



ECE

NEWSLETTER

Volume 1

July 2023



CONTENTS

- 01** WELCOME NOTE
- 02** MESSAGES
- 05** INDUSTRY INSIGHTS
- 06** FACULTY
SPOTLIGHTS
- 17** STUDENT CORNER
- 27** EVENTS
- 34** RESEARCH &
OPPORTUNITIES
- 44** TEAM

GREETINGS!

Welcome to the inaugural edition of the Electrical & Computer Engineering Department Newsletter!

It is with great pleasure and excitement that we bring you this comprehensive publication with the latest updates, insights, and achievements from our vibrant department. Whether you are a student, faculty member, alumni or simply passionate about the fascinating world of electrical and computer engineering, this newsletter is designed to keep you inspired and informed.

Through this newsletter, we aim to create a platform that not only informs but also sparks your curiosity and ignites your imagination. From student stories to industry trends and from faculty spotlights to featured projects, we have a plethora of exciting content that has been curated to cater to your diverse needs.

These virtual pages are not just a source of information but also a platform that celebrates the remarkable contributions made by our faculty, students, and alumni. We encourage you to actively engage with this newsletter by submitting your questions, contributions, and suggestions. We value your input a lot and believe that together, we can foster a dynamic community that embraces collaboration, knowledge sharing, and continuous growth.

As we embark on this journey together, let us embrace the endless possibilities that lie before and within us. We invite you to explore this captivating intersection of electrical and computer engineering!

**Warm Regards,
Content Team, ECE Newsletter.**

A MESSAGE FROM THE VICE CHANCELLOR

I am delighted that the Department of Electrical and Computer Engineering is releasing the ECE 2023 Newsletter. At Mahindra University we are committed to providing our students with a world-class education that meets the needs of the 21st century – with a focus on interdisciplinary, research-based, and interactive learning with technology integration.



The Department of Electrical and Computer Engineering exposes students to the fundamentals of both electrical and computer engineering. It offers a comprehensive program that prepares students for a variety of careers in the tech industry, including electronics and computer engineering, which are two of the most in-demand fields in the world. Students in this program gain knowledge in both hardware and software components. This is a valuable skill set in today's world, where technology is increasingly digital.

I wish all faculty, NT staff and students (both UG and PG) of the department the very best as they work towards providing a holistic education and an environment that fosters overall personality development, enabling the emergence of global professionals.

YAJULU MEDURY

A MESSAGE FROM THE HOD



I hope this message finds you in good health and high spirits. Welcome to the latest edition of our newsletter, where we bring you the most exciting updates, valuable insights, and engaging content from our department.

We have gone through some major changes in the department, the first of which is the name change. Until recently we were known as the Department of Electrical and Electronics Engineering (EEE), which has now been changed to the Department of Electrical and Computer Engineering (ECE).

This change is not only for namesake, but underlying the name change is the fact that the major concentration of the department has changed from the traditional Electrical Power engineering to the more in-demand areas of communication and computer engineering. We have introduced two new M. Tech. programs – VLSI Design and Embedded Systems and Power Electronics and Renewable Energy. Along with positive changes some negative changes are inevitable, and so is the case with our department – two of our very senior professors (Dr. G. Bhuvaneshwari, and Dr. Sunil Bhooshan) have taken retirement. They will be sorely missed but we wish them the best for their future endeavors. We are looking to hire some new faculty to fill the vacancies left by the retired professors as well as for the many new subjects that are being introduced into the curriculum. As we dive into the beginning of a new semester and academic year, we are thrilled to share with you a collection of thought-provoking articles, expert interviews, and inspiring stories that will enrich your knowledge and broaden your horizons.

A MESSAGE FROM THE HOD

Whether you're seeking industry trends, seeking personal growth, or simply looking for a delightful read, we've curated a selection of content to cater to your interests. In this edition, we'll be exploring the major events that have taken place during the past several months. Our team of experts has meticulously crafted articles to shed light on the latest developments, provide practical tips, and offer unique perspectives. From cutting-edge technological breakthroughs to intriguing cultural phenomena, we aim to keep you informed and inspired.

But that's not all! We understand the value of community and the importance of connection. That's why we've dedicated a special section to highlight the achievements, stories, and experiences of our incredible community. We encourage you to share your success stories, suggestions, and feedback, as this newsletter is a platform for all of us to learn and grow together.

We're excited to have you on board, and we hope this edition of our newsletter brings you joy, knowledge, and a renewed sense of curiosity. Thank you for being a part of our vibrant community, and we look forward to sharing an incredible journey with you in the upcoming months. Happy reading! Good luck to all the students for your new semester. Have a productive and safe summer!

RAM MOHAN VEMURI

INDUSTRY INSIGHTS

Electrical and Computer Engineering (ECE) is a dynamic and integral field that is experiencing rapid growth and transformation driven by advancements in technology. It encompasses the design, development, and application of electrical and electronic systems. ECE professionals are in high demand in a wide range of industries, including telecommunications, healthcare, manufacturing, and transportation.

- **The rise of artificial intelligence (AI): AI is revolutionizing many industries, and ECE is no exception. ECE professionals are needed to develop the hardware and software that powers AI systems.**
- **The growth of the Internet of Things (IoT): The IoT is connecting billions of devices to the internet, and this is creating a huge demand for ECE professionals. ECE professionals are needed to design, develop, and maintain IoT devices and systems.**
- **The development of quantum computing: Quantum computing is a new technology that has the potential to revolutionize many industries. ECE professionals are needed to develop the hardware and software that powers quantum computers.**
- **The integration of advanced technologies, including smart meters, energy management systems, and grid automation, is driving the need for ECE professionals to optimize energy distribution, improve efficiency, and enable intelligent energy consumption.**
- **The growth of technologies like data science, AI, ML, virtual reality and robotics are revolutionizing various sectors of electronics & computers and creating new opportunities for growth and advancement.**
- **Areas like sensor networks, wireless communication, and cloud infrastructure are gaining exponential importance and focus.**
- **Edge computing, which brings computing resources closer to the data source, has helped reduce latency, improve data privacy, and enable real-time processing for applications like autonomous vehicles, smart cities, and industrial automation.**
- **The deployment of 5G networks and the ongoing development of future communication technologies will open new opportunities in wireless communication, network infrastructure, IoT applications, and autonomous systems.**

