MANAKULA VINAYAGAR INSTITUTE OF TECHNOLOGY

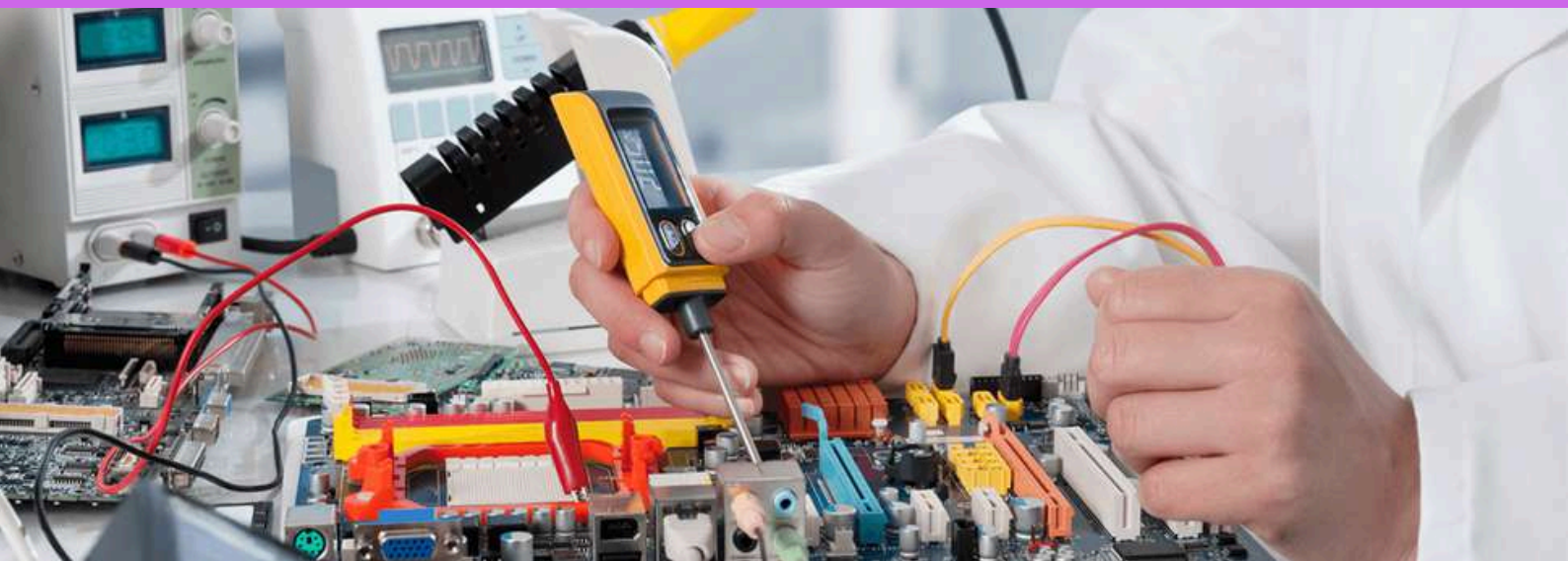
ELECTROMAG

VOLUME-11

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MAGAZINE

2024-2025



ABOUT THE DEPARTMENT

The Department of Electronics and Communication Engineering (ECE) began its journey in 2008 with an initial intake of 60 students, which expanded to 180 by 2014. In 2012, the department introduced its M.Tech program with 18 seats to promote higher education. The department received NBA-AICTE accreditation in 2018, which remains valid until 2026, reflecting its commitment to academic excellence. Our institution also secured a prestigious NAAC A grade in 2022, further emphasizing quality education. Recognized by Pondicherry University as a research center, the department offers opportunities for students to pursue doctoral degrees. The curriculum emphasizes semiconductor devices, electronic circuit design, and communication engineering while ensuring practical applications. Advanced laboratories, including R&D labs, simulation labs, microprocessor and microcontroller labs, and 3D printing facilities, provide students with hands-on learning experiences. Regular curriculum revisions keep pace with technological advancements, ensuring industry relevance. A well-equipped departmental library offers the latest books, journals, and magazines, along with internet connectivity. The department actively organizes seminars, workshops, and guest lectures to enhance students' technical expertise. To foster industry readiness, we maintain collaborations through MoUs with organizations such as Vaayusastra Aerospace IITM, Research Park, Kaivalya Tech Services, and MAVEN SILICON. These partnerships provide students with exposure to industry-oriented knowledge and real-world applications. Faculty members employ innovative teaching methodologies to make complex subjects accessible and engaging. Students are encouraged to participate in research and development activities to enhance their analytical and problem-solving skills. The department also offers specialized training modules aligned with the country’s vision for electronics manufacturing. Practical exposure is further strengthened through projects, internships, and industry interactions. Our computing infrastructure includes cutting-edge software and extensive resources for research and education. A campus-wide wireless internet network ensures seamless connectivity for students and faculty. Students are supported through mentoring, career guidance, and technical skill-building initiatives. The department’s vision is to produce industry-ready engineers capable of contributing to technological advancements. With a focus on academic excellence and holistic development, we continue to nurture innovative minds and future leaders in the field of electronics and communication engineering.

VISION

To emerge as a center of excellence nurturing innovative engineers in Electronics and Communication technologies who can address global challenges through multidisciplinary approaches, sustainable solutions, and ethical leadership.

MISSION

DM1: Deliver cutting-edge education in Electronics and Communication Engineering through Experiential learning, Project-Based Curricula, and Digital Pedagogy to create Industry-ready Professionals.

DM2: Foster research temperament by establishing state-of-the-art laboratories and innovation centers focusing on emerging technologies like IoT, AI/ML, 5G/6G and Quantum Computing.

DM3:Enhance industry collaboration through Internships, live Projects and technology transfer initiatives while promoting Entrepreneurial Mindset among students.

DM4: Develop socially conscious engineers capable of applying Electronic and Communication technologies for sustainable development and societal welfare.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Professional Excellence

Serve as innovative electronics and communication professionals, demonstrating expertise in emerging technologies.

PEO2: Research Leadership

Alumni will excel in research initiatives and entrepreneurial ventures, leading technological innovation in emerging electronics and communication domains

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PEO3: Sustainable Engineering

Develop and implement sustainable electronic and communication solutions addressing global challenges while ensuring environmental responsibility and societal welfare.

