**VIT**®

**Vellore Institute of Technology**
(Deemed to be University under section 3 of UGC Act, 1956)

# ELECTRICA 2023

## TECHNICAL MAGAZINE FROM THE SCHOOL OF ELECTRICAL ENGINEERING

## DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

## Vision

To offer an education in electrical engineering that provides strong fundamental knowledge, skills for employability, cross-disciplinary research and creates leaders who provide technological solutions to societal and industry problems.

## Mission

- Provide personalized experiential learning in industry sponsored labs to prepare students in electrical engineering with strong critical thinking and employability skills.

- Foster design thinking, creativity and cross-disciplinary research with highly qualified faculty to create innovators and entrepreneurs in the broad area of electrical engineering.

- Collaborate with national and international partners to provide innovative solutions to societal and industry challenges.

# Magazine Credits:

### Chief Editors:(UG final Year Students)

- Sakshi Sharma
- Divyansh Gupta
- Abhinav Awasthi
- Mathew Santosh

### Associate Editors:(UG Third year)

- Anshuman Barpanda
- Arham Jain
- Athul A Augustine
- Darshan Mishra

### From the Magazine Team

"We are delighted to present to you all yet another fascinating issue of this magazine, which has been painstakingly, creatively, and inventively made. This year's issue, a result of perseverance and teamwork, captures the spirit of our department's advancements in a variety of areas this academic year. This edition, which was thoughtfully drafted and properly indexed, is adorned with teacher messages, creative corners, academic accomplishments, and much more. We genuinely hope that these observations will pique your interest, encourage you, and highlight the seemingly endless possibilities of electrical engineering. Explore and celebrate our dynamic community's outstanding accomplishments
HAPPY READING!"

### Assistant Designers:(UG Second year)

- Prajan R
- Devangshi Rout
- Tejsva Pandey
- Nandini Walia

### Faculty Coordinator:

- Dr. Indragandhi V
  (Professor)

### Advisory Team: (PG Students)

- Mohammed Akhil Shariff
- Diptesh Barua
- Shweta Sambhavi
- Swati Pandey

### Data Support:

- Mrs. S. Padma
  (Sr. Assistant, SELECT)

### Edition 2023:

## "ELECTRICA"

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
SELECT– VIT**

# CONTENTS:

# 1.1  DEAN'S REFLECTION

Respected readers, It gives me immense pleasure to welcome you all to drift through the pages of a yet another edition of our department's annual magazine, a testament to the achievements, ideas and aspirations that define our department of electrical engineering, SELECT.

Electrical engineering is not merely about circuit analogies and systems. It is rather, the art of innovation that breathes life into technology. From renewable energy systems and intelligent networks to cutting edge advancements in automation and artificial intelligence, this domain has been a driving force behind societal progress. As engineers, we are tasked with not just solving present-day challenges but envisioning a future that aligns with sustainable and inclusive growth.

Innovation is also about adaptability and resilience. In an era of rapid technological evolution, electrical engineers hold the responsibility of leveraging emerging trends like green technologies, energy-efficient systems, and the Internet of Things to redefine how we live and work. The solutions we create today will shape the world for generations to come.

As you traverse through the columns of this magazine, I would encourage you to reflect on the transformative potential of this domain. Let this publication ignite your passion and inspire you to contribute in this ever evolving field. Together let us continue to shape young hearts, and lead with vision, creativity and purpose.

**Dr. Mathew Mithra Noel**
**Professor (HAG) and DEAN**
**School of Electrical Engineering (SELECT)**

# 1.2  HoD's FORESIGHT

As A P J Abdul Kalam once stated, "Dream is not that which you see while sleeping, it is something that does not let you sleep." Learning is always a journey filled with obstacles.  As a teacher, I get to witness a variety of students and faculty members working hard to fulfil their goals.

 We commemorate the achievements that make our department the centre of creativity and innovation as we continue to navigate the always shifting terrain of our branch.  This article demonstrates our department's ground-breaking research, innovative efforts, and exceptional accomplishments.  Since we all think that the possibilities are endless, it demonstrates the ingenuity and the incredible accomplishments made by the teachers, students, and researchers in our department.

I want to express my appreciation to the magazine team in our department for bringing the vibrant atmosphere of our department to life.  We use this publication as a forum to strengthen our sense of belonging.  Undoubtedly, this edition will serve as a memory of the fantastic year we've had.

I hope our department's accomplishments make you proud and inspire you to keep going and realize your goals.


**Dr. K Sathish Kumar**
**Professor and HOD/EEE**
**School of Electrical Engineering (SELECT)**

# 1.3 FACULTY COORDINATOR'S MESSAGE

**Greetings, Readers**

Speaking to you on behalf of the department of Electrical and Electronics Engineering has always been a privilege and a joy. Students are continuously supported by the department, which also helps them develop their innovative skills and abilities. Our department's several priority areas, such as renewable energy and e-vehicles, are aimed at improving people's everyday life. The department empowers students to carry out financed research in well-equipped research laboratories by fostering an innovative and inquisitive environment. To keep them on the cutting edge, we give them a well-planned, up-to-date academic education. We also give them the connections they need to pursue higher education and an entrepreneurial path.

Students that receive holistic development become more responsible, creative, and inventive. As a result, we encourage our students to participate inextracurricular and co-curricular activities in addition to their coursework. They can become future leaders since this method boosts their self-esteem, cultivates a positive outlook, and increases their social and ethical awareness. Their constant development and accomplishments are made possible by their efforts as well as the steadfast support of their parents, instructors, and well-wishers. Little actions taken repeatedly over time add up to success. Never give up because the work you do now will determine the engineer, inventor, and leader you become in the future. I would want to express my sincere gratitude to everyone who helped the EEE department succeed.

<div align="right">

Dr. Indragandhi V
Professor
School of Electrical Engineering (SELECT)

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## 2.1  HISTORY OF EEE

The B.Tech Electrical and Electronics Engineering programme had its inception in 1994. The programme lays emphasis on strong theoretical background on electrical engineering concepts in addition to providing avenues for divergent applications related to electromagnetism, power engineering, electronics and renewable resources.

