Excel ENGINEERING COLLEGE (AUTONOMOUS)

INSTITUTION'S INNOVATION COUNCIL

Department of Electronics and Communication Engineering

MAGAZINE

TECHMAG 2025

TECHMAG 2025

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VISION OF THE DEPARTMENT

To impart quality technical education in the field of Electronics and Communication Engineering in the young minds for serving the Society and Industry in a globally challenging environment

MISSION OF THE DEPARTMENT

To achieve the vision, the department will

•Impart quality education through state-of-the-art curriculum to meet global needs in Electronics and Communication Engineering field.

•Establish a conducive learning environment for continuous improvement to face the challenges in overall professional development.

•Instill competencies for working in interdisciplinary work culture

•Create desire for undertaking lifelong learning and entrepreneurship initiatives

Programme Educational Objectives (PEOs)

Programme Educational Objectives (PEOs) are established through a consultation process. PEOs are broad statements that describe the career and professional accomplishments that the graduates should achieve three to five years after graduation. The Electronics and Communication Engineering programme graduates will

PEO 1: Pursue their professional careers in Electronics and Communication Engineering and related fields by engaging in a global competitive landscape.

PEO 2: Seek advanced education and actively enhance their professional skills.

PEO 3: Effectively convey ideas and exhibit professionalism when collaborating within diverse teams.

PEO 4: Exhibit good inter-personal skills and demonstrate concern for society and environment

Programme Specific Outcomes (PSOs)

On completion of the B.E (ECE) degree the Electronics and Communication graduates will be able to

PSO 1: Analyze and Design Electronic Systems for Signal Processing and Communication Applications.

PSO 2: Identify and Apply Engineering Tools for Design, Analysis, Synthesis and Validation of VLSI and Communication Systems.

PSO 3: Demonstrate the Conceptual Knowledge with Respect to Architecture, Design, Analysis and Deployment in Embedded Systems and Computer Networking.

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Board of Studies

The Sixth Board of Studies meeting (EEC/ECE/BoS/06) of the Department of Electronics and Communication Engineering, Excel Engineering College (Autonomous), was held on 14.06.2024 at 10:00 AM in Kandasamy A/C Hall under the chairmanship of Dr. S. Anbu Karuppusamy, HoD. The members present included Dr. M. Dhinakaran (University Nominee), Dr. J. Aravinth, Dr. C. Karthikeyini, Dr. G. Jagajothi (Academic Experts), Mr. Arun Kumar Perumal (Industry Expert), and Mr. Prem Kumar R (Alumnus). The Board discussed and approved the revised Curriculum (v2) of the B.E. Electronics and Communication Engineering Programme for students admitted from the academic year 2023–24 onwards under Regulation 2023, the syllabi of III and IV Semesters and one-credit courses of the B.E. ECE Programme for students admitted from 2023–24 under Regulation 2023, and the syllabi of subjects offered to other departments. No other matters were raised, and the meeting concluded with the approval of the Chairman.