PEO4: Ethical Growth

Graduates will demonstrate ethical leadership in engineering teams while pursuing professional growth and contributing to the field through mentorship

STUDENT ARTICLE

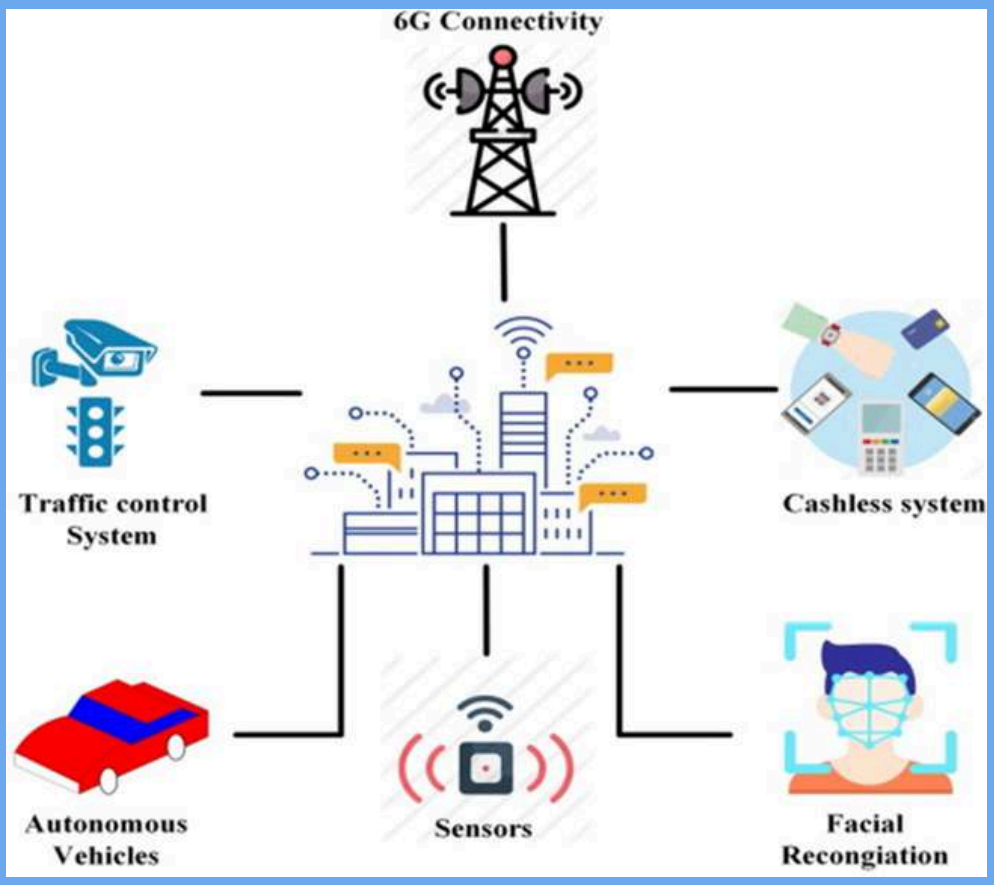
ARTICLE-1

Advancements in 6G Communication: The Future of Wireless Networks

The sixth generation (6G) of wireless communication technology is poised to revolutionize the digital landscape by offering speeds that are expected to be up to 100 times faster than 5G. While 5G is still being deployed globally, research and development efforts into 6G have already begun across leading countries and tech companies. The goal of 6G is to provide ultra-low latency, high data rates (up to 1 Tbps), and massive connectivity, supporting emerging applications such as extended reality (XR), holographic communications, and autonomous systems. This new generation of wireless communication will use the terahertz (THz) frequency band, enabling faster data transmission and more bandwidth than ever before.

One of the most significant advancements in 6G is the integration of Artificial Intelligence (AI) and Machine Learning (ML) into network architecture. These technologies will help optimize data flow, manage network resources efficiently, and ensure real-time decision-making. Intelligent networks will be self-learning, self-healing, and context-aware, enabling them to dynamically adjust to user needs and environmental changes. AI-driven 6G networks can prioritize critical communication, such as in healthcare or disaster management, and enhance the overall user experience by adapting services in real time.

6G will also focus heavily on ultra-reliable and low-latency communications (URLLC), which are crucial for mission-critical applications like remote surgery, industrial automation, and connected vehicles. Furthermore, 6G networks are expected to support advanced sensing capabilities, enabling wireless communication systems to perceive their surroundings through radar-like functions. These features will blur the boundaries between the physical and digital worlds, giving rise to new paradigms such as digital twins and immersive mixed-reality environments.



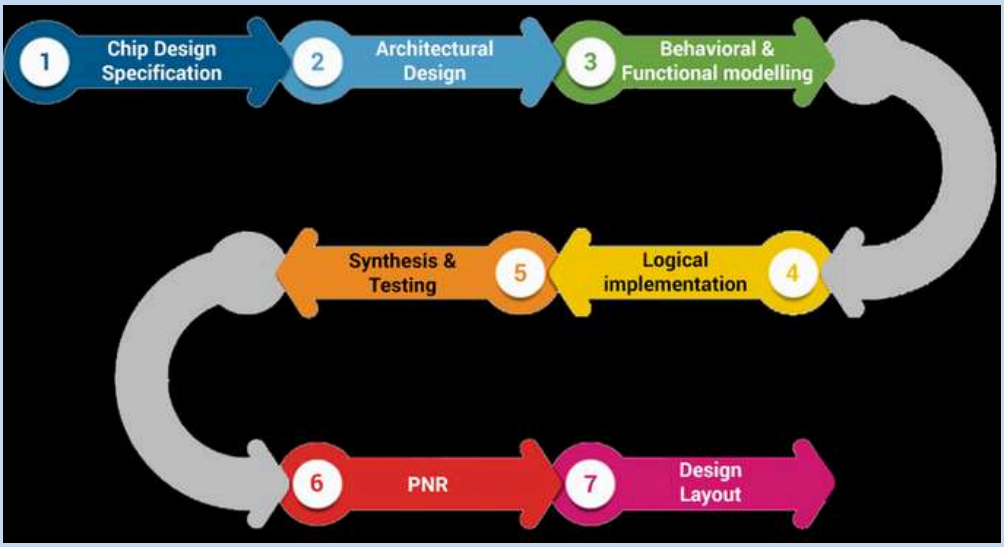
Despite the promising potential of 6G, numerous challenges remain. These include the need for new hardware capable of operating at THz frequencies, the development of energy-efficient systems, and addressing privacy and security concerns. Additionally, the establishment of global standards and regulations will be critical for seamless interoperability and equitable access. As research continues and pilot projects emerge, 6G is expected to become commercially viable by the early 2030s, laying the foundation for an era of ubiquitous, intelligent, and hyper-connected digital infrastructure.