The programme is handled by a team of experienced faculty equipped with wide research expertise in domains such as Smart Grid, Energy Management, E-Vehicle, Renewable and Sustainable Energy, Energy Monitoring, Insulation Diagnosis etc.

The department has excellently furnished laboratories to cater to the needs of both curriculum and research requirements.  In addition, industry sponsored Centre of Excellence Schneider Electric Laboratory, Power System Research Lab,Switchgear& Protection Lab with high voltage testing facility for insulation diagnosis etc., provide the students with the essential hands-on experience to tackle real-time industry related challenges.

The department has signed several MoUs with various reputed Industries and Universities across the globe. The curriculum of the programme is conceived and formulated in close collaboration with leading experts from industries to ensure effective bridging of the gap between industry and academia.

## 2.2  INNOVATIONS

**E-Vehicle technology:**

**Electric vehicle (EV) technology includes charging infrastructure, regenerative braking, and battery packs. EVs are quieter, more responsive, and have better energy efficiency than traditional internal combustion engine (ICE) vehicles.**

**Charging infrastructure**

- **Public charging stations allow drivers to travel long distances without interruption.**
- **Some countries are installing charging networks.**

**Regenerative braking**

- **Regenerative braking systems capture energy that would otherwise be lost when braking.**
- **This energy is then stored in the battery pack, which extends the vehicle's range.**

**Battery packs**

- **The capacity of the battery pack affects the range of the EV.**
- **For example, the Kia EV6 has a 77.4 kWh battery pack.**

**Other EV technologies Advanced Driver Assistance Systems (ADAS), Dual-screen dashboards, and Multisensory entertainment.**

**EV models**

- **MG Comet EV**
- **TATA Punch.ev**
- **BMW i7**
- **Kia EV6**
- **MG Windsor EV**
- **MG ZS EV**
- **Nissan Leaf**

# 2.3 FACILITIES

The B.Tech Electrical and Electronics Engineering program conceived with industry partners and ensure world-class facilities which provide students with the knowledge and technical expertise in a wide range of Electrical and Electronics domains which include latest research areas like Smart Grid, Power Electronics, and Electric Vehicle etc. The electrical and electronics engineers are required in various core industries, IT companies and PSUs. Besides, the program enhances the creativity of the students to develop innovative projects and eventually results in novel products which help to starts their own company.

## Laboratories:

- Schneider Centre for Excellence Laboratory
- Electrical Machines Laboratory
- Power Systems Research Laboratory
- Protection and Switchgear Laboratory
- Digital Simulation Laboratory

## Major Equipment:

- High Voltage Test & Measuring Equipment – Impulse Test Set (100 kV, 10 kVA AC, 140 kV, 25 mA DC / 140 kV, 980 Joules)
- Fault Analyzer (LL-LG)
- Dielectric Testing and Measurement System for Insulation Diagnosis- Partial Discharge Testing and Measurement System
- 3-Phase Transformer/ differential relay (Transformer Protection Simulator)
- Generator Protection Simulator

- **SCADA Based Setup for Generator Protection Simulator**

- **CYME T & D Power Engineering**

- **Air Circuit Breaker**

- **Typhoon - Real-Time emulator**

- **PMSG Machine coupled with DC motor**

- **ElecNet VT Perpetual**

- **Programmable AC/DC Electronic Load**

- **High Performance GPU Hardware System with Accessories**

- **Driver Control System for Electrical Machines and Driver Test Bench**

- **APLAB make custom built DC power supply. O/P 20-200V/200A**

- **Computerization of testing and controlling Induction Motor bundle (8 slot integrated dual controller Artix-7FPGA, 512 MB RAM and 1GB ROM memory with ethernet cable)**



Product Development
Phase II
Smart Inverter for PM Synchronous
Motor based E-compressor

# 2.4  EVENTS

According to the statistical data, students have orchestrated a wide range of events ranging from thons to work shops. These events serve as a platform for creativity, networking, and knowledge exchange, contributing significantly to personal and academic development. These initiatives not only enhance students' organizational and leadership skills but also promote collaboration and innovation across various disciplines.

| Sl. No | Event Title | From Date | To Date | Participant | Level |
|---|---|---|---|---|---|
| 1. | International Conference on Automation, Signal Processing, Instrumentation and Control (ICASIC 2022) | 28-11-2022 | 29-11-2022 | 240 | International |
| 2. | Virtual International Conference on Recent Advancements in Power System and Renewable Energy | 11-11-2022 | 11-11-2022 | 120 | International |
| 3. | One Day International Virtual Conference- Recent Advancements in Power System and Renewable Energy (RAPSRE22) | 11-11-2022 | 11-11-2022 | 120 | International |
| 4. | Angel Investment / Venture Capitalist Funding Opportunity forEarly-Stage Entrepreneurs | 07-09-2022 | 07-09-2022 | 44 | National |
| 5. | HOTEEE2023 | 17-03-2023 | 18-03-2023 | 32 | National |
| 6. | Energy Conservation Week | 14-12-2022 | 18-12-2022 | 300 | National |
| 7. | One-Day Workshop with Hands-On Training on Substation Automation and Relay Protection Using Communication ControlSARPUCC-2022 | 19-10-2022 | 19-10-2022 | 30 | National |
| 8. | Two Day National Workshop on Embedded System and Arm Processor - Hands On | 29-07-2022 | 30-07-2022 | 26 | National |