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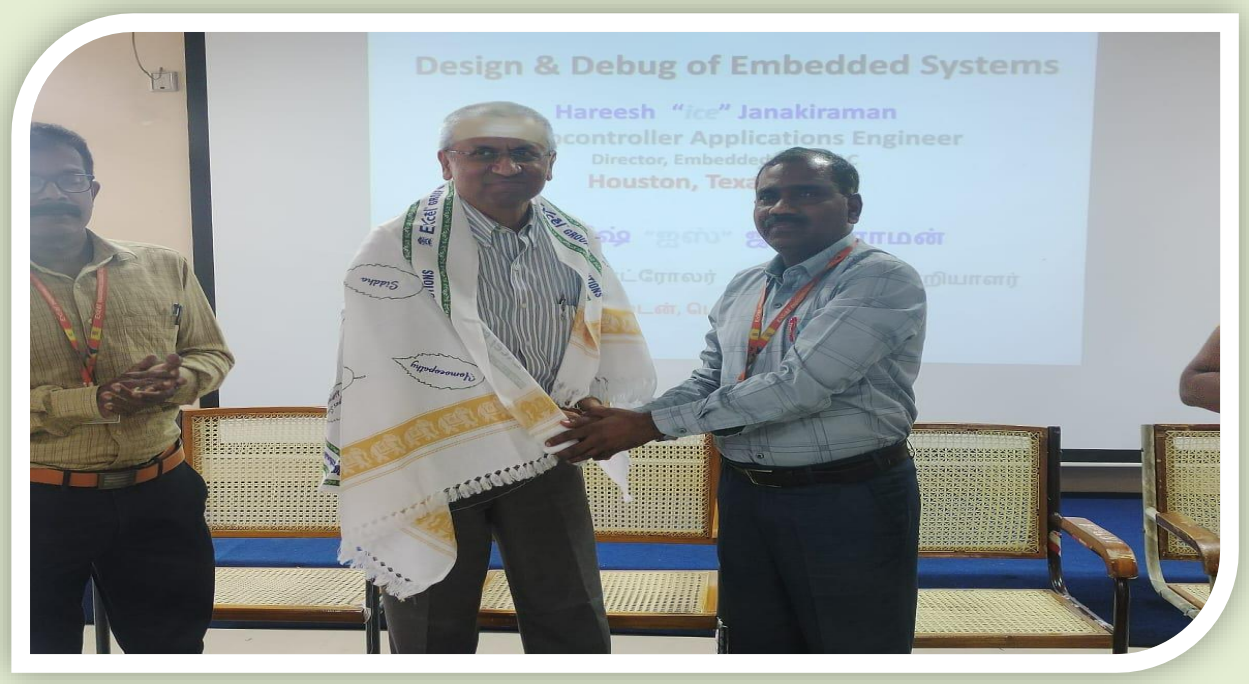
Academic Activities

The **Department of Electronics and Communication Engineering** organized a **Value-Added Course** on *"Trace PCB Tracks"* to provide practical exposure to PCB design and implementation. The sessions were conducted by **Mrs. A. Anitha Rani** and **Mr. S. Satheeshkumar**, **Assistant Professors/ECE**, on **20th July, 3rd August, 17th August, and 31st August 2024**. Students gained hands-on experience in PCB track tracing, design techniques, and industrial applications.

The **Department of ECE** organized an **Academic Guest Lecture** on *"Research Challenges and Opportunities in 5G D2D Communication Network"* on **24th July 2024**. The session was delivered by **Dr. M. Joseph Auxilius Jude**, **Associate Professor**, **Kongu Engineering College**. It provided insights into emerging trends, challenges, and research opportunities in 5G Device-to-Device communication



The **Department of ECE** organized an **Industry Guest Lecture** on *"Design and Debug of Embedded Systems"* on **22nd August 2024**. The session was handled by **Mr. Janai Raman**, **Director**, **Embedded Guru LLC**, Houston, Texas, USA. It provided insights into design methodologies, debugging techniques, and industry practices in embedded systems development.

The **Department of ECE** organized an **Academic Guest Lecture** on *"LabVIEW for Communication Engineers"* on **20th September 2024** at **Kandasamy Seminar Hall**. The session was delivered by **Dr. S. Navaneethan**, **Associate Professor**, **PSG College of Technology**, with around **120 students** participating. It provided practical insights into LabVIEW applications, bridging theoretical knowledge with real-time implementation

An **Alumni Guest Lecture** on "**Role of AI in Future**" was organized on **23.09.2024**. The session was delivered by **Mr. S. A. Yuvaraj**, **Software Developer**, who shared insights on the transformative impact of Artificial Intelligence across various industries. The lecture inspired students to explore AI-driven technologies and their potential in shaping the future.

An **Academic Guest Lecture** on "**LabVIEW for Communication Engineers**" was conducted on **20.09.2024**. The session was delivered by **Dr. S. Navaneethan**, Associate Professor, **PSG College of Technology**. It provided students with hands-on insights into using LabVIEW for designing, simulating, and analyzing communication systems, enhancing their practical knowledge and technical skills.

