14.** Unit of electrical current

**15.** A type of motor that runs on direct current

**16.** The rate of doing work

**Down**

**1.** A device that increases the power of a signal

**3.** The "V" in Ohm's Law

**5.** The opposition to current flow, measured in ohms

**6.** A semiconductor device that allows current to flow in one direction

**7.** A safety device that breaks a circuit if current is too high

**8.** He formulated the law of electromagnetic induction

**10.** Unit of electrical resistance

**11.** An electrical component that can store charge

Dr. Sishaj P. Simon
HOD

Dr. S. Moorthi
Faculty Advisor

# EEE'A CORE

Aditya Janga
Overall Coordinator

Harini S
Chairperson

Jayashree C
Treasurer

Vishnupriya
General Executive
Member

Vikas Sagi
General Secretary

Sandeep Srinivasan
General Secretary

Rithik Anand
General Executive
Member

Pramod Teja
Joint Executive
Member

Premesh R
Joint Executive
Member

Vidula A R
Joint Secretary

Priyadarsan S T
Joint Secretary

Sumiran Rathore
Joint Executive
Member

Madhumitha
Joint Executive
Member

Himanshu Makhwana
Post Graduate
Secretary

Mustafa husain
Post Graduate
Secretary

Venkatesh M
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Quality Assurance Head

Visalakshi M
Social Responsibility Head

Nivedita Dhar
Social Responsibility Head

Abhinay Sai
Workshops Head

Srinithi N
Workshops Head

Chavan Yash
Workshops Head