# 3.1 STUDENT ACHIEVEMENTS

**DETAILS OF EVENTS OUTSIDE THE STATE AY 2022-23**
**International (AY 2022-23)**

| S. No | NAME | Reg. No. | Event Name & Place | Position | Award Detail |
|---|---|---|---|---|---|
| 1. | Harris John E | 19BEE0294 | RICCARDO PALLETI CIRCUIT, VARANO DE MELEGARI, Italy | Participation | Participated in RICCARDO PALLETI CIRCUIT, VARANO DE MELEGARI, Italy |
| 2. | Jamal Fowzan P | 20BEE0384 | Galgotias University and Buddh International Circuit, Greater Noida | Third | Formula Hybrid Car in Formula Imperial Season 8.0 |
| 3. | Austin Senson | 19BEE0230 | Galgotias University and Buddh International Circuit, Greater Noida | Second | Second position in Business Plan in Formula Hybrid Car |
| 4. | Austin Senson | 19BEE0230 | Galgotias University and Buddh International Circuit, Greater Noida | Third | Third position in Cost Presentation of Formula Hybrid Car |
| 5. | Himanshu Singh | 20BEE0116 | NIT, Meghalaya, Shillong | Paper presented | Participated in paper presentation |
| 6. | Devanshu Sharma | 20BEE0191 | IRDC SPROS-International Rover Design Challenge | First | First position at International Rover Design Challenge 2022 |
| 7. | Devesh Shevde | 21BEE0234 | IRDC SPROS-International Rover Design Challenge | First | First position at International Rover Design Challenge 2022 |
| 8. | Shaurya Chandra | 20BEE0314 | IRDC SPROS-International Rover Design Challenge | First | First position at International Rover Design Challenge 2022 |

| 9. | Harris John E | 19BEE0294 | Formula SAE Italy 2022 | Participated | Participated as competitor |
|---|---|---|---|---|---|
| 10. | Sanjit F | 19BEE0089 | Formula SAE Italy 2022 | Participated | Participated as competitor |
| 11. | Mohammed Kaif | 19BEE0137 | EFEA 2022, Bagatelle Moka MU; Mauritius | Paper Presented | Optimizing Hydrogen Consumption in Fuel cells Using Simulated Annealing Algorithm |
| 12. | Mukund | 19BEE0122 | EFEA 2022, Bagatelle Moka MU; Mauritius | Paper Presented | Optimizing Hydrogen Consumption in Fuel cells Using Simulated Annealing Algorithm |
| 13. | Saurabh Basu | 19BEE0129 | EFEA 2022, Bagatelle Moka MU; Mauritius | Paper Presented | Optimizing Hydrogen Consumption in Fuel cells Using Simulated Annealing Algorithm |
| 14. | S Visweshwar | 19BEE0123 | ICESC 2022, Coimbatore | Paper Presented | Microcontroller based Mosquito Prevention and Elimination on Water Body by Integrated Subsystems |
| 15. | Syed Mohiuddin Ahmed | 19BEE0115 | ICESC 2022, Coimbatore | Paper Presented | Microcontroller based Mosquito Prevention and Elimination on Water Body by Integrated Subsystems |

| | | | | |
|---|---|---|---|---|
| 16. | Deepak Kumar R | 19BEE0332 | ICESC 2022, Coimbatore | Paper Presented | Microcontroller based Mosquito Prevention and Elimination on Water Body by Integrated Subsystems |
| 17. | Syed Mohiuddin Ahmed | 19BEE0115 | ICESC 2022, Coimbatore | Paper Presented | Microcontroller based Mosquito Prevention and Elimination on Water Body by Integrated Subsystems |
| 18. | Ishaan Chandra Saxena | 20BEE0157 | ICCIML -2022 Hyderabad | Paper Presented | Paper presentation at ICCIML -2022 |
| 19. | Dev Shankar Paul | 19BEE0375 | ICNTE 2023 Navi Mumbai | Paper Presented | Indoor Positioning System Using LiFi Based Network for Mobile Robots |
| 20. | Amit Kumar | 20BEE0092 | ICEES 2023 Chennai | Paper Presented | IoT based Smart Assistance for Visually Impaired People |
| 21. | Himanshu Singh | 20BEE0116 | ICEES 2023 Chennai | Paper Presented | IoT based Smart Assistance for Visually Impaired People |
| 22. | PrakharRai | 20BEE0082 | ICEES 2023 Chennai | Paper Presented | IoT based Smart Assistance for Visually Impaired People |
| 23. | Sabarivelan S | 20BEI0059 | ICEES 2023 Chennai | Paper Presented | IoT based Smart Assistance for Visually Impaired People |
| 24. | Arvind T | 19BEE0402 | iCASIC 2022,Taylor's University, Malaysia | Paper Presented | Paper presented at iCASIC 2022 |
| 25. | S Visweshwar | 19BEE0123 | iCASIC 2022, Taylor's University, Malaysia | Paper Presented | Paper presented at iCASIC 2022 |

| S. No | Name of the student | Reg.No. | Event Name &Place | Position | Award Detail |
|---|---|---|---|---|---|
| 26. | Sanjit F | 19BEE0089 | iCASIC 2022, Taylor's University, Malaysia | Paper Presented | Paper presented at iCASIC 2022 |
| 27. | Siddharth Pany | 21BEE0179 | RISEE 2023 Puducherry | Paper Presented | SOC Estimation of Lithium-ion battery using Deep Neural Network |
| 28. | Jandial Prajna Puneet | 19BEE0098 | Woods Hole Oceanographic Institution Woods Hole | Summer Student Fellowship | Summer student fellowship with stipend of $8040 |

## DETAILS OF EVENTS OUTSIDE THE STATE AY 2022-23
## National (AY 2022-23)

| S. No | Name of the student | Reg.No. | Event Name &Place | Position | Award Detail |
|---|---|---|---|---|---|
| 1. | Mehak Mahajan | 20BEE0389 | SAE VIT Vellore | Social Media Award | Human Exploration Rover Challenge 2022 |
| 2. | Anish Kumar P | 19BEE0135 | SAEINDIA, Pithampur | Second | Ebaja category |
| 3. | Chethan Reddy A | 20BEE0197 | Cyber Security Hackathon 2023 IIC, VIT | TOP 10 | One of top 10 in KAVACH 2023 representing VIT Vellore |
| 4. | Bishal Saha | 20BEE0298 | Agrithon | First | Cash prize of 15 thousand |
| 5. | Apurba Ranjan | 20BEE0203 | Pe Con 2022 | Paper Presented | UNHRC at the People's Conference 2022 |
| 6. | Ayush Senapati | 19BEE0171 | ICCCNT 2022, Kharagpur | Paper Presented | Identification of blurred objects in real time video using deep learning neural networks |

