

# POWER VISION

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## Magazine

**Powering  
Tomorrow's Tech  
Frontier Innovatively.**

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**Kongunadu College of Engineering and Technology  
(Autonomous)**

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai, Accredited by NBA (CSE, ECE & EEE& MECH),  
Accredited by NACC with B++ Grade, Recognized by UGC with 2 (f) & 12(B) and ISO 9001:2015 certified Institution)

# Preface

Welcome to Power Vision – Your Gateway to the Dynamic World of Power Engineering! In this premier edition, we invite you to embark on a captivating journey through the electrifying landscapes of innovation, sustainability, and excellence within the realm of power engineering.

Power Vision is not just a magazine; it's a testament to the transformative power of electricity in shaping our world. From cutting-edge technologies to visionary projects, each page is meticulously crafted to inspire and inform, showcasing the latest advancements and trends in the field.

Join us as we explore the forefront of power engineering, uncovering the groundbreaking research, impactful initiatives, and remarkable achievements that are driving progress and shaping the future of energy. Whether you're a seasoned professional, an aspiring engineer, or simply a curious mind eager to learn, Power Vision promises to enlighten and empower.

So, immerse yourself in the illuminating world of power engineering with Power Vision as your guide. Let us ignite your curiosity, spark your imagination, and empower you to make a difference in the electrifying journey ahead. Welcome to Power Vision – where the future of power awaits!

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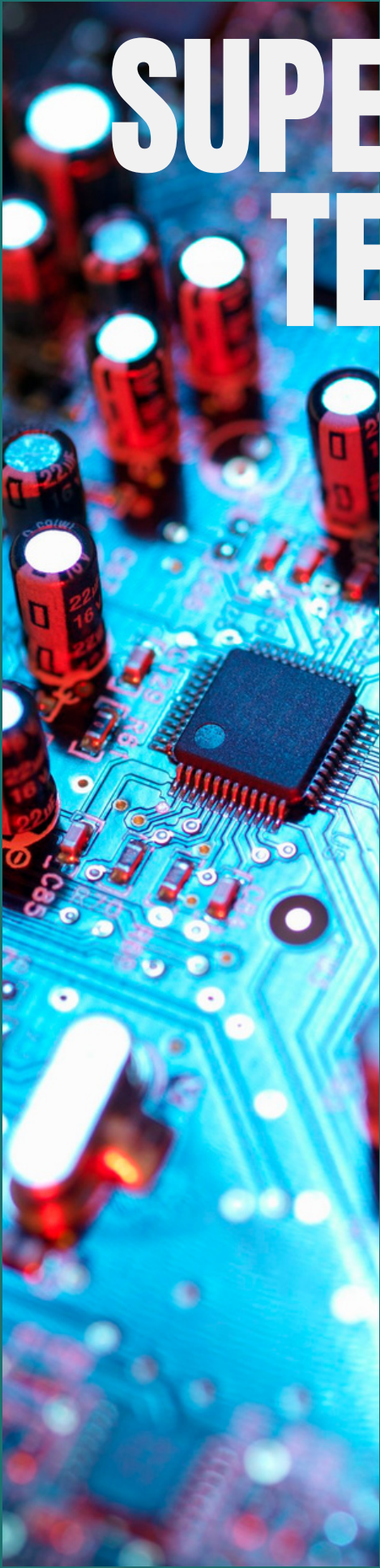


# QUANTUM COMPUTING

The integration of quantum computing into the electric sector presents opportunities to address evolving challenges. Quantum simulation accelerates battery material discovery, enhancing energy storage. Energy market optimization benefits from quantum computing's ability to solve complex problems, optimizing power generation to minimize costs while meeting demand. Quantum techniques like annealing and neural networks aid fault prediction, preventing grid disruptions. Integrated planning with quantum computing balances distributed generation and enhances grid resilience. Quantum chemistry simulation enables the discovery of materials for improved batteries and solar cells, advancing sustainability. Bridging differing perspectives between the quantum industry and electric sector is crucial for maximizing quantum computing's potential. This report offers valuable insights and concepts, laying the groundwork for further exploration and collaboration in leveraging quantum computing for the electric sector's benefit. Understanding and addressing these perspectives can foster more effective collaboration and implementation of quantum solutions in the electric sector.