Publications

- 01 Billel Smaani, Neha Paras, S B Rahi, Young Suh Song, Ramakant Yadav, Subham Tayal, "Impact of the Self-Heating Effect on Nanosheet Field Effect Transistor Performance", IOP Publishing, Vol.12, issue 2, pp. 021005, DOI: 10.1149/2162-8777/acb96b, Feb 23.
- 02 Bhat Soha Maqbool, Suhaib Ahmed, Ali Newaz Bahar, Khan A. Wahid, Akira Otsuki, and Pooran Singh "Design of Cost-Efficient SRAM Cell in Quantum Dot Cellular Automata Technology", MDPI, Electronics, Vol.12, issue 2, pp. 367, DOI: <https://DOI.org/10.3390/electronics12020367>, Jan 2023.
- 03 Reniwal, B.S., Singh, P., Shah, A.P., & Vishvakarma, S.K., "Energy Efficient and Reliable Embedded Nanoscale SRAM Design," (1st ed.), Nov. 2023. CRC Press. <https://doi.org/10.1201/9781003213451>.
- 04 Khanna, A., Garg, A., Madichetty, S. (2023), "Harmonic Performance Analysis for Different Loads with and Without PV", In: Singhal, P., Kalra, S., Singh, B., Bansal, R.C. (eds) Recent Developments in Electrical and Electronics Engineering Lecture Notes in Electrical Engineering, vol 979. Springer, Singapore, https://DOI.org/10.1007/978-981-19-7993-4_29.
- 05 Madichetty, S.; Banda, M.K.; Nandavaram Banda, S.K., "Implementation of Deep Learning based Bi-Directional DC-DC Converter for V2V and V2G applications in Microgrid - An Experimental Investigation", Preprints.org 2023, 2023041182, <https://DOI.org/10.20944/preprints202304.1182.v1>

Publications

- 06 V. S. P. Machina, S. S. Koduru, Madichetty, S. and S. Mishra, "A Novel Standalone Implementation of MDNN Controller for DC-DC Converter Resilient to Sensor Attacks- A Design Approach", IEEE Journal of Emerging and Selected Topics in Power Electronics, DOI: 10.1109/JESTPE.2023.3242299.
- 07 S. S. Koduru, V. S. Prasad Machina and Madichetty, S., "A Review on Forecasting Models and Anomaly Detection for Household Energy Consumption", 2022 International Conference on Smart Generation Computing, Communication and Networking (SMART GENCON), Bangalore, India, 2022, pp. 1-6, DOI: 10.1109/SMARTGENCON56628.2022.10084068.
- 08 M. K. Banda, Madichetty, S. and S. Mishra, "Design of ANN Based Controller for Battery Charging Using Synchronous Buck Converter", 2022 22nd National Power Systems Conference (NPSC), New Delhi, India, 2022, pp. 178-182, DOI: 10.1109/NPSC57038.2022.10069387.
- 09 V. S. P. Machina, S. S. Koduru, Madichetty, S. and S. Mishra, "Design of ANN Based Controller for Cyberattack Detection in DC-DC Buck Converter," 2022 22nd National Power Systems Conference (NPSC), New Delhi, India, 2022, pp. 460-464, DOI: 10.1109/NPSC57038.2022.10068889.
- 10 M. K. Banda, S. S. Koduru, V. S. Prasad Machina and Madichetty, S., "A Deep Learning Based Cyber Attack Detection and Mitigation Scheme in Synchronous Buck Converter", 2022 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), Jaipur, India, 2022, pp. 1-6, DOI: 10.1109/PEDES56012.2022.10080803.

Publications

- 11 K, P., Napa, N., Madichetty, S., Agrawal, M. et al., "Thermal Analysis of Lithium-Ion Battery Pack with Different Cooling Media," SAE Technical Paper 2022-28-0043, 2022, <https://doi.org/10.4271/2022-28-0043>.
- 12 Madichetty, S., A. J. Neroth, S. Mishra and B. C. Babu, "Route Towards Road Freight Electrification in India: Examining Battery Electric Truck Powertrain and Energy Consumption," IEEE Chinese Journal of Electrical Engineering, vol. 8, no. 3, pp. 57-75, September 2022, DOI: 10.23919/CJEE.2022.000026.
- 13 Madichetty, S., Y. V. S. Manoj, S. A. Kareem and S. Mishra, "A Novel High-Speed Sensorless Faulty Panel Detection Technique for an SPV String/Array: An accurate and cost-effective approach for SPV industry", IEEE Power Electronics Magazine, vol. 9, no. 1, pp. 33-39, March 2022, DOI: 10.1109/MPEL.2022.3140985.
- 14 S. S. Koduru, V. S. P. Machina and Madichetty, S., "Real-Time Implementation of Deep Learning Technique in Microcontroller-Based DC-DC Boost Converter- A Design Approach", 2022 IEEE Delhi Section Conference (DELCON), New Delhi, India, 2022, pp. 1-6, DOI: 10.1109/DELCON54057.2022.9753325.
- 15 S. P. C. Machina, S. S. Koduru and Madichetty, S., "Solar Energy Forecasting Using Deep Learning Techniques", 2022 2nd International Conference on Power Electronics & IoT Applications in Renewable Energy and its Control (PARC), Mathura, India, 2022, pp. 1-6, DOI: 10.1109/PARC52418.2022.9726605.

Publications

- 16 Suprabhath Koduru, S.; Machina, V.S.P.; Madichetty, S., "Cyber-attacks in Cyber-Physical Microgrid Systems: A Comprehensive Review", Preprints.org 2023, 2023040691.
<https://DOI.org/10.20944/preprints202304.0691.v1>.
- 17 S. S. Koduru, S.P.C. Machina, Madichetty, S., "A Deep Learning Based Cyber Attack Detection Scheme in DC Microgrid Systems", IEEE CPSS Transactions on Power Electronics and Applications (Accepted for publication and under press- DOI: 10.24295/CPSSSTPEA.2022.00051)"
- 18 Sneha Chennamsetty and Subbarao Boddu, "Analysis of PAPR in OTFS Modulation with Classical Selected Mapping Technique", IEEE, 15th International Conference on Communication Systems & Networks (COMSNETS), India, 2023, pp. 621-624
- 19 Sneha Chennamsetty and Subbarao Boddu, "Analysis of Neural Networks Based OTFS Wireless System" IEEE International Conference on Emerging Techniques in Computational Intelligence (ICETCI), Sept. 21st-23rd, Hyderabad, India, 2023 (Accepted)
- 20 T Addepalli, K J Babu, Subbarao Boddu, Rajasekhar M, A. Nella, B. Kiran Kumar, "A 4-Element Crescent Shaped Two-Sided MIMO Antenna for UWB, X and Ku band wireless applications", Springer International Journal on Wireless Networks, June 2023,
<https://doi.org/10.1007/s11276-023-03390-w>.