SHALUJA G
III Year ECE A

STUDENT ARTICLE

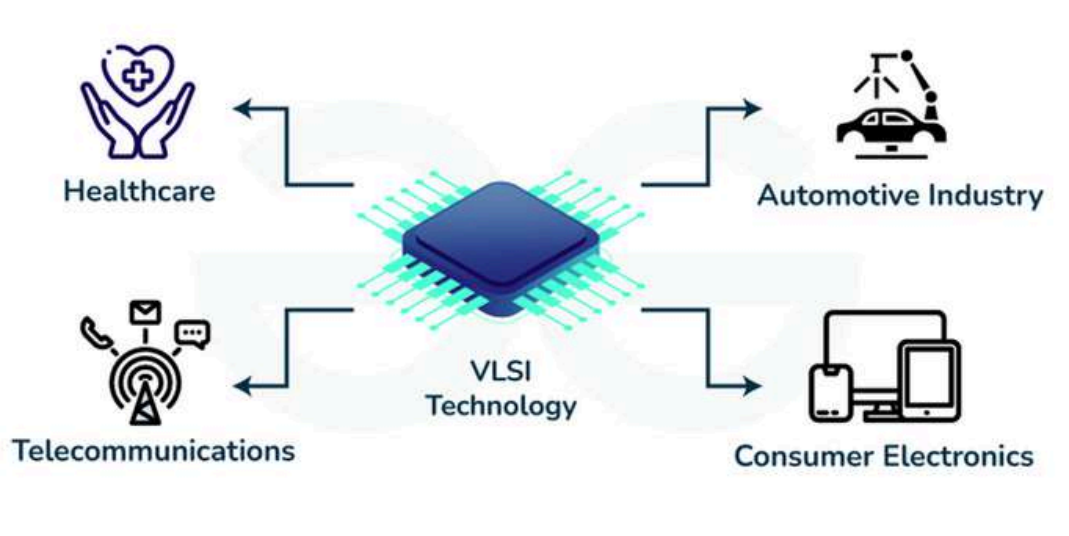
ARTICLE-2

The Role of AI in VLSI Design and Chip Optimization



Artificial Intelligence (AI) is playing a transformative role in the field of Very-Large-Scale Integration (VLSI) design, significantly improving the speed, accuracy, and efficiency of chip development processes. VLSI design involves the complex process of integrating millions or even billions of transistors onto a single chip, and traditionally, this requires extensive human effort and computational resources. With AI, especially Machine Learning (ML) algorithms, engineers can automate time-consuming tasks such as floorplanning, placement, and routing. These are critical stages in chip design where components are arranged and interconnections are defined. AI can analyze vast datasets from previous designs and optimize layouts for power, performance, and area (PPA).

In the early stages of chip design, AI models can assist in architectural exploration by predicting performance metrics before a physical design is completed. This enables faster decision-making and reduces the number of iterations needed to meet design goals. Generative AI can even propose new circuit architectures or logic gate configurations based on learned patterns, speeding up innovation. Furthermore, AI algorithms can detect design rule violations or bottlenecks early in the design phase, helping avoid costly rework at later stages. This predictive capability is especially beneficial in advanced nodes like 5nm and 3nm, where design complexity increases dramatically.



AI also contributes significantly to chip optimization by improving power consumption, clock timing, and thermal management. For example, reinforcement learning—a type of ML—has been used to optimize chip placement with results comparable to or better than those achieved by expert human engineers. Tools like Google's Deep Mind have demonstrated success in creating production-ready chip layouts in record time. Additionally, AI aids in post-silicon validation by analyzing test data to identify defects and yield issues, streamlining the debugging and manufacturing process.

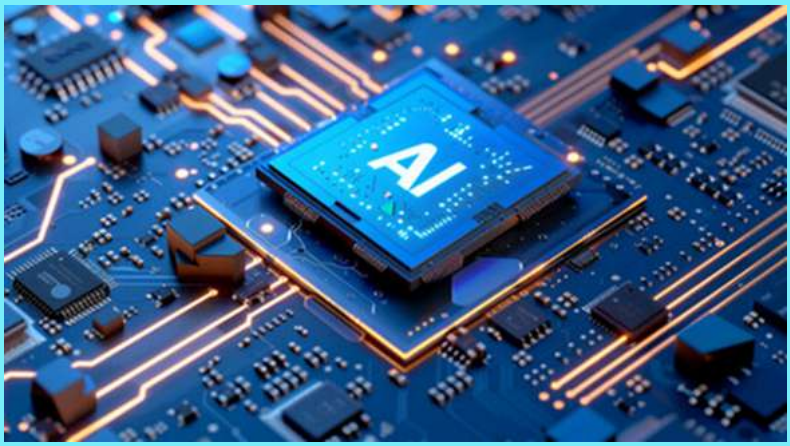
Despite its advantages, the integration of AI into VLSI design is not without challenges. These include the need for large, high-quality datasets for training AI models, the interpretability of AI decisions, and ensuring the robustness of AI-generated designs. Moreover, human oversight remains essential, as AI tools can sometimes miss context-specific constraints or introduce new forms of design errors. However, as AI technology matures, its role in VLSI design will continue to grow, leading to faster design cycles, reduced costs, and more efficient, intelligent chips suitable for next-generation applications in IoT, AI hardware, and high-performance computing.

NANDHINI.T
IV YEAR ECE-A

STUDENT ARTICLE

ARTICLE-3

The Future of Embedded Systems with Artificial Intelligence



Raditionally, AI has relied on the cloud to process large amounts of information, since complex models require significant computational resources that are often not available on edge devices. In a classic architecture, data collected by sensors or other embedded devices is sent directly to the cloud, where it is processed by sophisticated models. The results of this processing are then transmitted back to edge devices to make decisions or perform specific actions. This approach, while effective, also has some important limitations. First, the latency introduced by data transfer between the device and the cloud can be significant, especially in critical applications such as healthcare monitoring or autonomous driving, where every millisecond counts; second, sending data to the cloud raises privacy and security concerns, as sensitive data can be vulnerable during transfer or storage. Edge AI aims to overcome these limitations by bringing processing closer to the source, directly on embedded devices, dramatically reducing latency as data no longer has to travel back and forth between the device and the cloud, and improving privacy and security. Instead of sending large amounts of raw data to the cloud, these systems can process and analyze sensitive data locally without ever leaving the device. According to estimates, global spending on edge computing is expected to exceed $200 billion in 2024, up 15.4% from the previous year. Embedded devices like microcontrollers don't have the computing power of a data center, but with advances in AI algorithm

efficiency and specialized hardware, it's now possible to run models on these devices. New chips designed specifically for edge AI, such as neural processing units (NPUs)integrated into microcontrollers, are making it increasingly possible to implement models in embedded systems. Edge AI not only reduces latency and improves security, but also has the potential to reduce operating costs. Cloud processing comes with significant costs associated with bandwidth, storage, and computational power. By moving some of the processing to the edge, it's possible to reduce the load on the cloud and, therefore, costs, which is especially beneficial in applications involving large numbers of distributed devices, such as industrial sensor networks or smart cities, where the cost of sending data to the cloud can become prohibitive. Another area where edge AI is having a significant impact is the Internet of Things (IoT) where millions of interconnected devices collect and transmit data in real time. Edge AI enables these devices to make autonomous decisions without having to rely on the cloud for every single operation. For example, in an environmental monitoring system, sensors can analyze data on-site to detect anomalies or dangerous conditions and send only the relevant information to the cloud for further analysis, which benefits in terms of reducing the volume of data transmitted, but also allowing faster reactions to critical events. The automotive sector is another example where edge AI is making a difference. In autonomous vehicles, processing speed is crucial, and edge AI allows vehicles to process data from sensors, such as cameras and lidars, directly on board without having to send it to the cloud for centralized processing, thus reducing latency and allowing the vehicle to react quickly to unexpected situations. All of this significantly improves the safety and reliability of the system.