Industry Guest Lecture on "**The Power of IoT and AI in Industry Automation**" was conducted on **04.10.2024**. The session was delivered by **Mrs. Sathya Raja**, Product Development Specialist, **Ibot.in**, highlighting the role of IoT and AI in revolutionizing industrial processes. It provided students with valuable insights into emerging technologies and their real-world applications

An **Alumni Guest Lecture** on "**Career Orientation and Planning in the ECE Domain**" was organized on **08.10.2024**. The session was delivered by **Mr. S. Panner Selvam**, Managing Director, **ABE Technologies**, who provided valuable guidance on career opportunities and strategic planning for students in the ECE field.

A **Conference** on "**Synergy of Semiconductor Innovations and Artificial Intelligence: Shaping the Future Technologies**" was held on **18.10.2024**. The session was led by **Dr. P. Mani**, Former Deputy Controller of Examinations, **Anna University, BIT Campus, Trichy**, who shared insights on the integration of semiconductor advancements with AI to drive future technological innovations.

A **Skill Development Program** was organized on **16.11.2024** to enhance students' technical and professional competencies. The program was coordinated by **Mrs. R. Pushpavathi** and **Ms. M. Jothiga**, Assistant Professors, **ECE Department**, focusing on improving practical skills and industry readiness.

A **Value Added Course** on "**AI-Based Embedded Systems**" was conducted on **31.01.2025**, **01.02.2025**, **15.02.2025**, and **01.03.2025**. The sessions were handled by **Dr. K. Mohanaprakash** and **Mr. K. V. Mohanaprasath**, Assistant Professors, **ECE Department**, focusing on integrating artificial intelligence with embedded systems to develop smart and innovative solutions

An **Academic Guest Lecture** on "**Building Smarter Systems: IoT Technologies, Data Insights, and Future Trends**" was organized on **15.02.2025**. The session was delivered by **Dr. C. Ganesh**, Associate Professor, **Sri Eshwar College of Engineering, Coimbatore**, providing students with valuable insights into IoT advancements, data-driven innovations, and emerging future trends in smart systems.

An **Academic Guest Lecture** on "**Challenges in Designing Low-Power VLSI Circuits**" was conducted on **12.03.2025**. The session was delivered by **Dr. V. Saravanan**, Professor and Head, Department of ECE, **Knowledge Institute of Technology, Salem**, focusing on techniques, design strategies, and emerging trends in low-power VLSI circuit design.

An **Industry Guest Lecture** on "**Tech as a Catalyst for Seamless Operations and Enhanced Efficiency**" was organized on **28.03.2025**. The session was delivered by **Er. R. Thirugnanam**, Deviser, **TEKSHEI – Future Ready Manufacturing Solutions at Scale**, Trichy and Bhilai. The lecture highlighted the role of advanced technologies in optimizing operations and improving industrial efficiency

An **Industry Guest Lecture** on "**Security and Privacy Challenges in 5G and Beyond**" was conducted on **01.03.2025**. The session was delivered by **Mr. Santhakumar Sivasamy**, Senior Cybersecurity Engineer, **Bannerman Inc., California, USA**. It provided valuable insights into the emerging security threats and privacy concerns in next-generation wireless communication networks

An **Alumni Guest Lecture** on "**Digital Twins**" was organized on **29.03.2025**. The session was delivered by **Mr. M. A. Elanchezhian**, a researcher collaborating with **Periyar University** and **Agriculture University**. He shared insights on the applications of digital twin technology and its impact on various industries, including agriculture and smart systems.

An **Alumni Guest Lecture** on "**Data Intelligence in AI and Cloud Technologies**" was conducted on **29.03.2025**. The session was delivered by **Mr. K. Krishnakanth**, CEO & HR, **Thikse Software Solutions Pvt. Ltd.** He provided valuable insights into leveraging data intelligence through AI and cloud computing to drive innovation and efficiency in modern industries.