*W. Srikanth*  
**III YEAR**





# SUPERCAPACITOR TECHNOLOGIES

Supercapacitors, lauded for their safety and rapid charging capabilities, are emerging as viable alternatives to traditional lithium-ion batteries. Among them, graphene-based supercapacitors stand out for their superior conductivity and potential in various sectors, notably transportation. However, challenges persist in achieving higher energy density levels. Research is actively underway to enhance surface area for better ion adsorption, leveraging graphene's conductivity. Despite these efforts, hurdles like production costs and quality control impede widespread adoption, particularly among smaller enterprises. Nevertheless, the development of graphene-based supercapacitors remains a focal point in advancing energy storage technologies. Their versatility extends beyond conventional battery applications, with potential uses in grid storage, renewable energy integration, and portable electronics. As research progresses and technological innovations address production challenges, the promise of graphene-based supercapacitors becoming a mainstream energy storage solution grows. In the pursuit of a greener and more sustainable future, graphene-based supercapacitors hold immense potential, offering a pathway to revolutionize energy storage and propel us towards a more efficient and environmentally friendly energy landscape.

R. Dharshana  
III YEAR

# BETAVOLT BB100: NUCLEAR POWER FOR THE FUTURE

Betavolt's pioneering technology harnesses the power of beta particles emitted by nickel-63 to revolutionize electric current generation. At its core are ultra-thin diamond semiconductors, just  $10\mu$  thick, encasing a  $2\mu$  thick nickel-63 sheet. This configuration efficiently converts decay energy into electrical current, resulting in independent atomic energy battery units. Betavolt claims an energy density over ten times that of lithium batteries, with the ability to store a staggering 3,300 MW hours in a 1-gram battery. The most remarkable aspect of Betavolt's batteries is their 50-year charge cycle, far exceeding that of traditional electro-chemical batteries. This longevity promises to transform sustainability and longevity in electronic devices, potentially eliminating the need for frequent charging altogether. Betavolt's use of fourth-generation diamond semiconductors further solidifies their position at the forefront of semiconductor technology. With their groundbreaking innovation, Betavolt opens the door to a future where constant charging becomes obsolete, offering efficient and long-lasting energy storage solutions for a wide range of electronic devices.

*P. Dinesh Murugan*  
**III YEAR**



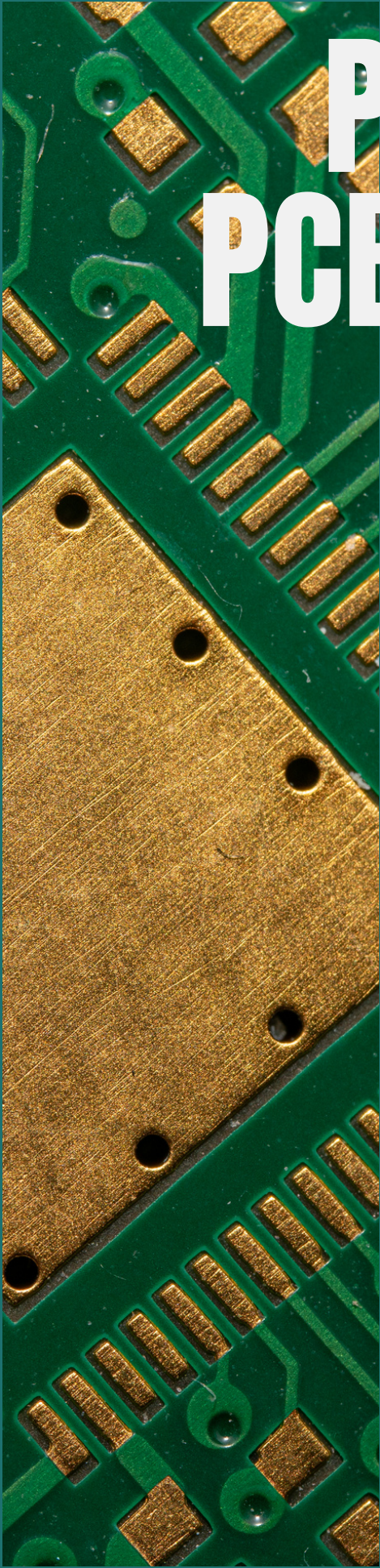


# CYBERSECURITY FOR CRITICAL INFRASTRUCTURE

In our digitally interconnected world, safeguarding critical infrastructure is paramount as energy grids, transportation networks, and healthcare systems face increasing cyber threats. Robust cybersecurity measures are essential to mitigate risks and ensure public safety and national security. Advanced Persistent Threats (APTs) necessitate a proactive defense strategy, including multilayered approaches and the adoption of the Zero Trust model. Incident response and recovery plans are crucial for swift and effective responses to cyber incidents. Securing Industrial Control Systems (ICS) involves network segmentation, patching, and anomaly detection, while collaboration among sectors and entities enhances collective cybersecurity efforts. Integration of emerging technologies like artificial intelligence (AI) and machine learning (ML) further enhances detection and response capabilities, strengthening our defenses against evolving cyber threats and safeguarding the backbone of modern society. With cyber threats evolving rapidly, continuous innovation and collaboration are essential to stay ahead in the cybersecurity landscape.