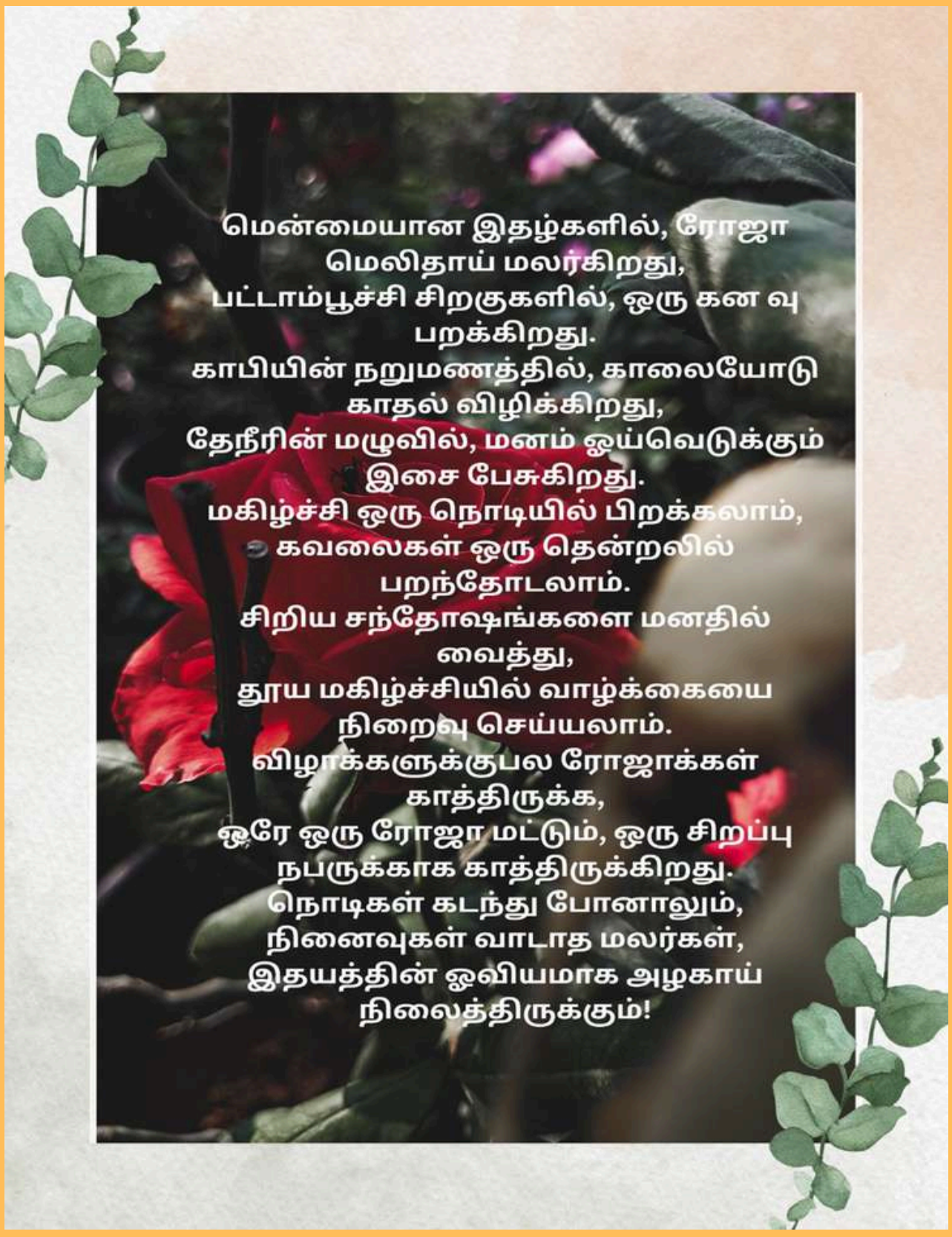
The integration of Artificial Intelligence (AI) with embedded systems is shaping a new era of intelligent, responsive, and autonomous devices across various domains. Embedded systems—traditionally designed to perform specific tasks within larger systems—are now becoming more adaptive and capable due to AI. This fusion allows devices to make real-time decisions, learn from data, and improve over time without constant human intervention. Whether in smart home appliances, industrial machines, or wearable technology, AI-enabled embedded systems are revolutionizing how machines interact with their environments.

One of the most significant advancements in this area is the development of Edge AI, where AI algorithms are executed directly on embedded devices without relying on cloud connectivity. This drastically reduces latency, increases data privacy, and enables real-time processing, which is crucial for applications like autonomous vehicles, robotics, and health monitoring systems. AI chips and microcontrollers with built-in neural network accelerators are now available, making it feasible to run complex AI models on low-power, resource-constrained devices.

Looking ahead, the future of embedded systems with AI promises even more powerful applications, especially with the emergence of technologies like TinyML (Machine Learning on microcontrollers) and 6G connectivity. These innovations will enable ultra-low-power AI processing at the edge, supporting a vast network of smart devices in the Internet of Things (IoT) ecosystem. However, challenges remain, including the need for energy-efficient hardware, robust security mechanisms, and standardization of AI frameworks for embedded platforms. With continuous research and development, AI-driven embedded systems will play a central role in building a smarter, safer, and more connected world.

SHARAN.R
IV YEAR ECE-A


POEMS



Shakthiswaran. M III YEAR ECE-A

RISE & OVERCOME

The cheers of the world are but a fleeting sound,
The true triumph is when you rise beyond your own bounds.

Fall but rise, with fiercer grace,
Break but find your strength in a deeper place.

When obstacles crowd and shadows fall,
Smile and dare to stand tall.

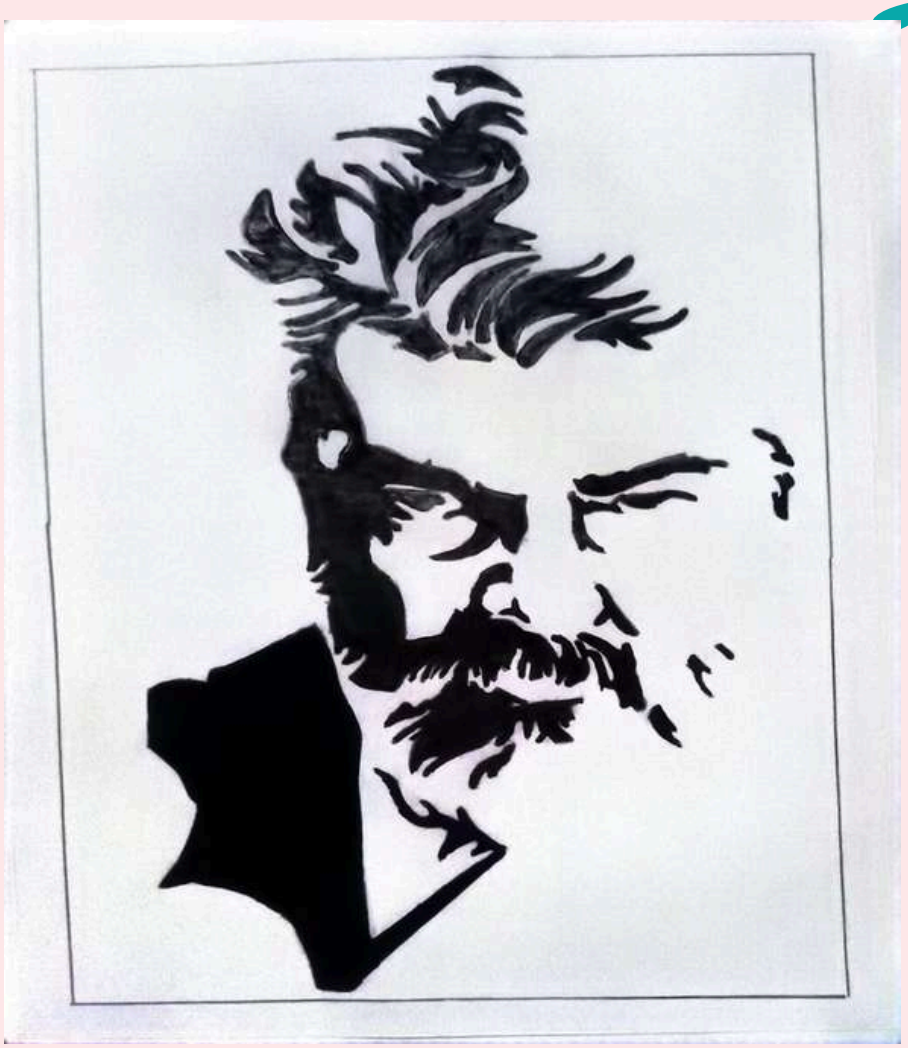
For in every step, every scar you embrace,
Your journey itself becomes your greatest praise.