Book chapters

1. Power Electronics Handbook- 05th Edition- Chapter No-12, Resonant and Softswitching Converters, published by Elsevier- This is scheduled to release on 01st Oct-2023 (Link:<https://www.elsevier.com/books/power-electronics-handbook/rashid/978-0-323-99216-9>)

2. Handbook of Power Electronics in Autonomous and Electric Vehicles- 01st Edition- Chapter No-8, Battery Charging Technologies, Published by Elsevier- This is scheduled to release on 01st Oct-2023 (Link:<https://www.elsevier.com/books/handbook-of-power-electronics-in-autonomous-and-electric-vehicles/rashid/978-0-323-99545-0>)

Patents applied & published

1. Indian Patent Published " Title of the invention : A HIGHLY EFFICIENT METHODOLOGY FOR SOLAR PV FARMS BY USING SYNCHRONOUS BYPASS AND BLOCKING SWITCHES" 202241029100 , Inventors: Sreehdar madichetty, Shantikumar and Nandini

2. Indian Patent Published, "202141029196", "HYBRID HARDWARE MAXIMUM POWER POINT TECHNIQUE FOR SOLAR PHOTOVOLTAIC PANELS", 14th Jan 2022, Inventors: Dr. Sreedhar Madichetty, Mr. Abdul Kareem

3. Indian Patent Published, 202241008481", "SENSORLESS PARTIAL/ FULL SHADED SOLAR PHOTOVOLTAIC PANEL DETECTION TECHNIQUE FOR AN SPV STRING/ARRAY" Dt:- 02nd Feb 2022, Inventors: Dr. Sreedhar Madichetty, YVS Manoj, Abdul Kareem, Shanti Kumar and Sukumar Mishra

4. Indian Patent Filed, 202311039798, Title of the invention: "A Device and Method for Light Weight Stream Cipher", Date: 10-06-2023, Name of the Inventors: Dr. Manish Kumar (BITS Pilani, Hyderabad Campus), Mr. Divye Kalra (BITS Pilani, Hyderabad Campus), Dr. Ramakant Yadav (Mahindra University)

Funding from external agencies

1) Technical Advisor: Bhargava Rajaram, Sreedhar Madichetty

Atal Innovation Mission – Atal Incubation Center

Funding agency: Niti Aayog

Budget: ~INR 10 crores

2) Principal Investigator: Pooran Singh

Title of the project: Design of Cost-Efficient SRAM in Quantum Dot Cellular Automata Technology for Low Power Applications

Funding agency: SERB SURE

Budget: ~INR 20 lakhs

Dr. Sreedhar Madichetty

Guest Editor:

1) Guest Associated Editor position in IET Power Electronics, which is sponsored by IET UK, and published by Wiley. (Link:

<https://ietresearch.onlinelibrary.wiley.com/hub/journal/17554543/homepage/call-for-papers/si-2023-000192>)

2) Guest Editor Energies- Special Issue "Control and Optimization of Microgrids and Renewable Energy Systems" (Link:

https://www.mdpi.com/journal/energies/special_issues/N397LGOESO)

Consultancy and Research Funding:

1) Awarded with the project "Off-Grid PV-VRFB-SC based Electric Vehicle Charging Infrastructure in collaboration with IIT Delhi- Amount- 191.5 Lakh INR

2) Consultancy projects from various industries: 24.5 Lakh INR

Retired professors



G. Bhuvaneshwari

She had been a part of the MU family since March 2021. Her areas of specialization are Power Electronics, Electrical Machines, Drives and all their application areas like power supply, power quality, HVDC, electric drives, electric vehicles, battery charging and renewable energy. She undertook sponsored and consultancy projects worth of Rs. 7 crores from various organizations like DRDO, DST, CSIR, MHRD, KVIC, BHEL and Copper-alliance. She is currently the Associate Editor of the IEEE Journal of Emerging and Selected Topics in Power Electronics, IEEE Journal of Emerging and Selected Topics in Industrial Electronics and the Transactions of the INAE & has over 200 publications in National and International journals and peer-reviewed conferences.

Sunil Bhooshan

He did his M.S., and Ph.D. in the Electrical Engineering Department from the University of Illinois at Urbana-Champaign, USA. He started his teaching career back in 1987 as an Assistant Professor in IIT Kanpur and worked there until 1988. From 1993 – 1996, he was a Reader, at Priyadarshini College of Computer Science, Noida, U.P. He worked as a professor for one year (1998 – 1999) at SRMS College of Engineering and Technology, Bareilly, U.P. From 1999 – 2002, he was a professor, at Meerut Institute of Engineering and Technology, Meerut, U.P. He then had a vast teaching stint at Jaypee University of Information Technology, Wakanaghat as a professor from 2002 – 2017. He has also written a book named 'Fundamental of Engineering Electromagnetics,' published by Oxford University Press in 2012.



New members in the department (Welcome to the team)



Dr. Ramakant Yadav

He is a member of IEEE and has over 9 years of teaching experience. He received his B. Tech degree in Electronics and Communication Engineering from Chhatrapati Shahu Ji Maharaj University, Kanpur in 2010. In 2012, he completed M. Tech in Signal Processing specialization from Indian Institute of Technology Guwahati. He received his Ph.D. from the EEE department of BITS Pilani, in the area of Tunnel Field Effect Transistor in 2022. He joined the EEE department of MU as an Assistant Professor on 20th June 2022. Before joining MU, he was associated with Birla Institute of Technology and Science (BITS) Pilani, Hyderabad Campus, as an Assistant Professor in the Electrical and Electronics Engineering Department, since Feb. 2016. His research interests include Tunnel FETs, semiconductor devices and VLSI circuit design.



Dr. Poreddy Chaitanya Akshara

She is an Assistant Professor in the Electrical and Electronics Engineering Department at Mahindra University. She received her Ph.D. in the Discipline of Electronics Science from University of Hyderabad, in 2020. Her PhD working area is VLSI Technology (Fabrication of Semiconductor and Microelectronics devices), during which she has earned an experience in fabricating and characterizing semiconductor devices and thin film growth in cleanroom (class 100 and class 1000). Prior to joining MU, she worked as a Visiting Researcher at the University of Hyderabad for two years. Her research interests lie in Fabrication of Semiconductor and Microelectronics devices such as RRAM, MEMS/NEMS, and Fabrication of Flexible Electronic Devices for Neuromorphic computing applications. She is also interested in conducting research in the area of VLSI design.

New members in the department (Welcome to the team)



Dr. Pavani Ponnaganti

Pavani Ponnaganti did her master's and PhD from IIT Kanpur in 2010 and 2015, respectively. Later, she went to Denmark to work as a postdoctoral fellow at Aalborg University, where she has also worked as Assistant Professor until April 2023. Her areas of interests include power distribution system operation and control, demand side management, integration of renewable energy sources for green energy transition and application of deep learning techniques for power system problems.



Mr. Vydy Ram Prasad

Vydy Ram Prasad is a lab Engineer in VLSI Synopsys Lab of Electrical & Computer Engineering Department at Mahindra University. He has completed his M.Tech in VLSI System Design from JNTU University. Prior to joining MU, he worked as an Assistant professor for two years and Lab Assistant for seven years in different Engineering Institutions. Presently, he shows interest in learning about Synopsys EDA Tools, Siemens Tools. He also qualified All India GATE 2022 & 2019 Examination in Electronics & Communication Engineering (EC).

Promotions within the department

Mr. Muragaiah Gurramkonda has been promoted to Sr. Lab Assistant in the Electrical & Computer Engineering Department at Mahindra University École Centrale School of Engineering. He is associated with Advanced electronics lab of the department.