*R. Nithisha*  
**II YEAR**





# PLANT-BASED PCB SUBSTRATE

The surge in gadget consumption has exacerbated the global e-waste dilemma, with only a fraction of the 50 million tonnes of discarded tech being recycled annually. Addressing this issue, UK-based Jiva Materials has developed Soluboard, a printed circuit board (PCB) substrate engineered to dissolve in water, easing material recovery processes. Partnering with European manufacturers, Jiva aims to showcase Soluboard's effectiveness in combating e-waste. Unlike conventional methods, which are complex and resource-intensive, Soluboard offers a sustainable solution, composed of plant-based fibers and a non-toxic polymer. When exposed to hot water, the polymer dissolves, enabling the recovery of up to 90% of electronic components for reuse or recycling, with the remaining solution disposed of safely. This innovation not only reduces environmental impact but also boasts a significantly lower carbon footprint compared to traditional fiberglass-based boards. With major players like Germany's Infineon already exploring Soluboard for various applications, including specialized designs for refrigeration, Soluboard holds promise in revolutionizing electronics manufacturing for a greener future.

R.S. Mahil Mithiran  
III YEAR



# AI REDEFINES VEHICLE CARE?

AI-powered car health checks represent a groundbreaking advancement in automotive technology, utilizing sophisticated algorithms and sensors to continuously monitor various aspects of a vehicle's performance in real-time. By analyzing data from embedded sensors covering engine performance, tire pressure, battery health, and fluid levels, these systems provide comprehensive insights into the vehicle's overall condition. Their proactive approach to issue detection empowers drivers and mechanics to take preemptive action, minimizing the risk of breakdowns and accidents, thereby enhancing safety and prolonging vehicle longevity. Additionally, AI's efficiency and accuracy in processing vast amounts of data enable a thorough assessment of the vehicle's health, surpassing traditional diagnostic methods and identifying subtle issues that might go unnoticed during manual inspections. Overall, AI-powered car health checks redefine how we monitor and maintain vehicles, offering proactive issue detection, efficiency, accuracy, and predictive maintenance capabilities, paving the way for a safer and more reliable driving experience. With their integration, vehicles become not just modes of transport but intelligent partners ensuring optimal performance throughout journeys. As this technology evolves, it holds the promise of further advancements, making driving safer and more efficient than ever before.

*W. Keerthana*  
**IV YEAR**






# EV BATTERY SUSTAINABILITY

Electric vehicles (EVs) are pivotal in reducing air pollution and meeting climate goals, yet their sustainability hinges on the management of lithium-ion batteries. As the International Energy Agency (IEA) predicts substantial growth in global EV stock, reaching 245 million vehicles by 2030, addressing the sustainability of EV batteries becomes increasingly urgent. While EVs themselves do not emit CO<sub>2</sub>, the extraction and processing of raw materials for lithium-ion batteries, including cobalt, lithium, and nickel, raise ethical and environmental concerns. Additionally, the low recycling rate of lithium-ion batteries—estimated to be less than 5%—intensifies waste management challenges. Organizations like Redwood Materials, Li-Cycle, and Aceleron are pioneering sustainable solutions through closed-loop recycling systems and innovative battery pack designs. Moreover, initiatives like the US Department of Energy's ReCell Center and the Global Battery Alliance advocate for improved recycling techniques and a circular battery value chain. These efforts underscore the critical importance of prioritizing EV battery sustainability to realize the full environmental benefits of electric mobility.

