THE ELECOMM

A Quarterly Newsletter

Department of Electronics & Communication Engineering,
Echelon Institute of Technology, Faridabad

It gives me immense pleasure to connect with you through this newsletter. As we continue to excel academically, I urge all of you to actively participate in co-curricular activities. These engagements not only complement your classroom learning but also foster creativity, teamwork, and leadership skills.

Ms Sonal Kaushik
Editor

Highlights

- ❖ **Article on QUBITS**
- ❖ **Orientation programme**
- ❖ **Industrial Visit on IoT**
- ❖ **Activities in the department**
- ❖ **Faculty Achievements**

QUBITS & THE QUANTAM LEAP IN ELECTRONICS

As we continue to push the boundaries of electronic design and computation, it has become increasingly evident that classical systems are nearing their physical limits. In response, the field is witnessing the emergence of quantum electronics, with qubits at its core—heralding a transformative era in how we process and transmit information.

Understanding Qubits : At the most fundamental level, a qubit or quantum bit differs from a classical bit in that it can exist in a superposition of states—both 0 and 1 simultaneously. This property, along with entanglement (where qubits become interdependent regardless of physical distance), empowers quantum systems to perform computations at an unprecedented scale.

In essence, while a classical computer solves problems step-by-step, a quantum computer explores multiple solutions in parallel, making it vastly more efficient for certain complex tasks.

Technological Approaches: Several physical implementations of qubits are currently under development:

- Superconducting Qubits: Utilized by IBM and Google, based on circuits that exhibit quantum behavior at cryogenic temperatures.
- Trapped Ion Qubits: Use of electromagnetic fields and laser manipulation to control ions, noted for high accuracy.
- Photonic Qubits: Leverage the quantum states of light particles, offering potential in secure communication.
- Spin Qubits: Operate using the spin of electrons in semiconductors, offering a path toward integration with existing silicon technology.

Each platform has its merits and challenges, with scalability and error correction being active areas of research.

Challenges and Frontiers: Despite remarkable progress, working with qubits presents significant hurdles. Decoherence, or the loss of quantum information due to environmental interactions, limits the practical use of current quantum systems. Active research is focused on quantum error correction, better qubit fidelity, and increasing coherence times. These challenges, however, are being steadily overcome with advances in material science, cryogenics, and quantum algorithms.

Applications Beyond Imagination

The potential applications of quantum computing are vast and transformative:

- Cryptography: Quantum key distribution ensures communication security beyond current standards.
- Material Science: Simulating quantum interactions enables precise modeling of molecules and materials.
- Optimization Problems: Logistics, financial modeling, and AI training could benefit from faster, more complex problem-solving capabilities.

Conclusion

As educators and researchers in electronics and communication engineering, it is both exciting and imperative that we begin integrating quantum principles into our academic discourse. While full-scale quantum computers are still under development, foundational

knowledge of qubits and their behavior is increasingly relevant—especially for the next generation of engineers.

I encourage students and fellow faculty to engage with this emerging field, attend seminars, and explore interdisciplinary collaborations. The future of electronics is not only faster—it is quantum.

- Yogesh Pilwan
(ECE)

Orientation Program for 4th & 6th Semester Students

The Department of Electronics and Communication Engineering successfully organized an **Orientation Program** for **the 4th and 6th semester students on 27th January 202**5. The program was designed to help students transition smoothly into the new semester and align themselves with academic and professional goals.

During the session, students were introduced to the semester's curriculum, departmental resources, and upcoming academic activities. Faculty members shared insights on subject expectations, project guidelines, and the importance of continuous learning through internships, certifications, and technical events.

The orientation also encouraged students to actively participate in departmental clubs and initiatives, emphasizing the role of co-curricular involvement in personal and professional development.

Exploring IoT Innovations: An Industrial Visit by ECE Department

The Department of Electronics and Communication Engineering organized an enriching **Industrial Visit** to **Uniconverge Technologies Pvt. Ltd, Noida** on 7th Feb 2025 for the **4th and 6th semester students** as part of its continuous efforts to bridge the gap between academic learning and industry practices.

During the visit, students explored:

- Real-time IoT systems and architectures used in industry.
- Sensor integration, data acquisition, and wireless communication technologies.
- Live demonstrations of smart devices, cloud-based control systems, and

automated solutions across various domains.

Industry experts conducted engaging sessions on how IoT is transforming sectors such as healthcare, smart cities, agriculture, and industrial automation. The students were especially fascinated by the hands-on walkthroughs of IoT-enabled devices and their data flow across networks.

The department appreciates the enthusiastic participation of students and thanks the faculty coordinators and host organization for making the visit a grand success.

Activities in the department

WORKSHOP ON ARDUINO–
Organized by Electronika & Robotic Club
Date: 19th February 2025

The Department of Electronics and Communication Engineering, under the banner of the **Electronika & Robotic Club**, successfully organized a **Workshop on Arduino** on **19th February 2025**. The event aimed to introduce students to the fundamentals of microcontroller programming and embedded systems using the versatile **Arduino platform**.

The session covered an overview of Arduino hardware, basic interfacing techniques, sensor integration, and simple automation projects. Participants engaged in interactive learning sessions and practical exercises, including building basic circuits, coding in Arduino IDE, and implementing real-time applications like LED blinking, temperature sensing, and motion detection.

This initiative not only enhanced the students' technical skillset but also encouraged innovation and creativity in embedded systems design. The Electronika & Robotic Club extends its gratitude to all the faculty

coordinators and volunteers who contributed to the smooth execution of the event.

Technical Quiz Competition – Under Club Activity

Date: 5th March 2025

As part of the club activities, the Electronika & Robotic Club of the Department of Electronics and Communication Engineering successfully organized a Technical Quiz Competition on 5th March 2025.

The quiz was designed to test students' technical knowledge and analytical skills, with questions focused on core topics such as electronics, communication systems, digital logic, microcontrollers, and emerging technologies. Participants were given 20 minutes to attempt a set of thought-provoking questions.

The event witnessed enthusiastic participation from students across all years. **Top performers were awarded exciting prizes**, recognizing their technical excellence and presence of mind.

Faculty Achievements:

Following faculty members of the department participated in several faculty development programs and workshops:

Dr. Jaspal

- Participated in the 5-day online FDP on "Applied AI: Practical implementations" conducted by Techsaksham program from 6th Jan 2025 to 10th Jan 2025.
- Participated in one week online FDP on "Artificial Intelligence & Machine Learning" organized by IIT Guwahati held from 17th Feb 2025 to 21st Feb 2025.

Ms. Sonal Kaushik

- Participated in the 5-day online FDP on "Applied AI: Practical implementations" conducted by Techsaksham program from 6th Jan 2025 to 10th Jan 2025.
- Participated in one week online FDP on "Artificial Intelligence & Machine Learning" organized by IIT Guwahati held from 17th Feb 2025 to 21st Feb 2025.

Mr. Rupender Chahar

- Participated in the 5-day online FDP on "Applied AI: Practical implementations" conducted by Techsaksham program from 6th Jan 2025 to 10th Jan 2025.
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Editorial Board:
Faculty coordinators:
Ms Sonal Kaushik
 (Editor -The Elecomm)
For any queries and suggestions contact:
hodece@eitfaridabad.co.in
Sonalkaushik@eitfaridabad.o.in