DRDO Sponsored National Level Seminar on **"The Future is Small: MEMS Sensors Leading the Way"** was organized on **29.04.2025 and 30.04.2025**.

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Non-Academic Activities

Non-Academic Event on "**World Chess Day**" was celebrated on **20.07.2024**. The event was coordinated by **Mr. N. Siva** and **Mrs. N. Nithya**, Assistant Professors, **ECE Department**. It aimed to promote strategic thinking, problem-solving skills, and mental agility among students through engaging chess activities and competitions.

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Non-Academic Event on "**Global e-Waste Monitor 2024**" was conducted on **19.08.2024**. The session was coordinated by **Mr. N. Rajagopalakrishnan** and **Mr. D. S. Mydheeswaran**, Assistant Professors, **ECE Department**. The event focused on raising awareness about e-waste management, recycling practices, and sustainable environmental soluti

A **Non-Academic Event** on "**ISRO Day**" was celebrated on **23.08.2024**. The event was coordinated by **Mrs. A. Anitha Rani** and **Ms. M. Jothiga**, Assistant Professors, **ECE Department**. It aimed to inspire students by highlighting the achievements of **ISRO** and encouraging interest in space research and technology

A **Non-Academic Event** on "**Women's Equality Day**" was organized on **27.08.2024**. The event was coordinated by **Mrs. T. Nathiya** and **Ms. M. Jothiga**, Assistant Professors, **ECE Department**. It aimed to promote awareness about gender equality and empower women through interactive sessions and activities.

A **Non-Academic Event** on "**World Ozone Day**" was conducted on **27.09.2024**. The event was coordinated by **Mr. B. Karthik Prabu** and **Mr. S. Satheeshkumar**, Assistant Professors, **ECE Department**. It focused on raising awareness about the importance of protecting the ozone layer and promoting sustainable environmental practices.

A **Non-Academic Event** on "**Gender Sensitization in Modern Society: Bridging the Gap**" was organized on **27.01.2025**. The session was coordinated by **Mrs. T. Nathiya** and **Mrs. N. Nithya**, Assistant Professors, **ECE Department**, aiming to promote awareness on gender equality and foster an inclusive environment.

A **Non-Academic Event** on "**Changing the World: Campus Environmental Efforts Beyond the Walls**" was conducted on **28.02.2025**. The event was coordinated by **Mr. P. Loganathan** and **Mr. S. Satheeshkumar**, Assistant Professors, **ECE Department**, focusing on creating awareness about sustainability and extending eco-friendly initiatives beyond the campus.

National Exercise Day was organized on **18.04.2025** to promote fitness and well being.The event was coordinated by **Mr. N. Rajagopalakrishnan, AP/ECE**, and **Mr. N. Kathirvel, AP/English**. Students actively participated and engaged in various exercise activities.

World Telecommunication Day was celebrated on **17.05.2025** to emphasize the significance of communication technology in today's world. The event was coordinated by **Mr. V. Sakthivel, AP/ECE**, and **Mr. N. Siva, AP/ECE**, with active student participation, fostering awareness about the vital role of telecommunications in modern society.

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Professional Society Activities

The **Department of ECE** organized a **Technical Quiz** under the **IETE Student Chapter** on **21.08.2024** at **Kandasamy Hall**. A total of **10 finalists** competed in the final round, and the **top three performers** were declared winners. The event was coordinated by **Mr. S. Satheesh Kumar** and **Ms. A. Anitha Rani**, AP/ECE.

The IETE (Institution of Electronics and Telecommunication Engineers) Student Chapter hosted a thrilling **Sudoku contest on October 09, 2024**, at [MB 207 Devices Laboratory]. The event saw active participation from over 50 IETE student members, who came together to test their logical reasoning and problem-solving skills

The **IETE – ISF Student Chapter** organized a **"Design Contest on Electronic Circuit Craft Design to Innovate"** on **30.01.2025**. Eight batches participated, designing innovative applications using the **IC 555 Timer**. The event was coordinated by **Mr. S. Satheesh Kumar** and **Ms. A. Anitha Rani**, AP/ECE.