*A. Kirubanantha*  
**IV YEAR**






# EDGE IOT: CLOUD ANALYSIS REVOLUTION?

Cloud computing is revolutionizing agriculture by providing scalable solutions for managing the vast data generated by IoT devices in smart farming. With sensors monitoring crops, weather, livestock, and machinery, there's a constant flow of data that requires robust storage and processing capabilities. Cloud-based platforms offer efficient storage, eliminating the limitations of local storage capacity, and enabling farmers to securely store and analyze vast amounts of data. Moreover, edge cloud computing enhances efficiency by processing data closer to its source, reducing latency and enabling real-time responses. Cloud-enabled IoT devices in agriculture empower farmers with valuable insights to improve decision-making and optimize resource allocation, leading to increased efficiency and productivity. By harnessing the power of cloud computing, farmers can effectively manage data from IoT sensors, enabling them to make informed decisions and adapt to changing environmental conditions, ultimately fostering a more sustainable and resilient agricultural industry. Additionally, the scalability and flexibility of cloud-based solutions allow farmers to easily expand their operations and integrate new technologies as they continue to innovate and improve their farming practices. With cloud computing, the agricultural sector is poised to meet the challenges of feeding a growing global population while minimizing environmental impact.

*R. Jeeva*  
IV YEAR



# SMART ELECTRICITY FOR SMART CITY

Sustainable smart cities face a dual challenge of addressing immediate concerns while also ensuring long-term environmental sustainability. Issues like infrastructure maintenance and data security must be tackled alongside efforts to promote resource efficiency, reduce carbon emissions, and implement renewable energy sources. These cities aim not only to enhance the quality of life for residents but also to minimize their ecological footprint, creating greener and more resilient urban environments. Incorporating transparency, education, and community engagement into technological solutions is crucial to building trust and fostering widespread adoption. Moreover, social inclusivity must be a priority, ensuring that advancements in smart technology benefit all segments of the population, regardless of income or technological proficiency. By balancing short-term challenges with long-term sustainability goals, sustainable smart cities can pave the way for a more environmentally conscious and equitable future. Furthermore, continuous innovation in technology is essential to overcome emerging challenges and adapt to evolving urban needs. Collaboration between government agencies, private sector entities, and community organizations is key to driving progress toward sustainable smart city initiatives. Ultimately, the success of these endeavors hinges on proactive planning, robust infrastructure investment, and ongoing community involvement.

*M. Swathi*  
**III YEAR**

# PROJECTS

## EFFICIENT FOOD WASTE MANAGEMENT THROUGH IOT INTEGRATION

The integration of IoT in food waste management is a game-changer. By linking devices with sensors and connectivity, IoT enables real-time data collection and smart decision-making throughout the supply chain. It tackles waste at every stage, from production to consumption, by monitoring levels and extending shelf life. This not only reduces waste but also promotes sustainability by increasing transparency and efficiency. Ultimately, IoT offers a promising solution for a greener future, showcasing technology's power to optimize resources and prioritize sustainability.

**- K SRINITHA & V VIJIKHA (III YEAR)**

## IOT BASED DRIPS MONITORING SYSTEM IN HOSPITALS

An innovative IoT-based drip monitoring system is revolutionizing IV fluid administration in hospitals. By integrating ultrasonic sensors along the IV tubing, it continuously monitors the drip chamber's liquid level. Real-time data are wirelessly transmitted to a central hub, where algorithms calculate drip rates precisely. This system enhances patient safety by detecting deviations from prescribed rates and alerting healthcare professionals promptly. With its proactive approach, it promises to reduce medication errors and improve IV administration precision, ensuring safer healthcare experiences for patients.

**- T ABISHEIK, M KAMALESH, P DHAYANITHI (III YEAR)**

## INNOVATIVE SURVEILLANCE ROVER CAR USING ARDUINO

The "Imitative Automotive using Arduino for Surveillance" project creates a remote-controlled surveillance system with an Arduino-based automotive device. It enables real-time monitoring through mobile instructions and incorporates sensors like cameras and ultrasonic sensors for obstacle detection. Users interact via a mobile app, which also offers imitative functionality for recording and replaying actions. Emphasizing data security, encryption, and user authentication, it provides an affordable solution for applications like home security and environmental monitoring.

**-M SRIKANTH , K CHANDRA MOULI & J VALAN JOSHI (III YEAR)**



# ELONGATE HEXANGONAL PYRAMID SHAPED PORTABLE SOLAR DRYER

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*“The Elongated Hexagonal Pyramid Shaped Portable (EHPP) Solar Dryer redefines agricultural drying methods with its innovative design and functionality. Contrary to traditional drying techniques, this dryer offers a unique departure with its pyramid-shaped top chamber and hexagonal-shaped bottom chamber. Despite its stationary nature, the EHPP solar dryer provides unmatched convenience, enabling farmers to utilize solar energy for effective drying of fruits, vegetables, and greens at any time and location.”*



A key feature of the EHPP solar dryer is its capability to evenly distribute hot air throughout the drying chambers, ensuring consistent drying across all produce and minimizing the risk of uneven drying and spoilage. Moreover, with the inclusion of an electronic controller setup and six thermostats, precise temperature control is achieved, optimizing drying conditions for enhanced efficiency and quality.