## DETAILS OF EVENTS WITHIN THE STATE AY2022-23

| S. No | NAME | Regn. No. | Event Name &Place | Position | Award Detail |
|---|---|---|---|---|---|
| 1. | Neha. D | 21BEE0376 | VIT, Vellore | Second | VIT Premier League Vellore |
| 2. | Rajagopal B | 22BEE0063 | VIT, Vellore | 10th and participation | IoT workshop |
| 3. | Neha. D | 21BEE0376 | VIT, Vellore | First | Olympic Day Sports 2023-2024 |
| 4. | S Harini Hemavarshini | 20BEE0183 | Idea -O-Lite Sriperumbudur | Finalist | Presented a paper |
| 5. | A Anirudh Bharadwaj | 21BEE0411 | IT VIT, Vellore | Solo-First Winner | Ideathon |
| 6. | A Anirudh Bharadwaj | 21BEE0411 | HACK 4 IMPACT VIT, Vellore | First | 24 hours hackathon |
| 7. | S Harini Hemavarshini | 20BEE0183 | Idea -O-Lite Sriperumbudur | Finalist | Presented a paper |
| 8. | A Anirudh Bharadwaj | 21BEE0411 | Workshop VIT | Participation | 2 Day workshop |
| 9. | Aditya Pratap Singh | 22BEE0333 | VIT Vellore | Participation | Gravitas, Quadcopter Workshop |
| 10. | Satyam Choudhary | 21BEE0267 | VIT Vellore | Participation | 'Major Challenges, Innovation and Opportunities in Energy Industry' organized by SELECT |
| 11. | Sristi Mukherjee | 21BEE0230 | VIT Vellore | Participation | 'Major Challenges, Innovation and Opportunities in Energy Industry' organized by SELECT |

# 3.2   FACULTY ACHIEVEMENTS

**No. of Books published/Edited/Authored/Chapter:**

| Sl. No. | Content Title | ISBN | Content Type |
|---|---|---|---|
| 1. | Big Data Analytics in Astronomy, Science, and EngineeringIntegrated Transmission and Distribution Modelling Using Multi-Agent Based Framework – Devesh Shukla and S. P. Singh | 9783031283499 | Book Authored |
| 2. | Smart Energy Management for Microgrid and Photovoltaic Systems - V Indragandhi | 9783036567181 | Book Edited |
| 3. | Sensors for Next-Generation Electronic Systems and Technologies - P. Uma Sathyakam, K. Venkata Lakshmi Narayana | 9781032265155 | Book Edited |
| 4. | Interconnect Technologies for Integrated Circuits and Flexible Electronics – Nayash Agrawal, Kavicharan Mummaneni, P. Uma Sathyakam | 9789819944767 | Book Edited |
| 5. | Intelligent and Soft Computing Systems for Green Energy Intelligent and Soft Computing Systems for Green Energy - A. Chitra, V. Indragandhi, W. Razia Sultana | 9781394166374 | Book Edited |
| 6. | Algorithm and Design Complexity - Sherine A.; Jasmine M.; Peter G.; Alexander S.A. | 978-1000865516 | Book |

## Sponsored Research:

| Project Title | Funding Agency | Amount In INR | Duration/Sanctioned Date | PI/Co-PIs | Outcome |
|---|---|---|---|---|---|
| Development of fuel cell Three-Wheeler for urban Green Transportation in India | RYEUK | 1000000 | 3yrs (March 2023 – March 2025) / 15-03-2023 | Prof. Thundil Karuppa Raj R. Prof. Elangovan D, Prof. Denis Ashok S | -- |
| Development of an Interdisciplinary Approach for the Diagnosis and Correction of The Emotional Sphere Disorders of Children Using Artificial Intelligence Methods: A Cross-Cultural Study | DSTIR | 3710016 | 3yrs (March 2023 – Feb 2026) / 30-12-2022 | Prof. Ruban N Prof. Mary Mekala A Prof. Thenmozhi M Prof. Prabhakar Karthikeyan Prof. Monica Subashini M Prof. Varalakshmi M | No. of Papers published - 03 |

## Product Development:

| Sl. No | Patent Title | Date | Status |
|---|---|---|---|
| 1 | Small scale wind energy conversion system | 15-03-2023 | Filed |
| 2 | A wind flow functioned piezoelectric energy harvesting system for multiple wind speed conditions | 26-03-2021 | Published |

# 4.1 PROJECTS

| S. No | REG.NO | Name | Guide Name | Title | Capstone Project at Inhouse/ Industry/ SAP |
|---|---|---|---|---|---|
| 1 | 19BEE0001 | KUPPIREDDY AKHIL REDDY | Dr. VENKATARAMAN M. N | Live stockify | Inhouse |
| 2 | 19BEE0002 | ADITYA ASPAT | Dr. KOWSALYA M | wind powered cars | Inhouse |
| 3 | 19BEE0004 | SHIVAM RAJPUT | Dr. KOWSALYA M | Islanding Detection for DC Micro grids based on episode of care index | Inhouse |
| 4 | 19BEE0005 | BHALERAO PRANAV RAJESH | Dr. BELWIN EDWARD J | 4.5 KW Undersung RBC and EBC Battery Charger. | Inhouse |
| 5 | 19BEE0008 | THEDLA NITHIN | Dr. SARAVANAKUMAR R | Crop Shield System with IoT Technology Surveillance | Inhouse |
| 6 | 19BEE0011 | KARANAM TARUN | Dr. RAVI K | Solar Tracking System With Panel Condition | Inhouse |
| 7 | 19BEE0012 | NAMAN KAPOOR | Dr. SRIHARI MANDAVA | Condition Monitoring of Rotating Electrical Drive using Deep Learning. | Inhouse |
| 8 | 19BEE0015 | ABHISHEK TIWARI | Dr. ALBERT ALEXANDER S | IoT Based Smart Blind Stick With SoS& Live Tracking System | Inhouse |
| 9 | 19BEE0017 | SUMAN KUMAR | Dr. WASHIMA TASNIN | Stage wise Scheme for Energy Distribution | Inhouse |
| 10 | 19BEE0018 | ROHIT KUMAR | Dr. BELWIN EDWARD J | Compressed Air Energy Storage System | Inhouse |
| 11 | 19BEE0020 | TELURU SIVA REDDY | Dr. SARAVANAKUMAR R | Dynamic charging of electric vehicles | Inhouse |
| 12 | 19BEE0021 | MOOLA SRI HEMANTH REDDY | Dr. GOKULAKRISHNAN G | IOT Based Air Pollution Quality Monitoring System | Inhouse |
| 13 | 19BEE0022 | P V V HARDHIK | Dr. RAJA SINGH R | Eye Drop Adherence System | INDUSTRY |