DHIVAGAR.P IV year ECE-A


Painting

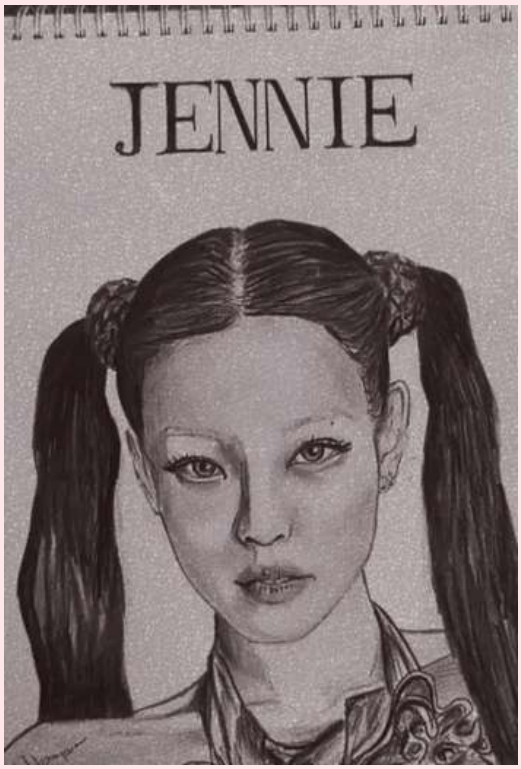
TALENT WORK

Harshidha. M III YEAR ECE-C



Shakthiswaran. M III YEAR ECE-A

Neranjana.K IV year ECE-B



Neranjana.K IV year ECE-B

Dhivya.V IV year ECE-B

Dhivya.V IV year ECE-B

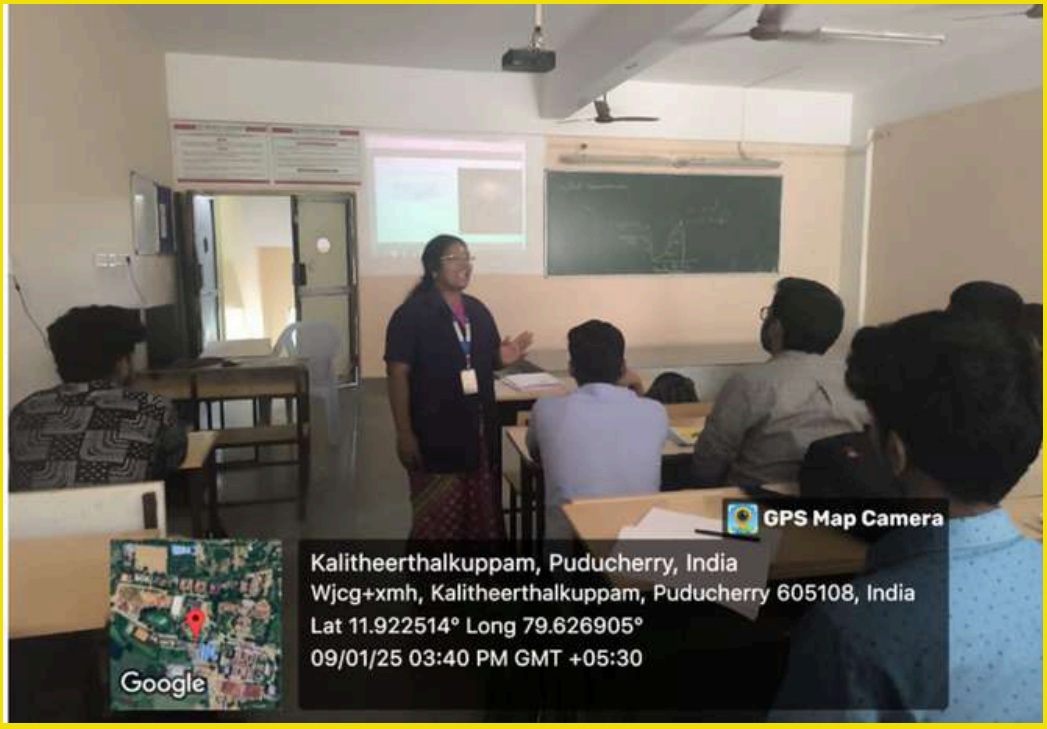
GUEST LECTURE

Dr. S.Arunmozhi, HOD/ECE and Dr. S. Semmalar, AssProf/ECE conducted a " Quality Improvement Program "by Mr. Rajkumar, industrial person on July 2024

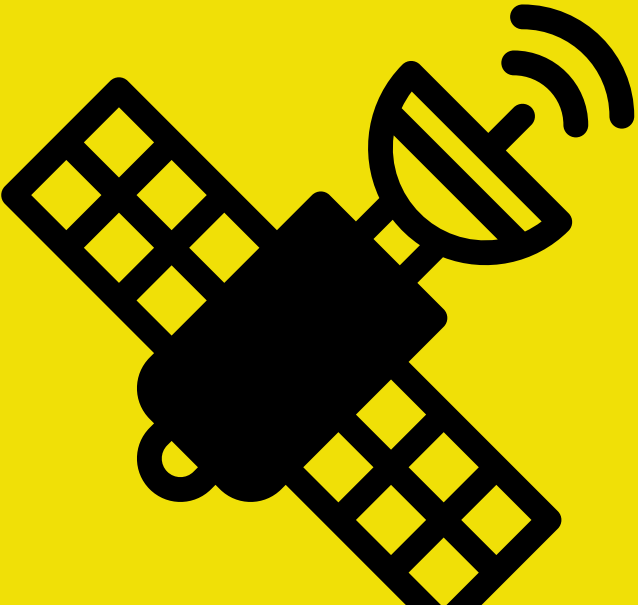
Dr. S.Arunmozhi, HOD/ECE and D. Marygetsy, AP/ECE conducted a guest lecture "VLSI Design Methodologies "by Mr. A. Aashiq Ahamed, CEO, Bistate System, Puducherryon 14th August 2024.