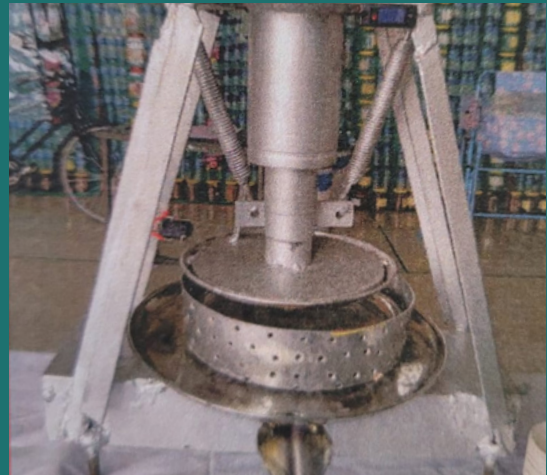
Beyond its operational advantages, the EHPP solar dryer signifies a leap towards sustainable agricultural practices. By harnessing solar power, it reduces dependency on fossil fuels and mitigates carbon emissions, contributing to global efforts against climate change. Furthermore, its stationary yet robust design offers flexibility and adaptability to farmers, empowering them to elevate crop preservation methods while minimizing environmental impact. In summary, the EHPP solar dryer represents a fusion of innovation, efficiency, and sustainability, promising to revolutionize agricultural drying practices worldwide.

“ By :  
Department of Electrical  
and Electronics

# Electro-Hydraulic Compression (EHC) based pseudo stem juicer

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*The Electro-Hydraulic Compression (EHC) based pseudo stem juicer heralds a new era in juice extraction technology, particularly for banana pseudo stems. Its innovative design, comprising mild steel with silver center and base plates, incorporates three key components: an electrical motor setup, a hydraulic setup, and a power supply unit. This juicer offers several advantages, including the ability to extract juice without compromising its quality or color, straightforward operation, portability, lightweight construction, affordability, and high reliability with minimal maintenance requirements.*



Traditional juicers often fall short when it comes to extracting juice from banana pseudo stems, either altering the juice's characteristics or lacking sufficient compression power. The EHC-based juicer addresses these shortcomings by employing hydraulic compression, ensuring efficient extraction without chemical or thermal reactions. Moreover, it mitigates issues such as rotor jamming, commonly encountered in electric mixers due to the fibrous nature of banana pseudo stems. This breakthrough technology enhances juice extraction processes, promising consistent results and preserving the natural qualities of the juice.

In summary, the Electro-Hydraulic Compression (EHC) based pseudo stem juicer represents a significant advancement in agricultural equipment, offering a reliable, efficient, and cost-effective solution for extracting juice from banana pseudo stems. Its ability to maintain juice quality and color, coupled with its ease of use and portability, makes it a valuable tool for farmers and juice producers seeking to optimize their operations while minimizing environmental impact.

“

By :  
Department of Electrical  
and Electronics

# LITERARY INTERLUDE

## INKED ELEGANCE

### The Art of Calligraphy

**"ENTER THE WORLD OF SWIRLING STROKES AND GRACEFUL CURVES AS WE DELVE INTO THE ENCHANTING REALM OF CALLIGRAPHY. FROM ANCIENT ORIGINS TO MODERN REVIVAL, DISCOVER THE TIMELESS BEAUTY AND CULTURAL SIGNIFICANCE OF THIS EXQUISITE ART FORM."**

#### INTRODUCTION

Calligraphy is an art form that involves creating decorative and expressive writing using skillful, deliberate strokes. Originating from various cultures, calligraphy emphasizes the beauty of letterforms and the harmonious arrangement of words on paper. It encompasses a wide range of styles, from traditional scripts to modern interpretations, showcasing the artist's mastery of penmanship and creativity in design.

#### EARLY CALLIGRAPHY

Early calligraphy dates back to ancient civilizations such as China, Egypt, and Mesopotamia. In China, around 2000 BCE, brush and ink were used to create characters with graceful, flowing lines. Egyptian hieroglyphs and Mesopotamian cuneiform represent early forms of calligraphy, conveying both practical and artistic messages. As writing systems developed, calligraphy became intertwined with religious texts, manuscripts, and official documents, playing a crucial role.