| 14 | 19BEE0024 | UDHAN ASHUTOSH RAMCHANDRA | Dr. SHARMILA A | Diabetes prediction using Machine learning | Inhouse |
|---|---|---|---|---|---|
| 15 | 19BEE0026 | AVINASH TIWARI | Dr. BELWIN EDWARD J | 4.5 KW Undersung RBC and EBC Battery Charger. | Inhouse |
| 16 | 19BEE0027 | SUMEET KUMAR BHAISAL | Dr. WASHIMA TASNIN | Stage wise Scheme for Energy Distribution | Inhouse |
| 17 | 19BEE0029 | KOLLI SAI RISHITH | Dr. RAJA SINGH R | BMS Testing and Validation. | INDUSTRY |
| 18 | 19BEE0030 | SIDDARTH PANKAJAKSHAN | Dr. SARAVANAKUMAR R | Crop Shield System with IoT Technology Surveillance | Inhouse |
| 19 | 19BEE0031 | B PRANEETH REDDY | Dr. SARAVANAKUMAR R | Dynamic charging of electric vehicles | Inhouse |
| 20 | 19BEE0033 | MOHAMMAD NAHEEM | Dr. SARAVANAKUMAR R | Dynamic Wireless Charging of Electrical Vehicle | Inhouse |
| 21 | 19BEE0034 | AMBATI V R AKHILESH | Dr. GOKULAKRISHNAN G | IOT Based Air Pollution Quality Monitoring System | Inhouse |
| 22 | 19BEE0035 | ROHIT KUMAR | Dr. WASHIMA TASNIN | Stage-wise Scheme for Energy Distribution | Inhouse |
| 23 | 19BEE0037 | NADIR NAJEEB KASSIM | Dr. BELWIN EDWARD J | Acoustic logger for activity detection in forest. | INDUSTRY |
| 24 | 19BEE0039 | SINGH KETAKA KUMAR MANJEET | Dr. ANUSUYA BHATACHARYYA | High energy storage supercapacitor films with RTV Silicone. | Inhouse |
| 25 | 19BEE0040 | RAPTADU ABHIGNA | Dr. MEIKANDASIVAM S | EV charging Station using Solar and Grid Power | Inhouse |
| 26 | 19BEE0041 | VASADI GOWTHAM RAJ | Dr. MEIKANDASIVAM S | EV charging Station using Solar and Grid Power | Inhouse |
| 27 | 19BEE0042 | PRANJAL SHARMA | Dr. INDRAGANDHI V | Design and Implementation of intelligent Urban Irrigation System | Inhouse |
| 28 | 19BEE0046 | AKSHAT SHARMA | Dr. YEDDULA PEDDA OBULESU | Design of a DC-DC converter for solar powered EV charger | Inhouse |

| 29 | 19BEE0050 | SAHELY DEB | Dr. KOWSALYA M | Integration of Solar, Wind and Wave energy to Micro Grid | Inhouse |
|---|---|---|---|---|---|
| 30 | 19BEE0055 | DAKSH SHARMA | Dr. ALBERT ALEXANDER S | IoT Based Smart Blind Stick With SoS & Live Tracking System | Inhouse |
| 31 | 19BEE0056 | MOORI JAWAHAR REDDY | Dr. RAVI K | Implementation & Simulation of a 3 phase grid connected Photovoltaic system by using MPPT algorithm. | Inhouse |
| 32 | 19BEE0061 | KHANEEYS M K | Dr. RAJA SINGH R | PMSM Fault Analysis | Inhouse |
| 33 | 19BEE0062 | ANKITA JAISWAL | Dr. TAPAN PRAKASH | Improving performance of CNN algorithm via Metaheuristic optimization algorithm for Image Processing | Inhouse |
| 34 | 19BEE0063 | DEVARAKONDA SAHITHI KIRANMAYI | Dr. KOWSALYA M | Integration of Solar, Wind and Wave energy to Micro Grid | Inhouse |
| 35 | 19BEE0065 | BAHETI YASH SUNIL | Dr. SHARMILA A | Diabetes prediction using Machine learning | Inhouse |
| 36 | 19BEE0070 | ARNAV PRANJAL | Dr. ANUSUYA BHATACHARYYA | ESTIMATION OF NOX MITIGATION WITH INDUSTRIAL WASTE CASCADED WITH DIELECTRIC BARRIER DISCHARGE. | Inhouse |
| 37 | 19BEE0071 | HARSH GARG | Dr. ALBERT ALEXANDER S | IoT Based Smart Blind Stick With SoS& Live Tracking System | Inhouse |
| 38 | 19BEE0072 | RAHUL RAJ | Dr. ANUSUYA BHATACHARYYA | High energy storage supercapacitor films with RTV Silicone. | Inhouse |
| 39 | 19BEE0074 | BYRI MANOJ S | Dr. RAJA SINGH R | PMSM Fault Analysis | Inhouse |

# 4.2  PUBLICATIONS

Students are encouraged to submit articles to magazines that are pertinent to the most recent advancements in the fields of Electrical and Electronics Engineering, as well as other engineering disciplines. The received articles are reviewed by the team membersand the selected articles are published in ELECTRICA magazine.

