



THE ELECOMM

A Quarterly Newsletter

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

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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.

Dr. Jaspal

Editor

Highlights

- ❖ **Article on Li-Fi**
- ❖ **Departmental Orientation Program**
- ❖ **Activities in the department**
- ❖ **Faculty Achievements**

Li-Fi: The Next Generation of Wireless Communication

Li-Fi (Light Fidelity) is a wireless communication technology that uses light to transmit data. It's similar to Wi-Fi, but instead of using radio waves, Li-Fi relies on visible light from LED bulbs to send information.

How Li-Fi Works:

LED Bulbs as Transmitters: LED bulbs are turned on and off at very high speeds—millions of times per second. This blinking is so fast that it's invisible to the human eye.

Data Encoding: The light signals carry information by changing their intensity in a specific pattern, similar to Morse code.

Receiver: A special sensor or photo detector captures the light signals and converts them back into data, such as text, images, or videos.

Key Features of Li-Fi:

- High Speed: Li-Fi can transfer data up to 100 times faster than traditional Wi-Fi, reaching speeds of over 100 Gbps in lab conditions.
- No Radio Waves: It's ideal for environments where radio waves can interfere with other devices, such as hospitals or airplanes.
- Secure: Since light can't pass through walls, Li-Fi signals are confined to a room, reducing the risk of hacking.

Benefits of Li-Fi:

- Speed: Faster downloads and smoother streaming.
- Energy Efficiency: LED bulbs are energy-efficient, and they serve a dual purpose—lighting and data transfer.
- Reduced Congestion: Unlike Wi-Fi, Li-Fi uses the light spectrum, which is much larger and less crowded than the radio spectrum.

Limitations of Li-Fi:

- Line of Sight: Li-Fi requires a direct line of sight between the LED and the receiver. If something blocks the light, the signal is interrupted.

- Limited Range: Light can't penetrate walls, so it works only within a single room.
- Special Equipment: Li-Fi requires compatible devices, such as LED bulbs and photo detectors, which are not yet widely available.

Applications of Li-Fi:

- Smart Homes: Light fixtures can double as high-speed internet sources.
- Hospitals: Safe communication in areas where radio waves may interfere with medical devices.
- Airplanes: In-flight entertainment systems using Li-Fi for high-speed streaming.
- Factories: Communication in environments with electromagnetic interference.
- Underwater Communication: Since light travels well in water, Li-Fi can be used for underwater data transfer.

Li-Fi is an exciting technology with the potential to revolutionize wireless communication. It complements Wi-Fi by offering faster, safer, and more efficient data transfer in specific environments. While it's not yet widely

adopted, its unique advantages make it a promising solution for the future.

- Sonal Kaushik
Assistant Professor (ECE)

Departmental Orientation Program

On August 1st, our institute's academic session commenced, marking the beginning of classes for the 3rd, 5th, and 7th semesters. To welcome the students and set a positive tone for the year, the department organized a comprehensive orientation program. During the event, students were introduced to newly joined faculty members and lab staff, to enhance the sense of connection and support. The orientation included detailed information about the locations of classes and labs, ensuring students were well-prepared for the academic challenges ahead. After the formal introductions, students enjoyed a small refreshment, which provided an opportunity for informal interaction among peers and faculty. The event concluded with the distribution of the semester's timetable and warm wishes for a successful and productive academic year. The orientation program effectively set the stage for a year of growth, learning, and collaboration within the department.



Activities in the department

Expert Lecture on “*Emerging trends in embedded system & Design*” by Dr. Pradeep Dimri

The Department of Electronics and Communication Engineering (ECE) organized an insightful expert lecture on the topic “Emerging Trends in Embedded Systems & Design” on 6th September 2024. The session was graced by the esteemed presence of Prof. Pradeep Dimri, Head of the ECE Department at

J.C. Bose University of Science and Technology (JCBUST), Faridabad as the speaker.



and ML in embedded system design and highlighted real-world applications across industries such as healthcare, automotive, and consumer electronics

The session concluded with an engaging Q&A round, where Prof. Dimri addressed queries with clarity and depth, leaving the audience inspired and informed.



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 STEM conducted by NITTR Chandigarh from 9th Sep 2024 to 13th Sep 2024.

Dr. Kavita Singh

- Published a research paper in IEEE Access on Enhancement of Frequency Regulation by TFOID Controller in Hybrid Renewable Energy with Battery Storage System Based Multi Area Micro-grids in August 2024.
- Participated in the 5-day online FDP on STEM by NITTR from 9th Sep 2024 to 13th Sep 2024.

Ms. Sonal Kaushik

- Participated in the 5-day online FDP on STEM conducted by NITTR Chandigarh from 9th Sep 2024 to 13th Sep 2024.

Mr. Rupender Chahar

- Participated in the 5-day online FDP on STEM conducted by NITTR Chandigarh from 9th Sep 2024 to 13th Sep 2024.

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