#### MODERN CALLIGRAPHY

Modern calligraphy, characterized by a departure from traditional scripts, has evolved into a dynamic and diverse art form. Emerging in the late 19th and early 20th centuries, artists explored new styles, blending traditional techniques with contemporary influences. Today, modern calligraphy encompasses various scripts, from free-flowing brush lettering to structured hand-lettered fonts. It has found expression in diverse mediums, including digital platforms, creating a fusion of traditional craftsmanship with innovative design. Modern calligraphy continues to thrive as a dynamic means of artistic expression and personalization.

#### CALLIGRAPHY PENS

Calligraphy pens are specialized writing tools with various nibs for creating decorative and expressive lettering. They come in different types, including dip pens with replaceable nibs and fountain pens with built-in nibs. The choice of pen depends on the calligraphic style and personal preference.

#### CONCLUSION

Calligraphy invites individuals to appreciate the elegance of written communication in a world often dominated by digital text. The meticulous strokes of a pen or brush, calligraphy transforms words into visual masterpieces, offering a timeless connection between language and aesthetics.

R. Jeeva  
IV YEAR





# METAPHOR MEADOW



## மனம் எதுவோ

என்னென்ற நிலை தெரியாமல்  
தவிக்கிறதே மனம்...  
எதிலும் பகிரா நிலையில்  
அழைகிறதே மனம்...  
இதை என்னென்பது ஏதென்பது  
தெரியவில்லை  
இதற்கு முன்பும் இதை  
உணர்ந்ததில்லை  
இந்நிலையை விரும்பவும்  
இல்லை வெறுக்கவுமில்லை  
யாது செய்வதோ தெரியாமல்  
இருக்குதே மனம்...  
எதை செய்யவும் விருப்பமில்லை  
எதுவும் செய்யாமல் தழராத  
தனிமையில் இருக்கவே  
நினைக்குதே என் மனம்...  
தொடரவும் வேண்டாம் முடியவும்  
வேண்டாம்  
இடையில் 'தனிமை...'

## வாழ்க்கை பயணம்

எங்கோ தொடங்கும் புதிதா நதி  
போல நமையரியாமலே  
தொடங்கியது ஒரு வாழ்க்கை!  
எங்கோ முடியும் தொடுவானம்  
போல தெரிந்த சில பார்வையிலே  
முடிகிறது வாழ்க்கை! வாழ்க்கை  
ஒருமுறை... அதில் வாழும்  
வாழ்வும் ஒருமுறையே...  
"உனக்காக ஓடு... உனக்கு பிடித்து  
ஓடு... உனக்கு பிடித்துதோடு  
ஓடு..." நீ வாழும் வாழ்க்கையில்...

B. Balaji  
IV YEAR

# AESTHETIC ALCOVE



V Deepana shree  
IV YEAR

# EDITORIAL



WRITE

EDIT

PUBLISH

## OUR TEAM

### **CHEIF PATRON:**

Dr.R.Shankar, HOD, EEE

### **EXECUTIVE EDITOR:**

Mrs.S.Revathi, AP, EEE

### **EDITORS**

R Jeeva	IV Year
A Kirubananthan	IV Year
P Dinesh Murugan	III Year
M Srikanth	III Year
M Harish	II Year
S Pooja	II Year



# College Vision & Mission

## VISION

**“To become an Internationally Renowned Institution in Technical Education, Research, and Development by Transforming the Students into Competent Professionals with Leadership Skills and Ethical Values.”**

## MISSION

- **Providing the Best Resources and Infrastructure.**
- **Creating a Learner-Centric Environment and Continuous -Learning.**
- **Promoting Effective Links with Intellectuals and Industries.**
- **Enriching Employability and Entrepreneurial Skills.**
- **Adapting to Changes for Sustainable Development.**

# Department Vision & Mission

## VISION

**“To be a pioneer in Electrical and Electronics Engineering and to create electrical engineering experts with social responsibilities, for global industry needs.”**

## MISSION

- **To facilitate the student's continuous learning with the best infrastructure and environment.**
- **To provide the students with skills, knowledge, and opportunities to function as members of multi-disciplinary teams.**
- **To Empower the students towards popular needs of industry, research, and development**
- **To enable ethics, values, and contribution to the society**