| S.No. | Name of the article | Name of the contributed student | Description |
|---|---|---|---|
| 1 | Solar PV Wireless Power Transfer System | Yash Sharma (20BEE0172) | This article focuses on developing a wireless power transfer system using mutual induction coupling method, utilizing a high frequency transformer and inverter to ensure ripple-free and constant incoming voltage. The system considers factors such as copper loss, iron loss and mechanical loss to make it cost-effective and feasible, using a 15V DC load for practical implementation. |
| 2 | Analysing The Electronics of Image Sensors and Their Functionality to Develop Images of Low-Light Emitting Sources | Hridya Hirawat (22BEE0256) | This article provides a comprehensive analysis of digital imaging technology focusing on low light emitting sources. It discusses on existing research and product websites and presents a proposed setup and an electro-mechanical hardware model of a barn door star tracker using available market components. |
| 3 | A Smart Farming Concept Based on Smart Embedded Electronics, Internet of Things and Wireless Sensor Network | Niveditha A M (22BEI0040) | This article introduces a smart Agri-system based on embedded electronics, IoT and wireless sensor networks. The system architecture includes core components, communication protocols and a functional framework. The article provides a detailed framework, circuit diagrams, working principles and functionality. Benefits of implementing the smart farming system are discussed, along with challenges and the scope for further development. As the global population grows, researchers are prioritizing the development and enhancement of smart farming systems. |

| 4 | Implementation of Solar PV-Battery and Diesel Generator based Electric Vehicle Charging Station | Kshitij Shallesh Tater (21BEE0094) | Artificial Neural Networks (ANNs) are powerful machine learning algorithms for load forecasting in electric vehicles (EVs). They learn from past data and can handle seasonal factors like weather. In this article, the Bayesian algorithm is used for EV load forecasting. The model uses a three-phase diode clamped MLI and high boost DC-DC converter to amplify output voltage. The efficiency of different motor types is analyzed using the 'Equivalent Consumption Minimization Strategy'. |
|---|---|---|---|
| 5 | An Efficient Regenerative Braking System Based on Battery-Ultra Capacitor for Electric Vehicles | Lavanya Ravi (21BEE0098) | Electric vehicles use regenerative braking technology to charge the battery, but power losses occur. This article discusses an energy storage system using an ultra-capacitor module and a nickel-metal hydride battery. A new DC-DC converter with isolated topology and Hybrid Energy Storage System (HESS)improves system efficiency compared to a standalone battery system. |

# 5.0  AWARDS & RECOGNITION

| S. No | Faculty | Awarding Agency | Name of Award | Award Type |
|---|---|---|---|---|
| 1 | Dr. Balaji S | MDPI | Certificate of Appreciation | Recognition |
| 2 | Dr. Sharmila A | AD Scientific Index | World Ranking Scientist | Recognition |
| 3 | Dr. Albert Alexander S | DST SERB | DST SERB PROPOSAL EVALUATOR | Recognition |
| 4 | Dr. Jacob Raglend I | Noorul Islam Centre for Higher Education | Board of Study | Recognition |
| 5 | Dr. Mahalakshmi P | Reva University | Member of Board of Studies | Recognition |
| 6 | Dr. Jacob Raglend I | Saintgits College of Engineering | Board of Study | Recognition |
| 7 | Dr. Albert Alexander S | IEEE | CHAIRMAN IEEE POWER ELECTRONICS SOCIETY IEEE MADRAS SECTION | Recognition |
| 8 | Dr. SrihariMandava | Python Institute Open Education and Development Group | Certified with Certificate of Proficiency in the Python Programming Language | Recognition |
| 9 | Dr. Geethanjali P | Department of EEE | Board of Studies Member | Recognition |
| 10 | Dr. Albert Alexander S | Taylors University | Adjunct Professor | Recognition |

| 11 | Dr. Jacob Raglend I | PSN College of Engineering and Technology | Board of Study | Recognition |
|---|---|---|---|---|
| 12 | Dr. Jacob Raglend I | Velalar College of Engg and Technology | Board of Study | Recognition |
| 13 | Dr. Ruban N | VIT Vellore in association with Prince Sultan University Saudi Arabia | Session Chair | Recognition |
| 14 | Dr. Geethanjali P | Department of EEE | Department Advisory Committee Member | Recognition |
| 15 | Dr. Chitra A | National Institute of Technology | Best Paper Award | Awards |
| 16 | Dr. Marimuthu R | VIT | 36 hours Make-a-thon Event | Recognition |
| 17 | Dr. Dhanamjayulu C | VIT VELLORE | THIRTY SIX HOURS CONTINUES MAKEATHON EVENT | Recognition |
| 18 | Dr. Sharmila A | VIT | Reviewer for SELECT MAKE A THON | Recognition |
| 19 | Dr. Rashmi Ranjan Das | Elsevier | Certificate of reviewing | Recognition |
| 20 | Dr. Balaji S | Vellore Institute of Technology | Certificate of Appreciation | Recognition |
| 21 | Dr. Geetha M | International Journal of Electrical and Computer Engineering Systems | Journal Reviewer Recognition | Recognition |

| 22 | Dr. Rani  C | Sri Krishna College of technology | Invited as a Syllabus Validating Expert | Recognition |
|----|-----------|----------------------------------|----------------------------------------|-------------|
| 23 | Dr. Sharmila  A | VIT | Research Award for h index contribution to VIT | Recognition |
| 24 | Dr. Sharmila  A | VIT | Research Award for h index contribution to VIT | Recognition |
| 25 | Dr. Razia Sultana  W | Vellore Institute of Technology Vellore | Research award | Awards |
| 26 | Dr. Jacob Raglend  I | SSM Institute of Engineering and Technology | Academic Advisory Committee Member | Recognition |
| 27 | Dr. Prabhakar Karthikeyan  S | IEEE | Best paper in the International IEEE conference by Srilanka section | Awards |
| 28 | Dr. Jacob Raglend  I | Mar Baselios College of Engineering and Technology | Board of Study | Recognition |
| 29 | Dr. Sathishkumar  K | VIT | Research award | Awards |
| 30 | Dr. Geetha  M | IEEE | IEEE Senior Member Grade Elevation | Fellowship |
| 31 | Dr. Jakeer Hussain | Danfoss Drives India | Danfoss solution award | Recognition |
| 32 | Dr. Rani  C | University Grants Commision UGC | Reviewer for Fellowship and Grants at UGC | Recognition |