The Department of ECE, under the **IETE – ISF Student Chapter**, organized "**INNOVATHON Contest 2K25**" on **23rd April 2025**, focusing on IoT, automation, smart systems, and sustainable technologies. The event encouraged innovation and problem-solving while providing a platform for students to showcase their creativity and receive valuable feedback from experts.

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Faculty Achievements

Dr. R. Dinesh published a research paper titled **"Aerial Image Segmentation Using Autoencoders and Non-Dominated Sorted Genetic Algorithm-II Enhanced by Non-Linear Analysis"** in the **Journal of Computational Analysis and Applications**, indexed in **SCOPUS**.

Dr. R. Dinesh published a research paper titled "GINSER: Geographic Information System Based Optimal Route Recommendation via Optimized Faster R-CNN" in the **International Journal of Computational Intelligence Systems (SCI)**.

Dr. K. Tamilarasi published a paper titled **"Context Aware Question Answer Analysis for Student Education Using Sentiment"** in **Educational Administration: Theory and Practice**, **SCOPUS indexed**, Vol. 30(8), pp. 30–40, September 2024.

Published a research paper titled **"Seg Caps–Efficient Net Deep Learning Method for Accurate Plant Species Segmentation and Classification"** in the **African Journal of Biological Sciences**, indexed in **SCOPUS**.

Dr. K. Tamilarasi published a research paper titled **"An Enhanced LPRAFF with Tri-State Inverter Embedded Non-Clock Gating via the CT-GWO Algorithm"** in the **IETE Journal of Research**, indexed in **SCI**, October 2024.

Dr. K. Tamilarasi published a research paper titled "Optimized SVM Parameters with Google Net Model for Handwritten Signature Verification" in the **Journal of Electrical Systems (SCOPUS)**. This work focuses on enhancing signature verification accuracy using advanced deep learning techniques.

Mrs. T. Nathiya published a research paper titled **"Multiobjective Optimization of EDM Machining Parameters of TiB_2 Ceramic Materials Using Regression and Gray Relational Analysis"** in the **High Temperature Materials and Processes** journal, indexed in **SCI**.

Ms. T. Nathiya authored a book titled **"LoRa IoT Network for Instant Forest Fire Detection and Alert System"**, published by **BP International**, with **ISBN: 978-93-48388-48-3**.

Mrs T.Nathiya published a research paper titled "Optimized SVM Parameters with Google Net Model for Handwritten Signature Verification" in the **Journal of Electrical Systems (SCOPUS)**. This work focuses on enhancing signature verification accuracy using advanced deep learning techniques.

Dr. S. Anbukkaruppusamy published a research paper titled **"Scalable and Resolution Data Analysis of Image and Video Compression Using DL-CNNS Neural Network"** in **Circuits, Systems and Signal Processing**, indexed in **SCI**.

Dr. C. Karthikeyani published a research paper titled **"Eye Disease Prediction Using Deep Learning and Attention on OCT Scans"** in **Springer Nature**, indexed in **SCOPUS**.

Mr. S. Satheesh Kumar published a research paper titled **"Maximizing MIMO Spectral Efficiency Using Linear Discriminant Analysis (LDA) and DRL with Non-Linear Analysis"** in the **Journal of Computational Analysis and Applications**.

Mr. V. Arun Antony published a research paper titled **"Evolutionary Agents with Quantum-Based Nano Electric Circuit Design for Electronic Photonic Integrated Circuits"** in the **ICTACT Journal on Microelectronics**, indexed in **UGC**.

Mrs. A. Anitharani published a research paper titled **"Eye Disease Prediction Using Deep Learning and Attention on OCT Scans"** in **Springer Nature**, indexed in **SCOPUS**

Mrs. R. Pushpavathi authored a book titled **"Digital Electronics"**, published by **RK Publishers**, with **ISBN: 978-8197121807**.