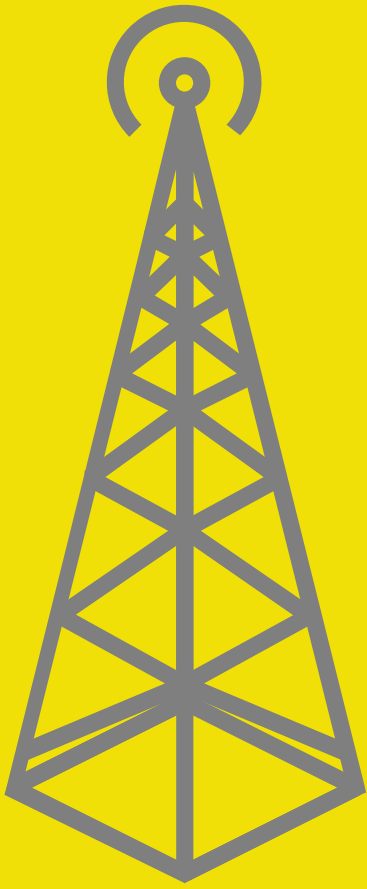
Ms.R. Vithya,AP/ECE conduct Endowment Lecture on “Underwater wireless drone for Sustainable Development” by the resourse personMr. Jagadeesh Kanna, CEO, Vaayusastra Aerospace PVT LTD,IITM, Research Park,Taramani, Chennai, on 22/11/2024.

Dr.S.Arunmozhi,HOD/ECE organised the orientation Program on 'Accelerating Innovation Through Professional Membership' for Third-year students. Expert Members from SAE, India. On 24.01.2025

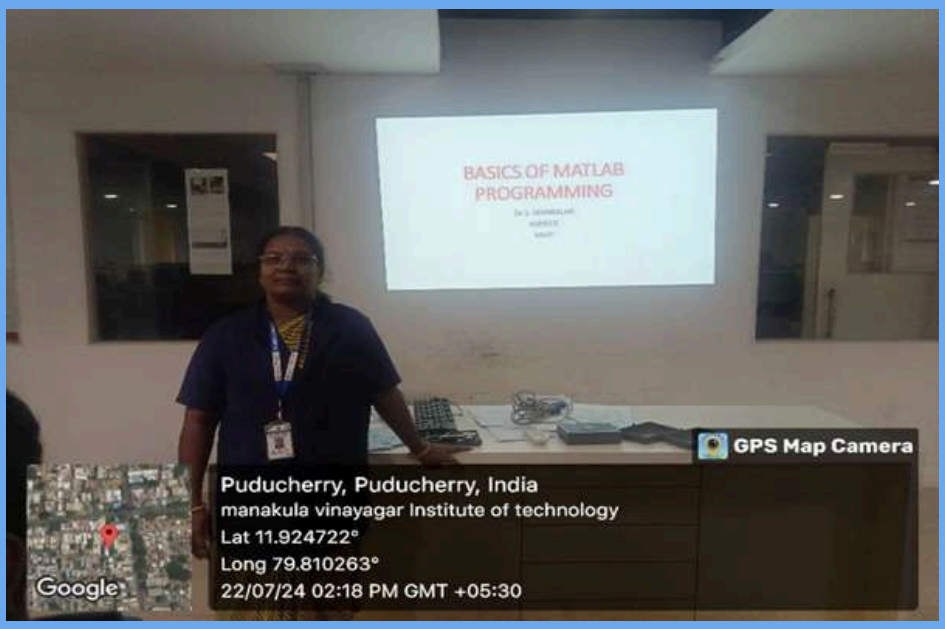


Dr.M.Semmalar ASP/ECE conducted Special lecture- 5G and satellite integration for IV ECE B on 09/01/2025

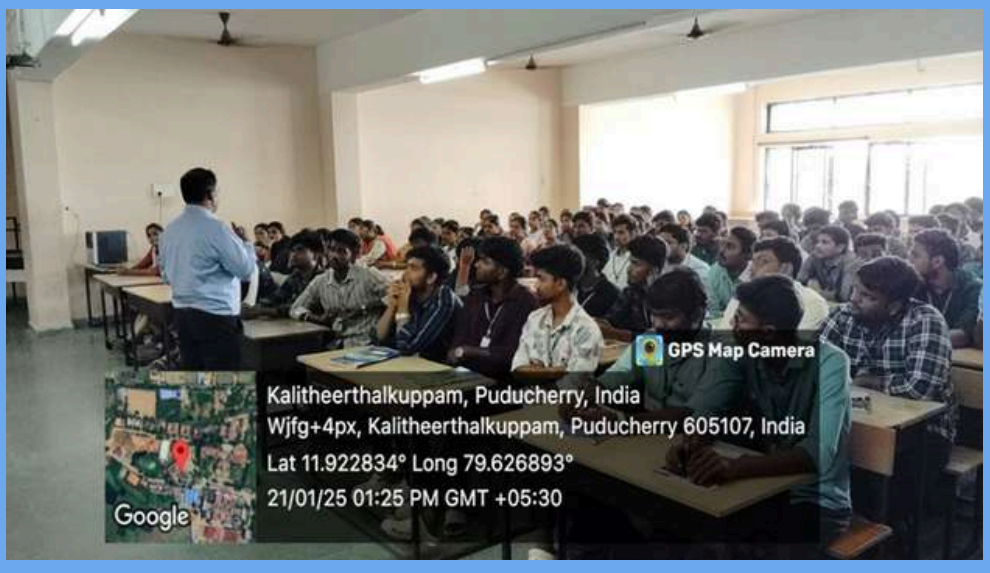




WORKSHOP ORGANIZED



Dr. S. Semmalar, ASP/ECE conducted a "Basics of MATLAB Programming" internal workshop on July22, 2024.



Mr.V.Rajesh,AP/ECE organised Quality Improvement Program on the topic “Enhancing Quality in Research and Innovation through Patent Filing” on 21/01/2025 for III ECE Students

ACTIVITIES AND ACHIEVEMENTS

P.Eswari of III-C has completed the offline course Java Programming in the month June 2024

NSS Team contribute fund for Wayanad landscape July 2024.

NBTC

தேசிய தன்னார்வ இரத்ததான தினம் - 2024

பாராட்டுச் சான்றிதழ்

மணக்குள விநாயகர் தொழில்நுட்பக் கல்லூரி .... அமைப்பு / அவர்கள்

உயிருக்கு போராடும் நோயாளிகளுக்கு உயிர்கொடுத்து உதவும் வகையில், 2023 ஆம் வருடத்தில்

இரத்ததான முகாம் ஏற்பாடு செய்துள்ளார்கள்.