| 33 | Dr. Uma Sathyakam P | Springer Nature | Associate Editor in Journal | Extension |
|---|---|---|---|---|
| 34 | Dr. Jacob Raglend I | IEEE | IEEE Senior Member | Fellowship |
| 35 | Dr. Rashmi Ranjan Das | Hindawi | Certificate of reviewing | Recognition |
| 36 | Dr. Albert Alexander S | AICTE | AICTE approved Translator under National Educational Policy 2020 | Recognition |
| 37 | Dr. Geetha M | AICTE India | Appreciation for act as a Reviewer for Tamil translation engineering book from AICTE India | Recognition |
| 38 | Dr. Sitharthan R | IEEE and Sri Sai Ram Engineering College | Best Paper Award | Awards |
| 39 | Dr. Amutha Prabha N | Taylors University | Judge in EURECA conference in Taylors University | Recognition |
| 40 | Dr. Jacob Raglend I | Taylors University | Judge in 18th EURECA International Engineering Research Conference | Recognition |
| 41 | Dr. Ruban N | Taylors University | JUDGE | Recognition |
| 42 | Dr. Balaji S | Taylors University | Judge 18th EURECA International Engineering Research Conference | Recognition |
| 43 | Dr. Monica Subashini M | Taylors University | Judge 18th EURECA International Engineering Research Conference | Recognition |

| 44 | Dr. Jaganatha Pandian B | Taylors University Malaysia | JUDGE for 18th EURECA International Engineering Research Conference | Recognition |
|----|----|----|----|----|
| 45 | Dr. Monica Subashini M | Taylors University Malaysia | International Conference Session Chair | Recognition |
| 46 | Dr. Amutha Prabha N | Taylors University | Best Paper Award | Awards |
| 47 | Dr. Marimuthu R | VIT | Organizing Committee Member - iCASIC Conference | Extension |
| 48 | Dr. Anbarasan P | The institution of engineers ( India ) | The institution of engineers ( India ) | Recognition |
| 49 | Dr. Geetha M | Sri Krishna College of Engineering and Technology | Reviewer Recognition | Recognition |
| 50 | Dr. Geetha M | DST SERB | Reviewer Recognition | Recognition |
| 51 | Dr. Rani C | University des Mascareignes | Adjunct Professor | Recognition |
| 52 | Dr. Venkata Lakshmi Narayana K | Office of Academic Research VIT | RAMAN RESEARCH AWARD | Awards |
| 53 | Dr. Prabhakar Karthikeyan S | MDPI | Guest Editor | Extension |
| 54 | Dr. Prabhakar Karthikeyan S | MDPI Publications | Certificate of service | Extension |

- **International Conference (i-pact 2023) jointly organized by VIT, Vellore and University Malaya, Malaysia.**



- **International Conference (ICASIC 2022) jointly organized by VIT, Vellore and Taylor's University, Malaysia.**



ICASIC 2022          NOVEMBER 28-29,2022

- ICASIC 2022 was jointly organized by VIT, Vellore and Taylor's University, Malaysia.
- ICASIC 2022 was hosted at Taylor's University, Malaysia.
- Theme of the conference was "Sustainable Developments through Automation".
- 174 papers were received.
- Accepted papers will be published in American Institute of Physics (AIP) proceedings.

# 6.0   ALUMNI SPOTLIGHT

- **Founder at KuppiSmart Solutions by Alumni (AKHIL REDDY)**



**AKHIL REDDY** ✓ (He/Him) · 2nd

Founder at KuppiSmart Solutions (Incubated startup at VIT,Ag-Hub)

Hyderabad, Telangana, India · Contact info

Vellore Institute of Technology

**Kuppismart Solutions Pvt Ltd pioneers advanced IoT solutions and data analytics for diverse agricultural domains including poultry, dairy, mushroom farming, sericulture, controlled environment agriculture, and piggery farming. Our cutting-edge IoT devices monitor critical parameters such as temperature, humidity, air quality, soil moisture, and nutrient levels, delivering real-time insights for optimal farm management. In poultry, our sensors track environmental conditions and predict diseases using AI and ML algorithms, ensuring the health and productivity of livestock. For dairy, our systems optimize farm THI and animal welfare. In mushroom farming, we maintain ideal growing conditions, while in sericulture, we enhance silk production through precise monitoring. Our technology also supports hydroponics and greenhouses in controlled environment agriculture. By harnessing the power of data, Kuppismart empowers farmers with actionable insights, driving sustainable and profitable farming practices across various sectors.**

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# 7.0  CREATIVE CORNER

## DESIGN AND ANALYSIS OF MODULAR WHEELED ROBOT

### S.SIDDHARTH - 20BEE0001

With the decrease manpower in agricultural sector a need for automation is warranted. So a modular mobile wheeled robot platform was conceptualized, designed and analysed. The mobile platform had to work at a comparable pace to the workers it is trying to replace, so it has to be quick in navigating the uneven terrains. Previous literatures on wheeled robots were mostly on Rocker Bogie suspension which is very good in traversing uneven terrain but has a speed limitation due to lack of damping. In this project we have tried to solve the problem with a unique rocker suspension with pneumatic suspension on all wheels. Which allows for damping and maintain all wheel contact and contact pressure. With ride height adjustment in the works. The mobile platform is designed to equip multiple equipment and monitoring sensors to do various actions from monitoring farms to harvesting fruits. The kinematic model of the wheeled robot platform was developed to analyse its ability to traverse uneven terrains and slip. And the overall system is analysed in Robotic Operating System. The proposed robotic platform is hoped to kick start the automation in agriculture.
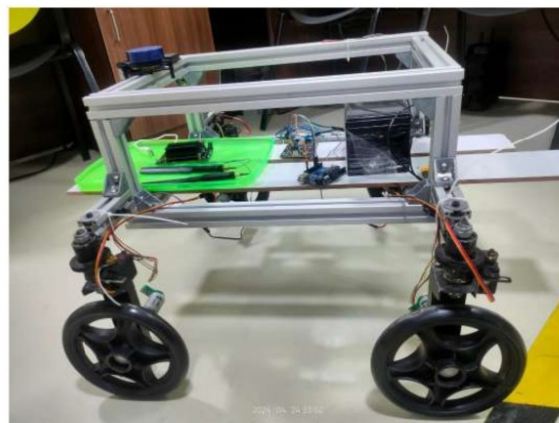


Robot Setup Model

Overall, wheeled robots with robotic arms represent a powerful combination of mobility and manipulation capabilities. Their versatility, coupled with advancements in robotics technologies like AI, machine learning, and computer vision, continues to expand their potential applications and make them increasingly integral to modern industries and research endeavours.