Mr. Akhilesh Pandey has been promoted to Sr. Lab Assistant in the Electrical & Computer Engineering Department at Mahindra University École Centrale School of Engineering. He is associated with Electrical lab of the department.

Lab Developments

Two new teaching labs have been developed in the ECE department:

Communication Systems Lab: This Lab is equipped with a variety of hardware and software, including SDRs such as Wi-Guy and Deep Radio, spectrum analyzers, signal generators, and simulators. The lab will provide students with hands-on experience with a variety of communication systems, including digital communication, 4G/5G wireless communication systems, and signal processing in real time.

Vehicular Communication Networks Lab: This M. Tech. lab is equipped with a variety of hardware and software, including V2V and V2I communication devices, simulators, and testbeds. This lab will provide students with hands-on experience with vehicular communication networks, including vehicle-to-vehicle (V2V) communication, vehicle-to-infrastructure (V2I) communication, and vehicle-to-everything (V2X) communication.

These new labs will help students to develop the skills and knowledge they need to be successful in their careers in the fields of communication systems and vehicular communication networks.

New lab equipment added in the power electronics lab of the department:

1. AC/DC Electronic Load 10 kW Capacity
2. NI Industrial Controller with 8 BG Ram and GPUS
3. 30 kW EV Charger CCS based
4. 1500 V Standard IV Curve Tracer
5. Solar PV system-2 kW Capacity with Battery Storage, Wind Energy Integration System
6. Solar Hybrid Grid Connected Inverter Facility- 5 kW
7. DC Microgrid Research test bed- 5 kW Capacity

Tech Vision 2047 event

It has been 75 years since India gained independence from the British Empire, but has it achieved technological independence yet? This question was the central theme of the Technology Vision 2047 conference organized by the Technology Information, Forecasting and Assessment Council (TIFAC) at the Indian Institute of Sciences (IISc) in Bengaluru on April 27th and 28th, 2023. A team of four students from Mahindra University, M. Sairam Srikanth (19XJ1A0238), C. Deepyash Varma (SE20UEEE006), Likhith G. (SE20UECE039), and Soumik Rao (SE20UEEE033), participated in the student conclave. The conference featured discussions among a diverse panel of experts including scientists, researchers, doctors, and businesspeople from various industries. The conference aimed to emphasize the transformation of "Make in India" into "Create in India," a more ambitious goal. A speaker at the conference highlighted that we no longer live in a hierarchical framework of civilization where humans are at the top; instead, we exist within an ecosystem where all organisms coexist. The conference, titled "Technology Vision 2047 -The Concept," consisted of six well-defined panel discussion tracks: Sugam Parivahan (Drone Technology), Savyav Krushi (Precision Agriculture), Swathsya Rakshan (Biotechnology), Prakruthi Vipatti (Disaster Management), Sahajeevanam (Anthropocene), and Vyom Sutra (Space Exploration). The AGRO-MOVERS team from Mahindra University, worked towards bringing Smart Farming Infrastructure project to life, we divided the project into three distinct groups—Embedded Systems, Image Processing, and Core—worked towards our vision revolved around "Regional Crop Management using Microbotic Sensor Technology and Agricultural Forecasting". This involved the development and integration of advanced sensors, sensor fusion, under-actuation, and satellite forecasting. The concept of Microbotic sensors aimed to improve soil fertility through earthworm mimetics, utilizing artificial production of humus, a highly nutritious soil component typically produced by earthworms. Additionally, satellite imagery provided valuable insights into crop productivity and health.

Tech Vision 2047 event

We presented our idea to a panel of judges from IISc and ISRO and despite the lack of preparation time, our idea stood out due to its visionary orientation and intricate design, earning us the first prize. We were honored to receive the award from the Former Chairman of ISRO, Padma Shri A.S. Kiran Kumar, and ISRO Chair Professor P.G. Diwakar. The outcome of this conference provided us with opportunities to connect with governmental and private organizations, securing investment for the project and contributing to the creation of smart farms empowered by advanced IoT, robotics, and information systems. These advancements aim to improve crop productivity and address global hunger challenges.

-Team ArgoMovers



FEATURED PROJECTS

1. *Radiation – hardened SRAM design for Space Application*

Members: Neha Pandey (SE21UECE083), NL Supraja (SE20UECE048), Lakshmi Narayana (SE20UECE060), Challa Likhith Reddy (SE20UECE040).

Space missions face the formidable challenge of operating in an environment abundant in radiation, which can corrupt electronic components and compromise data integrity. Radiation-induced errors can disrupt SRAM cells, resulting in temporary data corruption or even complete failure of critical systems. Recognizing the significance of mitigating this risk, college students are embracing the opportunity to develop radiation-hardened SRAM designs that can withstand the demanding conditions of space. 2nd year and pre final year students are actively involved in pioneering radiation-hardened SRAM designs for space applications. Through research, collaboration with professor experts, optimization, simulation, and knowledge sharing, they are pushing the boundaries of technology to create more resilient memory systems that can withstand the harsh radiation environment of space. These student-led initiatives are instrumental in shaping the future of space technology, ensuring the reliability and success of space.

2. *SRAM based Computing in-memory*

Members: Rithvik Kaliga (SE20UECE069), Harshita Kasina (SE20UECE023), Sai Krishna (SE20UECE035).

Computing-in-memory (CIM) is a promising approach to reduce the latency and improve the energy efficiency of deep neural network (DNN) artificial intelligence (AI) edge processors. However, SRAM-based CIM (SRAM-CIM) faces practical challenges in terms of area overhead, performance, energy efficiency, and yield against variations in data patterns and transistor performance. To achieve compact area, fast access time, robust operations, and high energy-efficiency, we can propose a SRAM-CIM which uses a split-word-line compact-rule 6T SRAM and circuit techniques. Students are actively working on developing SRAM-based CIM designs that can withstand the rigors of the radiation environment.

FEATURED PROJECTS

3. *Smart Farming*

Members: Adinath Guduru (SE20UEEE001), Kruthik Reddy (SE20UEEE025).

In an era of rapidly evolving technologies, traditional farming methods are being revolutionized by the advent of smart farming. Combining innovative technologies such as the Internet of Things (IoT), data analytics, and automation, smart farming is revolutionizing agriculture by optimizing productivity, minimizing resource consumption, and improving sustainability. By employing sensing and monitoring systems, precision irrigation, automated machinery, data analytics, and AI, farmers can optimize resource utilization, enhance crop yields, and promote sustainable practices. As the world faces increasing demands for food production and environmental stewardship, smart farming emerges as a powerful solution that empowers farmers and revolutionizes agriculture for a more sustainable and resilient future.