இந்த சிறந்த செயலினைப் போற்றும் விதத்தில் அவர்களுக்கு

தொடர் இரத்ததான முகாம் ஏற்பாட்டாளர்

என்ற பாராட்டுச் சான்றிதழ் வழங்கப்படுகிறது

மாவட்ட குருதி பரிமாற்று மருத்துவ அலுவலர்
விழுப்புரம் மாவட்டம்

முதல்வர்
அரசு விழுப்புரம் மருத்துவக்கல்லூரி மருத்துவமனை

S.Ramprasath of IV-A awarded for conducting blood donation camp

ECE students won volley ball in Pondicherry university conducted on November 2024

V.Ravikumar and team presented project in Pondicherry Technical University on November 2024

Dr.M.Semmalar ASP/ECE organized Students Contest under SDG-9 on 31st January 2025 - External industrial expert- as a judge- Mr. M. Victor Raja Title: Innovation Design Solutions for Industrial problem Selected Winner and Runner and awarded cash prize of 2500/- & 1500/- respectively

WOMEN'S POLYTECHNIC COLLEGE, KARAIKAL
(A Constituent College of PIPMATEL, DOTE. Institution Code: 420
(Sponsored by the Govt.of Puducherry)
Karaikalmedu, Karaikal-609 605.

No. WPTC-KKL/Letter of Appreciation/2024-25/ 600 Date:- 30.12.2024

To

Selvi SHERLEY SUZANE TREMOT,
Reg No. 22TCL014
Third Year – Dept of Electronics and Communication Engineering,
Manakula Vinayagar Institute of Technology,
Puducherry

LETTER OF APPRECIATION

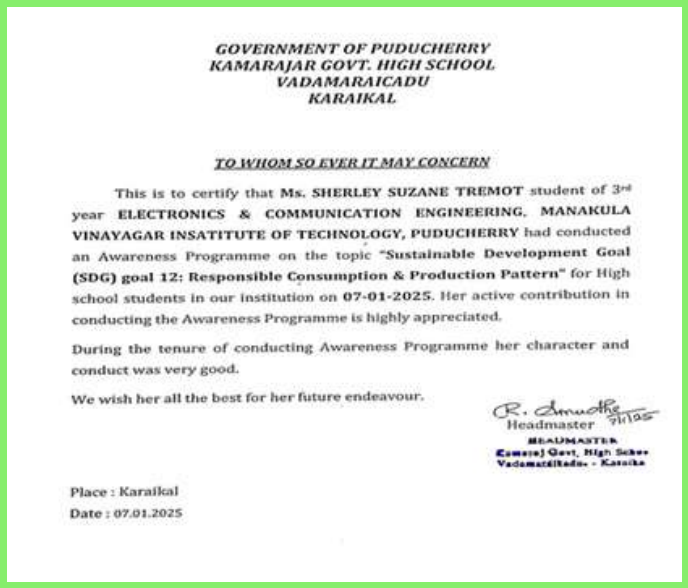
I acknowledge your sincere efforts and appreciate your commitment on the training session titled **"SDG Goal 12 – Responsible Consumption and Production Patterns"** to all the Final Year students of this institution on 30.12.2024. Your active engagement and thoughtful contributions during the session greatly enhanced the overall learning experience for everyone involved. You are really an inspiration to the students of this institution.

I am sure that the enthusiastic session by you creates more responsible young individuals. Your striving efforts on this global issue can create an impact on the sustainability of our environment. Keep up this good spirit and futuristic thoughts that can mould you to become a most successful person in the future.

Looking forward to witness your growth and achievements.

With regards,

PRINCIPAL
WOMEN'S POLYTECHNIC COLLEGE
KARAIKAL MEDU KARAIKAL - 609 605



GOVERNMENT OF PUDUCHERRY
KAMARAJAR GOVT. HIGH SCHOOL
VADAMARAICADU
KARAIKAL

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Ms. SHERLEY SUZANE TREMOT** student of 3rd year **ELECTRONICS & COMMUNICATION ENGINEERING, MANAKULA VINAYAGAR INSATITUTE OF TECHNOLOGY, PUDUCHERRY** had conducted an Awareness Programme on the topic **"Sustainable Development Goal (SDG) goal 12: Responsible Consumption & Production Pattern"** for High school students in our institution on **07-01-2025**. Her active contribution in conducting the Awareness Programme is highly appreciated.

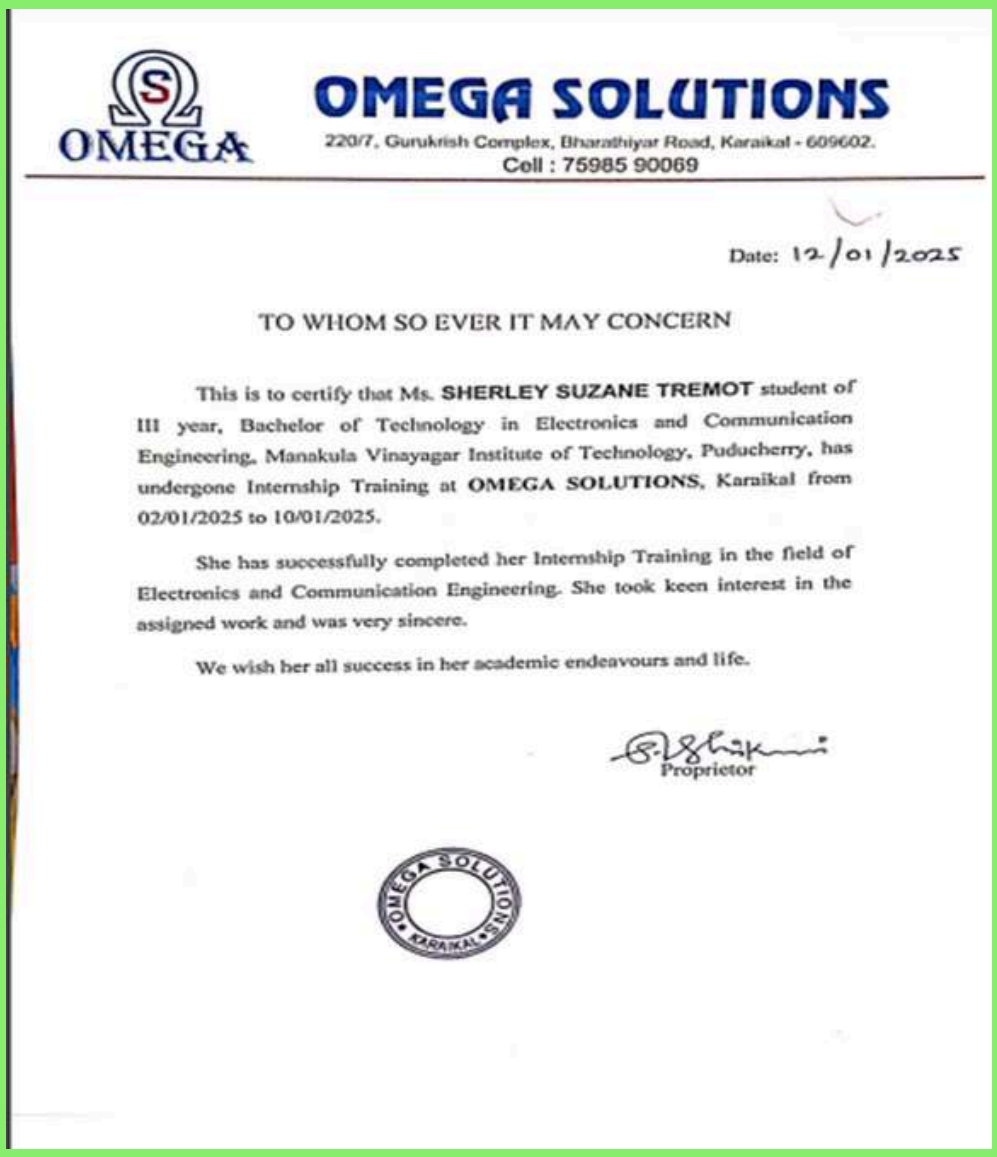
During the tenure of conducting Awareness Programme her character and conduct was very good.