# ROBUST CONTROLLER DESIGN FOR 2-DOF HELICOPTER SYSTEM

## PRITHWISH PRADHAN - 20BEE0026

Controlling a 2-degree-of-freedom (DOF) helicopter is challenging due to its nonlinearities and sensitivity to external disturbances. This summary explores robust control design methods to address these issues. Conventional approaches often linearize the complex model, which might not perform well under real-world conditions. Two alternative strategies are presented here:

- Considering Model Uncertainties: The nonlinearities are included as uncertainties in the model. This allows for designing a robust controller using Linear Matrix Inequalities (LMIs) and decentralized Proportional-Integral (PI) controllers. This method offers good tracking control and desired closed-loop pole placement.

- Learning-Based Control: A learning strategy adapts to model uncertainties and disturbances. This method employs a gradient descent algorithm to minimize a cost function based on the system's error dynamics. This approach has been validated through simulations and experiments.

Both methods offer promising avenues for robust control of 2-DOF helicopter systems, ensuring stability and desired trajectory tracking even in the presence of uncertainties and disturbances. Controllers such as PI/PD and LQR have been used earlier, but here in our project, we are going to design our own robust controller.



DoF Helicopter System

A 2-DOF (degree-of-freedom) helicopter is a small, lab-based helicopter model that allows for studying flight control systems. The project "Robust Controller Design for 2-DOF Helicopter System" tackles the challenge of designing a control system that can handle this helicopter's flight dynamics.

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**
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# REAL-TIME V/F TECHNIQUE BASED SPEED CONTROL OF BLDC MOTORS

## SNEHA HARISH (20BEE0180)

V/F is a simple yet efficient technique to control the speed of PMSMs. V/F control allows for smooth starting and stopping of motors, eliminating the sudden jolts and stresses associated with direct-on-line starting. Coupled with an advanced commutation strategy such as SVPWM, it allows for smoother operation of the motor. These benefits come at the price of having to implement computationally taxing mathematical transformations, advanced commutation techniques, microcontroller driver development and tuning of a PI controller. While each of these tasks is challenging, majority of it is relatively straightforward to implement regardless of the hardware. Tuning the controllers, is, however, not as formulaic and varies greatly by application specific requirements and the unique combination of hardware. Commonly available tools and workflows for motor control implementation suit vendor specific hardware and software combinations. This thesis investigates the possibility of combining the various sources and developing a common workflow to control a PMSM through the V/F technique.



The hypothesis of this thesis is that this can provide a vendor independent, universally applicable workflow for the end-to-end implementation of V/F control, with a focus on tuning. To demonstrate this workflow, the speed control of a PMSM (specifically BLDC motor) is presented. Ultimately, the speed control of a BLDC motor was achieved in full speed range using V/F technique and SVPWM modulation algorithm.

# SOLAR PV FED ISOLATED SEPIC CONVERTER FOR STANDALONE INVERTER APPLICATIONS

## OM TAPADIA (20BEE0348), AMIT KUMAR (20BEE0092)

This thesis develops and implements a Solar PV Fed Isolated SEPIC Converter to address the requirement for improved performance and reliability in independent solar power systems. By guaranteeing steady voltage regulation, supplying galvanic isolation, and increasing energy harvesting efficiency, the project seeks to solve the drawbacks of conventional standalone inverters. Three main goals are to optimize the SEPIC converters architecture, integrate it with standalone solar inverters, and carry out thorough performance assessments. The success of the suggested method is validated by the findings, which show notable increases in the efficiency and stability of the system. The project encourages the use of renewable energy sources and advances sustainable development goals. The lessons learned emphasize how crucial sound design processes, exhaustive testing protocols, and ongoing innovation are to the advancement of solar power technology. In summary, the Solar PV Fed Isolated SEPIC Converter is feasible for dependable, effective, and sustainable energy generation in isolated places. It is a significant improvement in standalone solar power systems.
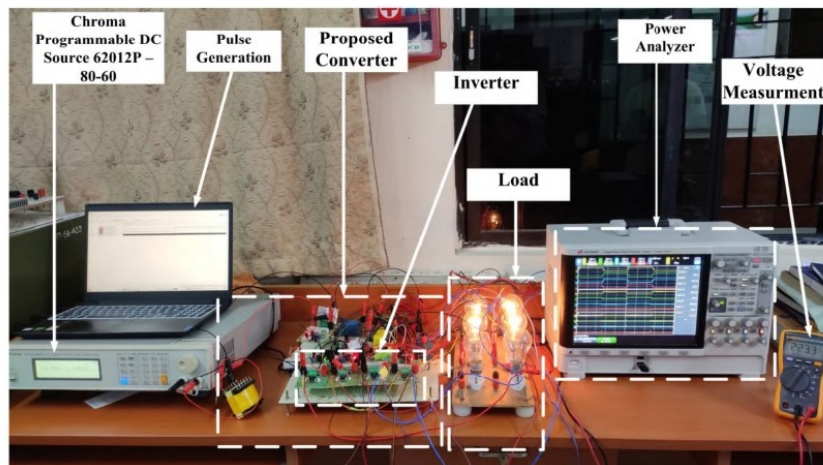


Finally, the circuit was made in lab using the available components available in the labs. After lot of tweaking and tinkering the circuit was able to light the lamp loads connected to it. The obtained waveforms using the power analyser was also satisfactory.