4. *Deep Learning-Based OTFS Modulation*

Members: Sneha (PHD student)

Pioneering 6G Modulation with Neural Network Models - As the world anticipates the arrival of 6G technology, researchers and our students are actively exploring innovative modulation schemes to meet the demands of future wireless communication systems. Orthogonal Time Frequency Space (OTFS) modulation has emerged as a promising candidate, offering improved spectral efficiency and resilience to multipath fading. Leveraging the power of deep learning and neural network models, researchers are pushing the boundaries of OTFS modulation, paving the way for advanced 6G communication. OTFS modulation can achieve superior performance, improved spectral efficiency, and adaptability to dynamic channel conditions. Software-Defined Radios serve as valuable tools for real-time analysis and implementation, allowing researchers to validate and fine-tune deep learning based OTFS modulation algorithms. As we move towards the era of 6G, the fusion of deep learning and OTFS modulation holds tremendous promise in shaping the future of wireless communication systems.

IEEE student chapter

Through this newsletter, we encourage you to start an IEEE student chapter for MU. IEEE is the world's largest professional association for the advancement of technology, and your chapter can be a great way to learn about IEEE, meet other engineers and technologists, and get involved in the engineering community. There are many benefits to being a member of IEEE. As an IEEE student member, you will have access to:

- **Professional development:** IEEE offers a variety of professional development opportunities, including conferences, workshops, and online courses. These opportunities can help you to learn new skills, stay up-to-date on the latest technologies, and network with other engineers.
- **Networking:** IEEE provides a forum for you to network with other engineers and technologists from around the world. This networking can help you to find jobs, get advice, and collaborate on projects.
- **Publications:** IEEE publishes a variety of journals and magazines, as well as technical standards. These publications can help you to stay up-to-date on the latest technologies and learn about the latest research in your field.
- **Opportunities to give back:** IEEE offers opportunities for you to give back to the engineering community by volunteering your time or expertise. This can be a great way to make a difference in the world and to learn from other engineers.

Starting an IEEE student chapter is a great way to get involved in IEEE and to make a difference in our University and community. Here are some steps on how to start an IEEE student chapter:

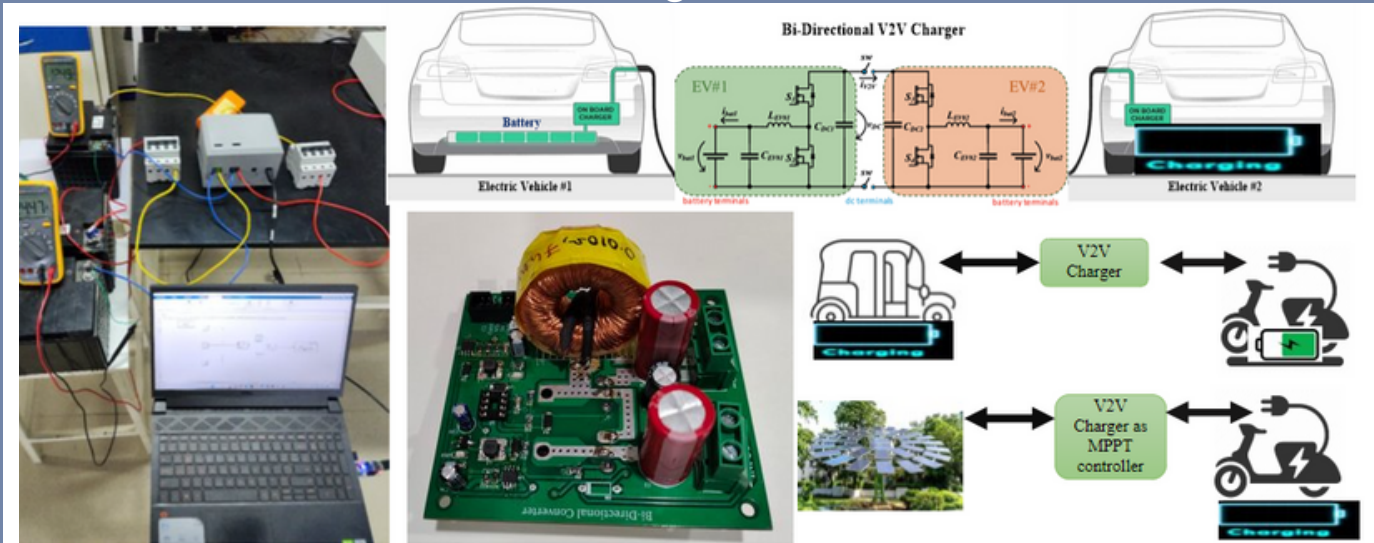
- Find a faculty advisor who is an IEEE member.
- Gather a group of students who are interested in starting a chapter.
- Contact the IEEE Student Activities Committee (SAC) for the region to get started.
- Create a constitution and bylaws for your chapter.
- Hold regular meetings and events.
- Get involved in IEEE activities at the regional and national levels.

We as ECE department at MU believe that IEEE can be a valuable resource for you as you pursue your engineering career. Therefore, with this article we encourage you to start an IEEE student chapter and take advantage of all the benefits that IEEE has to offer. Below is the link from where you can get information about how to get involve with the IEEE student membership.

<https://www.ieee.org/membership/join/index.html>

PRODUCTS DEVELOPED

Universal Bi-Directional V2V Charger

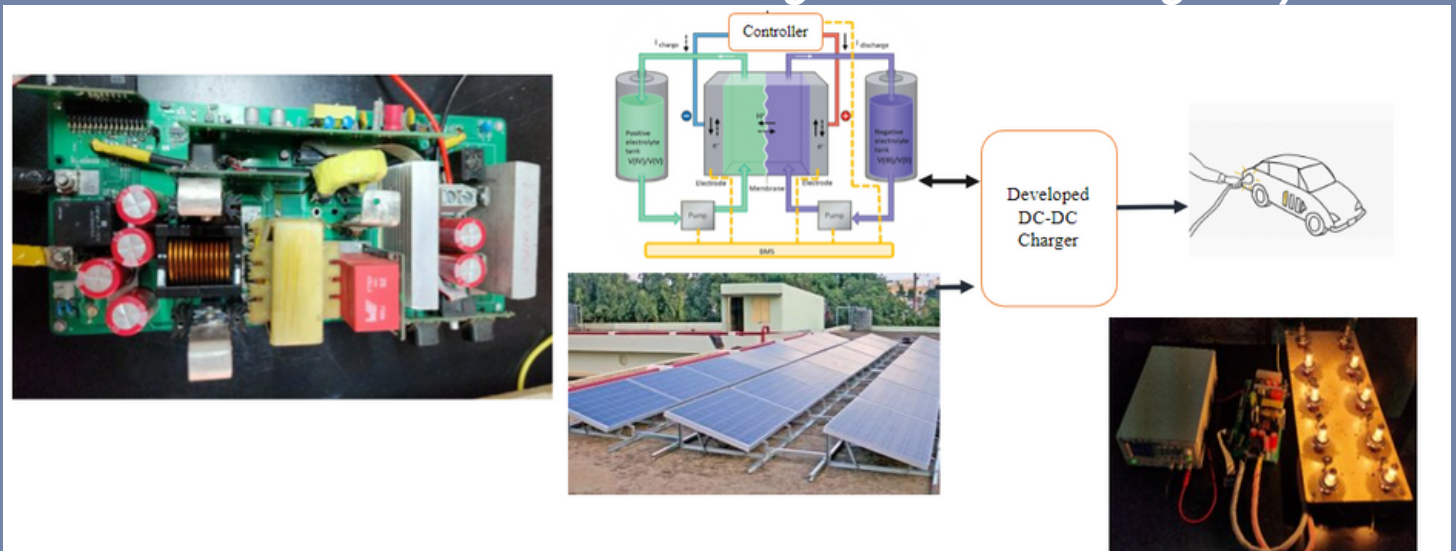


2.7 kW compact universal DC-DC Converter with maximum voltage of 90 V and current of 30 A. Applications to 2-Wheeler to 2-Wheeler, 2-Wheeler to 3-Wheeler and 4-Wheeler to 2-Wheeler. It acts as MPPT controller when connected to SPV system/ small wind turbine/ fuel cell system. It can work as an independent buck converter/ boost converter. It can also be used to works as a regenerative unit. 4-wheeler to 4-wheeler (protocol testing is underway)