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Student Achievements

B. S. Sekaran, III year, exhibited his talents at the **KSR Engineering College Symposium** on **28th September 2024**, winning the **First Prize**.

B.S. Sekaran, a III-year student, participated in a Symposium held at Government College of Engineering on 22nd October 2024 and won III Prize

Won I Prize in **Paper Presentation** at *ELMEDRONX 2K25*, **Annapoorna Engineering College**.

Won I Prize in **Project Presentation** at *DIGIAVINYA 2K25*, **RVS College of Engineering & Technology**.

Won I Prize in **Project Presentation** at *EMOREZ 2K25*, **RVS College of Engineering & Technology**.

Won I Prize in **Project Presentation** at *E-NNOVATE 2K25*, **AVS Engineering College, Salem**.

Won II Prize in **Project Presentation** at *PRATHYOGITHA 25*, **Kongu Engineering College**

Won First Prize in **Ideation** at PRATHIYOGITHA 25, **Kongu Engineering College**.

Won Second Prize in **Project Presentation** at PRATHIYOGITHA 25, **Kongu Engineering College**.

Won Third Prize in **Open Project Poster Presentation** at TEXPERIA 2025, **SNS College of Technology**.

Won Second Prize in **Project Presentation** at PRATHIYOGITHA 25, **Kongu Engineering**

M. Naveen Kumar, III year, attended a Symposium at **Sengunthar Engineering College** on **21st September 2024** and secured the **First Prize**.

M. Naveen Kumar, also a III-year student, competed in a Symposium at Paavai Engineering College on 8th November 2024 and won I Prize

K. Harini, III year, participated in a Symposium held at **Shri Shakthi Kailash Women's College** on **28th August 2024** and won the **Second Prize**

M. Sanjeevan, III year, showcased his skills in a Symposium conducted by **Kongunadu College of Engineering** on **21st September 2024** and won the **First Prize**

P. Rajakumar, III year, actively participated in the Symposium at **Kongunadu College of Engineering** on **21st September 2024** and bagged the **First Prize**

K. Poongundran, III year, took part in the Symposium at **Kongunadu College of Engineering** on **21st September 2024** and secured the **First Prize**

M. S. Saran, III year, competed in the Symposium hosted by **Kongunadu College of Engineering** on **21st September 2024** and achieved the **First Prize**.

V. Dinesh Karthick, III year, participated in the Symposium organized by **KSR Engineering College** on **28th September 2024** and was awarded the **First Prize**

M. Sivalingam, a III-year student, participated in a Symposium at Kongu Engineering College on 27th October 2024 and achieved I Prize.

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Student Corners

DRAWING

22EC010 -ASHWITHA K

22EC027- ELAMATHI J

22EC061- NIVETHA M

22EC088- SARAN M S

PHOTOGRAPHY

24EC083 PRAVEENRAJ.M

24EC013 BHOOMIKA.M

TAMIL POEM

மழைத் துளி விழும் போது,

மண் மணம் வீசும் ஓர் வேளை,

மரங்களின் நிழல் பரப்பி,

மனதையும் குளிரச் செய்கிறது நிச்சயம்.

சிறு பறவைகள் பாடும் ராகம்,

காற்றின் இசையோடு கலந்த நாதம்,

ஆற்றின் ஓசை நெஞ்சை நிமிர்க்க,

அழகிய இயற்கை உலகை அழைக்கிறது.