We wish her all the best for her future endeavour.

Headmaster
HEADMASTER
Govt. High School
Vadamaraikadu - Karaikal

Place : Karaikal
Date : 07.01.2025

Sherley Suzane Tremot attended Training session on SDG-12 " Responsible Consumption and Production Patteren", Womens Polytechnique college, Karaikal on 30.12.2024 and 07.01.2025



OMEGA SOLUTIONS

220/7, Gurukrish Complex, Bharathiyar Road, Karaikal - 609602.
Cell : 75985 90069

Date: 12/01/2025

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Ms. **SHERLEY SUZANE TREMOT** student of III year, Bachelor of Technology in Electronics and Communication Engineering, Manakula Vinayagar Institute of Technology, Puducherry, has undergone Internship Training at **OMEGA SOLUTIONS**, Karaikal from 02/01/2025 to 10/01/2025.

She has successfully completed her Internship Training in the field of Electronics and Communication Engineering. She took keen interest in the assigned work and was very sincere.

We wish her all success in her academic endeavours and life.

Proprietor

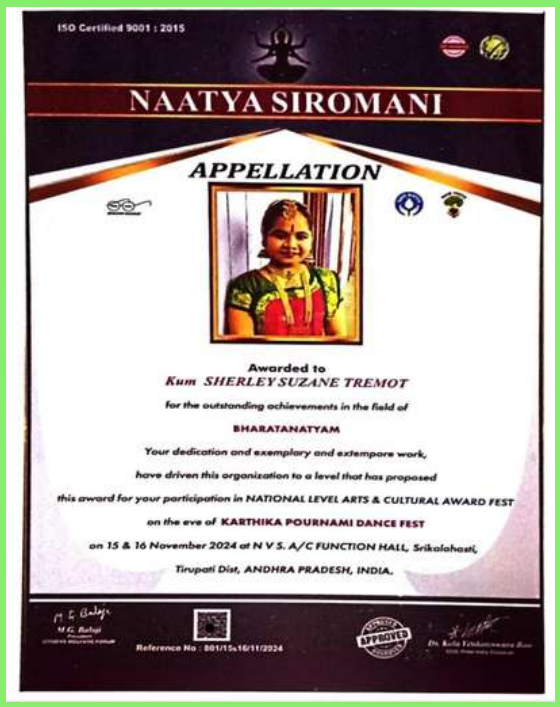
OMEGA SOLUTIONS KARAIKAL

III Year ECE B sec student Ms. Sherley Suzane Tremlt, Reg No:22TCL014 have completed internship in OMEGA from 02/01/2025 to 10/01/2025 .

Harini E of III year ECE C Completed Certificate from Great Learning titled Java Programming

Premraaj, Salman, Naveen prasth , Bharath of III Year ECE A Secured Third prize for Project Expo at Mailam engineering college on 20th march 2025

Mohamed Salman M.R , Mohamed Shabeer , Manoj . V of III Year ECE A secured second place in PowerPoint presentation held at Christ college of engineering and technology on 24.2.2025



Sherley Suzane Tremot from III year B sec awarded with the title Natya Shiromani

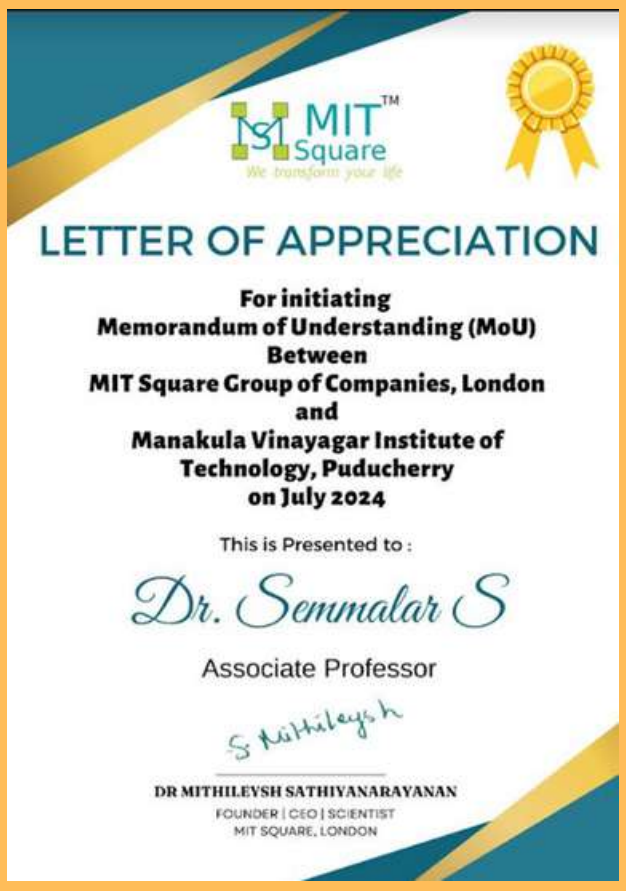
Sherley Suzane Tremot from III year B sec received International Icon Award 2025

Sherley Suzane Tremot participated in a Yoga and Meditation event on world meditation day

GLIMPSE OF THE YEAR

II-year ECE students visited DUGAA Tech, Salem on 27th July 2024.

The III year ECE students visited the Radio Astronomy Centre, Ooty on 23rd July 2024



Dr. S. Semmalar ASP/ECE initiated the MoU between MIT Square London and Manakula Vinayagar Institute of Technology on July 2024

FAREWELL CELEBRATION

EDITORIAL MEMBERS

NANDHINI.T	IV YEAR ECE A
SUBIKSHA.M	IV YEAR ECE A
VINOTH.K	IV YEAR ECE B
DHIVYA.V	IV YEAR ECE B
MADHAN.M	III YEAR ECE A
NARESH KUMAR.S	III YEAR ECE B
JANANI.P	III YEAR ECE C
YUVARAJ.A	II YEAR ECE B
MOHANALAKSHMI.A	II YEAR ECE B

STAFF INCHARGE

Dr.A.SHANKAR
Associate Professor/ECE

CONTACT US

Dr.S.ARUNMOZHI
Professor & Head

Department of Electronics and Communication Engineering,
Manakula Vinayagar Institute Of Technology,
Kalitheerthalkuppam,Puducherry-605107.