List of other products developed:

1. Plug and Play Solar IV Curve Trace- 450 V 20 A
2. Isolated DC-DC Converter- 1 kW Capacity
3. MPPT Solar Charge Controller- 1 kW Capacity
4. Single Phase Inverter- 1 kW Capacity
5. 500 W DC Electronic Load
6. Bi-Directional DC-DC Converter- 1 kW Capacity

PV- VRFB based Isolated DC Fast Charger for National Highways



2.5 kW, ~94% efficient, ZVS technology-based DC fast charger. It has 90 V Max input and Variable output till 50 V. Maximum current carrying capacity of 50A.

BTech student testimonials



S Vishal

"One of the reasons that I believe makes this department really cool is that it lets us access its resources at almost any time, without much hassle. Having used them, I could say that there's a wide variety of software and tools pertaining to various subfields like VLSI technology, power electronics, communication, etc. Apart from experienced faculty, there were also friendly PhD scholars and MTech students, who were very helpful in getting us started with these resources."

Vaibhav Marwaha

"I'm very thankful to every professor at university who taught me throughout B.tech. But most of all I'm thankful to Prof. JLB, Prof. Ram Mohan Vemuri, and Dr. Pooran Singh from the EEE department. Prof JLB was the one who guided me about how to plan for career in EEE, choose a domain of interest and told me importance of research experience. Dr. Pooran taught me Digital Electronics in second year and VLSI Design in third year, and under his guidance I had done a lot of projects and research work, which gave me a firm base to enter VLSI domain. Prof. Ram taught me computer architecture and apart from that he guided me a lot about maintaining my CV and skill set as per industrial standards in top VLSI companies. He's also the one who provided me with an opportunity of an interview at Synopsys (world's best electronic design and Automation company) and where I made through. I joined Synopsys as an intern (now full time) in July 2022. I'm designated as an Application Engineer where I work on PDK development. While going through my training and projects at Synopsys, I realized that I already had the base of those concepts which I had learned through course work and experienced through projects. Again, my sincere gratitude and thanks to EEE dept and entire faculty of university."



BTech student testimonials



Sairam Srikanth

"When you think about electrical energy, it almost seems analogous to flowing water in a river. The understanding of statics and dynamics of states of water represents the numerous functionalities of electrical circuits and their utilitarian value in electronics. I am a prospective graduate of bachelor's in technology in the field of Electrical and Electronics Engineering attempting to achieve true autonomous robots with the conjunction of machine learning and mechanical engineering. The freedom electrical energy has given me to think about the limitless potential of technology and its usage has made me explore topics of interest beyond traditional concepts. My ambition is to work on planetary rovers to reach the red planet located 276 mil km away from Earth taking 2-3 years to travel. The Indian Government has taken the initiative in the form of National Mission on Interdisciplinary Cyber Physical Systems (NMICPS) to research and implement autonomous navigation with the establishment of Technology and Innovation Hub on Autonomous Navigation (TIHAN) at Indian Institute of Technology, Sangareddy, Telangana. I am an intern at this esteemed facility working on a project to produce efficient and student-accessible autonomous electric bicycles using a combination of Precision Point Positioning (PPP) and Self Balancing Technology.

The Electrical and Electronics Engineering Dept. at Mahindra University is composed of friendly and resourceful faculty who are always up to hear the ideas and interests of the students. The variety of research projects I have done with the faculty has kept me motivated to read more about technology and implement it in the real world. The infrastructure and the innovation at Mahindra University gives students massive opportunities to be heard and learn through feedback. My current association with the Electrical and Electronics Engineering at Mahindra University branches out with the project on Smart Farming Infrastructure for dry and arid lands using Sensor Technology, Robotics and Satellite Image Processing. I aspire to continue this relationship with my university and this project after my graduation and proceed my conquest to Masters in Robotics and Autonomy followed by a Doctor of Philosophy (PhD) to embark my journey to send artificial life to other planets of our solar system.

PhD student testimonials



Sriranga Suprabhath Koduru

The PhD program at Mahindra University is a rigorous and comprehensive program that fosters intellectual growth and encourages critical thinking. The faculty members are distinguished experts in their respective fields, and their guidance and mentorship throughout my doctoral journey have been invaluable. The research facilities and resources at Mahindra University are state-of-the-art. The university has made significant investments in creating an environment that fosters innovation and encourages interdisciplinary collaboration. I had access to well-equipped laboratories, extensive libraries, and advanced technological tools that allowed me to conduct cutting-edge research in my field.

One aspect that truly sets Mahindra University apart is a stress-free and effective PhD atmosphere. With a supportive community, open communication, work-life balance, clear expectations, access to resources, professional development opportunities, and recognition of achievements, Mahindra University has propelled me to thrive and produce high-quality research.

PhD student testimonials



Soha Maqbool Bhat

"The department of Electrical and Electronics Engineering at Mahindra University is a hub for budding researchers. The department has high class lab facilities. The department is pushing the budding researchers for state-of-the-art research. I would like to express my sincere gratitude to the faculty and fellow researchers for a healthy work environment."

M S Sai Karthikeya

"I am a pre PhD student working under the guidance of Dr Aditya Abburi, Associate Professor in the field of gas sensors. I have developed interest in the field of sensors because of the unstinted guidance and support of my guide. Other faculty have guided me in the field of electronics and its applications in making the technology for effective utilisation for the betterment of the mankind.

The facilities in the department and the kind of encouragement we get from the faculty makes one to realise that this University is a top-notch university where one can excel through hard work and dedication.

I am proud to be a student at Mahindra University where diligence and dedication are valued and rewarded."



Mr. Anand Mahindra's Visit



Anand Mahindra visited Mahindra University on 10th February 2023 to meet with students and faculty, and to learn more about the university's programs. He was particularly impressed by the university's focus on innovation and entrepreneurship. The highlights of his trip were a visit to the state-of-the-

art labs, the inauguration of the Central Library, where he interacted with the students and a meeting with the entrepreneurship and research team.