சூரியன் உதிக்கும் பொழுது,

புது நம்பிக்கைகள் மலர்கின்றன,

இயற்கையை காப்பது நம் கடமை,

அதுவே நமக்கான உயிர் தாயகம். 🕊

21EC006 AMUTHA S

TECHNICAL ARTICLE

Web 3.0 & Blockchain: The Next Internet Revolution

22EC100- SOLOMANRAJA M, 22EC112- TAMILSELVAN M

The internet is evolving into its next phase with Web 3.0, a decentralized and intelligent network powered by blockchain technology. Unlike Web 2.0, where tech giants control data, Web 3.0 empowers users to own and manage their digital identity securely. Blockchain acts as the backbone, providing transparency, trust, and security through tamper-proof digital records. Its applications span across finance (Decentralized Finance), healthcare (secure patient data), education (verifiable certificates), and supply chain management (tracking goods transparently). With cryptocurrencies and NFTs, Web 3.0 introduces a new digital economy that rewards creators and users directly. While challenges like scalability, cybersecurity threats, and unclear regulations remain, the potential of Web 3.0 to reshape industries and everyday life is immense. This revolutionary shift will transform the internet into a space of freedom, innovation, and digital empowerment, placing control back in the hands of people.

The Role of Edge AI in Next-Generation Embedded Systems

21EC024-DHANUVARSHINI R

Edge AI is revolutionizing embedded systems by enabling devices to process data locally rather than relying on cloud servers, reducing latency and improving real-time decision-making. It combines **machine learning algorithms** with hardware like microcontrollers, AI accelerators, and sensors to create intelligent devices used in **healthcare wearables**, **autonomous vehicles**, **industrial automation**, and **smart cities**. Technologies such as **5G**, low-power wide-area networks (LPWAN), and IoT platforms support seamless connectivity and scalability. With advancements in VLSI design, signal processing, and wireless communication, the demand for **low-power AI chips** and optimized neural network models is growing rapidly. For ECE students, gaining expertise in embedded systems, AI, and networking can open career opportunities in cutting-edge fields like **IoT, robotics, and next-gen computing**, making Edge AI a crucial area for innovation and research.

Li-Fi Technology: High-Speed Communication Using Light

23EC014-ARVIND KUMAR SINGH

Li-Fi (Light Fidelity) is an emerging **wireless communication technology** that uses **visible light** instead of traditional radio waves to transmit data, offering speeds up to **100 times faster than Wi-Fi**. It operates by modulating the intensity of **LED light sources** at extremely high frequencies that are undetectable to the human eye. A **Li-Fi transmitter**, typically an LED bulb, sends data in the form of light signals, which are then captured by a **photodiode receiver** and converted back into electrical signals for processing. This technology provides **ultra-high bandwidth**, **low latency**, and **enhanced security** because light cannot penetrate walls, reducing the risk of data hacking and interference. Li-Fi is particularly useful in environments where **radio frequency (RF) communication** is restricted, such as **hospitals, aircraft cabins, and underwater communication systems**. It also has potential applications in **smart homes, autonomous vehicles, industrial automation, and augmented reality (AR) systems**. With the integration of Li-Fi into IoT devices and **5G networks**, it could play a vital role in building **smart cities** and supporting the ever-growing demand for high-speed, reliable connectivity. For Electronics and Communication Engineering (ECE) students, Li-Fi opens opportunities to work on **optoelectronics, photonic circuits, embedded systems, and advanced communication protocols**, making it one of the most promising fields for research and development in the coming decade.

Green Electronics: Sustainable Technologies for the Future

22EC097-SIVALINGAM M

Green electronics is an emerging field focused on developing environmentally friendly electronic devices and systems by reducing hazardous materials, conserving energy, and promoting recycling. Traditional electronic manufacturing involves toxic substances like lead, mercury, and cadmium, which pose severe environmental and health hazards. Green electronics aims to replace these with biodegradable or recyclable materials and adopt energy-efficient designs. Key innovations include solar-powered devices, low-power processors, and eco-friendly printed circuit boards (PCBs) made from natural fibers or bioplastics. Additionally, e-waste management plays a vital role by reusing components and recovering valuable metals from discarded devices. Governments and industries are working together to enforce strict regulations like **RoHS (Restriction of Hazardous Substances)** and **WEEE (Waste Electrical and Electronic Equipment)** to minimize environmental damage. With the rise of smart grids, IoT, and renewable energy, sustainable electronics is not just a trend but a necessity for building a greener, technologically advanced future. Green electronics paves the way for innovation while protecting the planet for future generations.