Mahindra's visit to Mahindra University is a sign of the growing partnership between Mahindra University and Tech Mahindra. Tech Mahindra is a global information technology company that has a strong presence in India. The company has been working with Mahindra University on a number of projects, including the development of a new artificial intelligence program.

During his visit to MU, he visited several departmental labs, including the power electronics Lab. He was impressed by the students' enthusiasm and dedication to their research. He was also inspired by the university's commitment to cutting-edge research.



Tech Mahindra Team Visit



During Anand Mahindra's visit, he enthusiastically urged his colleagues at Tech Mahindra to explore Mahindra University (MU), recognizing it as the breeding ground for the next generation of innovators and entrepreneurs. The symbiotic partnership between Mahindra University and Tech Mahindra yields mutual benefits. Mahindra University gains from Tech Mahindra's invaluable expertise in the IT industry, while Tech Mahindra leverages Mahindra University's exceptional talent pool and cutting-edge research capabilities. Inspired by Anand Mahindra's endorsement, more members of Tech Mahindra have begun visiting Mahindra University, presenting a remarkable opportunity for the institution to showcase its strengths to prospective partners and employers.

Ecole Centrale Visit



On February 22nd, 2023, delegates from Ecole Centrale paid a visit to MU. As part of their visit, they explored the laboratories within the ECE department at MU.

Synopsys Lab Visit



Dr. Sankalp's visit to Mahindra University on 25th April 2023 proved to be an insightful and enriching experience for both students and faculty alike. During the meeting held between 11:00 AM to 12:00 PM, an array of engaging discussions took place. One of the primary topics centered around the diverse range of courses offered by the university, where Dr. Sankalp showcased his expertise in VLSI Domain. The conversation delved into the tools integrated into the curriculum, particularly focusing on TCAD Sentaurus and RTL to GDS II Flow. The prospect of organizing workshops on these subjects was also explored, offering students an opportunity to further enhance their knowledge and practical skills.

To conclude the visit, Dr. Sankalp had the pleasure of meeting with 3rd and 4th year students, providing invaluable career guidance in the ever-evolving VLSI Domain. This event served as a valuable addition to the school magazine, reflecting the commitment of Mahindra University in nurturing students' academic growth and professional development.

This event exemplified Mahindra University's dedication to providing a holistic educational experience, equipping students with the knowledge and skills necessary for success in their chosen field. The encounter with Dr. Sankalp will undoubtedly remain a highlight in the memories of those who attended, serving as a beacon of inspiration for future endeavors in the world of VLSI.

Dr. Vemuri's visit to BVRIT campus

Dr. Vemuri paid a visit to the BVRIT campus with the aim of enlightening the eager students about the various M. Tech. programs offered by the ECE department. The presentation drew an impressive crowd of over a hundred students, all of whom displayed an immense level of enthusiasm and curiosity for these programs. The engaging session captivated the students' attention, as they listened attentively and actively participated by asking thoughtful questions and seeking valuable insights. Following the conclusion of the presentation, a number of students eagerly sought guidance on the necessary qualifications required for admission into the M. Tech. program, the intricacies of the application process, and the potential stipends and financial support associated with pursuing this advanced degree.

The students left the session with a sense of inspiration and motivation to pursue their academic and professional aspirations within the ECE field. Dr. Vemuri's visit not only served as an informative session, but also fostered a sense of excitement and determination among the students, empowering them to make informed decisions about their future academic pursuits and career endeavors.

Dr. Vemuri's interview to CXOToday

Dr. Ram M. Vemuri's interview to CXOToday was focused on the newly launched M. Tech. programs in VLSI Design and Embedded Systems. The VLSI design program at Mahindra University is acting as a catalyst for performance enhancement of the semiconductor industry. The program provides students with the skills and knowledge they need to design and develop high-performance chips. In addition, the program has strong industry ties, which allows students to gain practical experience and make connections with potential employers. He discussed different aspects of VLSI or chip design, which explores the potential for start-ups in the silicon manufacturing industry and how the government can tap into the untapped potential of engineering graduates who are still looking for employment.

The interview concludes by highlighting the importance of the VLSI design program at Mahindra University and how it is helping to build a strong foundation for the future of the semiconductor industry in India.

Full interview is available here:

<https://www.cxotoday.com/interviews/mahindra-universitys-vlsi-design-program-acting-as-catalyst-for-performance-enhancement-of-semiconductor-industry-dr-ram-m-vemuri-professor-hod-department-of-electrical-and-electronics/>

Dr. Sreedhar Madichetty's interview to PCQUEST

In this interview with PCQuest, Dr. Shreedhar Madichetty primarily addressed the challenges confronting the electric vehicle (EV) industry in India. A key concern he discussed was the absence of standardized EV charging protocols. This lack of uniformity poses potential complications for the development of electric vehicle charging infrastructure, given the variations in charging protocols adopted by different countries. Furthermore, Dr. Madichetty shed light on India's rare earth metal shortage and its potential impact on EV growth. However, he expressed optimism, pointing out that India is increasing its efforts in mining and research related to rare earth metals, suggesting that this scarcity may not impede the progress of electric vehicles in the country.

Full interview is available here:

<https://www.pcquest.com/navigating-obstacles-in-ev-production/>

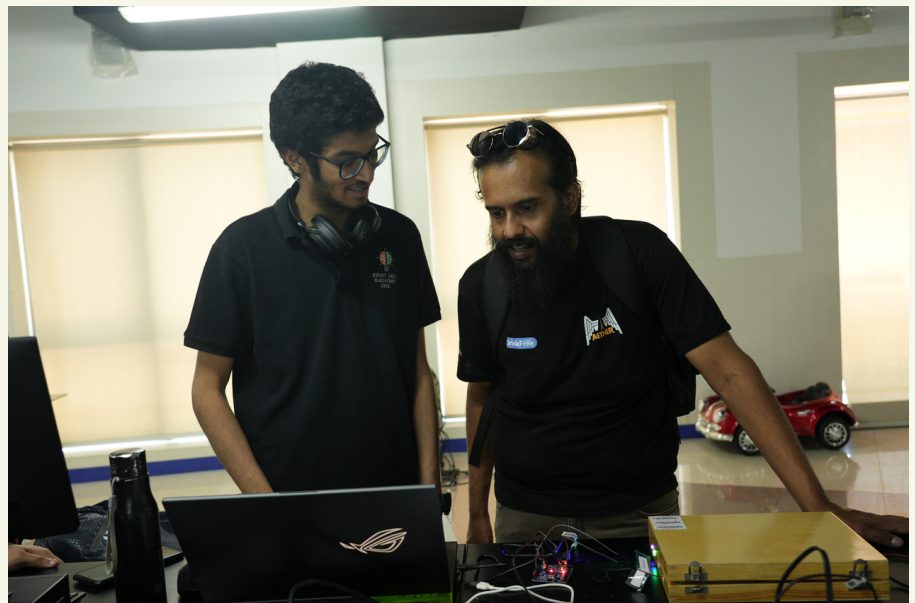
AIRO 2023

After a year of anticipation and longing, MU's annual sports fest was back with a spectacular showcase of enthusiasm, athleticism and camaraderie. It proved to be an incredible showcase of talent and competition across various tournaments. The boys' volleyball event witnessed fierce competition among 14 teams, ultimately culminating in MLRIT emerging as the victorious team. In table tennis, our university displayed remarkable prowess by reaching the finals in three out of five competitions, with CBIT winning in both individual and team categories. The basketball tournament was a thrilling spectacle, with MU triumphing in the boys' category and BITS Hyderabad claiming victory in the girls' category, both teams demonstrating their exceptional skills and teamwork. In a remarkable addition to the fest, the powerlifting competition saw MU shine brightly as Ranga and Uday excelled in their respective weight categories, showcasing their strength and determination. The badminton arena was dominated by MU, as they emerged as champions in the men's team event, secured victory in the women's team event and claimed gold in the mixed doubles category. The tennis tournament showcased the exceptional abilities of the BITS team who emerged as the victors. The football tournament witnessed MU's impressive journey to the semi-finals, while VNR emerged as the overall winners. In cricket, our college's journey led them to the finals, where VNR emerged as the winners and MU brought home the runner-up trophy.

Electronic Escape Room

A recent event that occurred during the annual tech and cultural fest of Mahindra University, Aether took the concept of Traditional Escape rooms to the next level by incorporating electronics and microcontrollers into the experience.

The Electronic Escape Room event, organised by student coordinators Soumik Rao (SE20UEEE033) and Ishna Jain (SE20UECE109), mentored by Professor Bhargav, and all the students' part of the Embedded system course, was one of the most hands-on electronics tech events. The event had two stages and involved participants opening a locked box using a microcontroller by giving a particular signal based on the clues. About 30 enthusiastic coders showed up with 3-5 in a team.



These two round events were exhilarating from the start to end. In this event the participants had to unlock a locked box by giving a particular pulse based on given clues using a microcontroller. Each box required three locks to open, i.e., three different pulses.

The integration of electronics and coding into the traditional escape room concept make this whole event quite unique. It challenged participants to not only solve puzzles, but also to use their technical skills to unlock the box. It was a perfect blend of creativity, innovation, and technical expertise. Thanking Dr. Bhargava Rajaram for coming up with this idea and making it hands on for all the students. Special mention to student Ishna Jain for coding the boxes.

This event caught the eyes of many people, including Vice Chancellor, Dr. Bishnu Pal, Dr Ram Mohan to name a few. To all the tech enthusiasts, this was a fun day filled with coding, tech, microcontrollers, and puzzles.

Winners of the event:

- First place - Ananta Srikar (4th year)
- Second place - Ventrpragada Srikar (SE20UARI164)
- Third place - Vanashree Mittal (SE20UECE097), Hitisha Tibrewala (SE20UECE025), Varshitha Reddy (SE20UECE100), Sneha (PHD), Sudhanshu (PHD), Shanti Kumar (PHD)

Spy of light

Unlike the Electronic escape room event, where participants had to decipher clues and give pulses to open boxes, in this event, participants had to receive some pulses to decipher the pattern. The patterns ranged from some morse codes to COD codes to grey codes. Participants could also use some clues when they were stuck. There were a total five stations with different patterns, and the ones who cracked the most patterns within the least time won the competition. This event is based on a simple principle of Visible Light communication, where a set of high-power LEDs emit these patterns with microsecond delays which are invisible to the naked eye. Contestants could use any sensor they wanted and integrate it with the microcontroller they were comfortable with to code it in such a way to receive those signals. Although, this event proved to be a little more difficult than electronic escape room, the turnout was decent, with about 20 - 25 people showing up in teams of 1-5 people.

This event was one of a kind, where all tech enthusiasts good with coding had an amazing time figuring out technological patterns and confusing yet fun clues. As a part of the embedded systems course, all the students worked hard to get this event into a reality. This event was organized by student coordinators Ishna Jain and Soumik Rao, mentored by Dr. Bhargava Rajaram. Spy of Light event attracted many dignitaries and tech enthusiasts from campus and outside.

Winners of the event:

- First place - Naga Tharun Makkena (SE20UCSE105), Rounak Das (SE20UCSE149) , Sai Anish Sreeramagiri (SE20UARI130), Ashish Joshua James (SE20UARI002)
- Second place - Ananta Srikar (4th year)
- Third place - Ventrapragada Srikar (SE20UARI164)



Faculty research

1) **Dr. Sayantan Hazra** (Associate Professor, ÉCSoE) was invited to work in CentraleSupélec, IETR Lab in Rennes, France as a Guest-Faculty (Professeur-Invité) in April – July 2022. The purpose of the visit was to strengthen research collaboration with the faculty members and researchers of CentraleSupélec, IETR Lab, Rennes. The travel and accommodation of the visit was sponsored jointly by Mahindra University and CentraleSupélec.

During this visit, Dr. Hazra started working with a team of Professors and researchers in the area of error correction coding for SSB-CPM signals and the work is ongoing with the involvement of Dr. Hazra. Dr. Hazra is also working with another team of CentraleSupélec professors in the area of cellular broadcasting for dense 5G cellular network and the initial ideas of this work also started during his visit to CentraleSupélec.

The ultimate goal of these collaborative works is to publish some research articles in reputed journals and conferences and to submit research proposals to different research funding agencies.

2) **Dr. Pooran Singh** (Assistant Professor, ÉCSoE) is dedicated to the design of low-power and reliable memories, specifically focusing on SRAM, DRAM, and their applications in Space, Memory in Compute (MIC), and IoT edge devices. His research areas encompass the design of low-power and reliable memory (SRAM), VLSI design, FPGA-based system design, and VLSI for biomedical applications.

In recognition of his expertise, Dr. Singh has recently been honored with a SERB grant. As a result, he is actively seeking a passionate candidate for the position of Junior Research Fellow (JRF), who will contribute to the exploration of low-power and reliable memory architectures utilizing innovative devices.

Faculty research

3) **Dr. Poreddy Chaitanya Akshara (Assistant Professor, ÉCSoE)** is focused on the development of Gallium Nitride High Electron Mobility Transistors (HEMT) for high-frequency applications. In pursuit of this research, Dr. Akshara is utilizing Synopsys TCAD Sentaurus as a tool for simulation and analysis. By employing this advanced software, Dr. Akshara aims to enhance the understanding and performance of Gallium Nitride HEMTs in high-frequency scenarios, thereby contributing to the advancement of this field.

4) **Dr. Ramakant Yadav (Assistant Professor, ÉCSoE)** is presently engaged in the design and simulation of Negative Capacitance Tunnel FET (NC-TFET) devices utilizing Synopsys Sentaurus TCAD for low-power VLSI applications. His objective is to leverage the integration of Quantum ATK with Sentaurus TCAD, enabling a comprehensive workflow that encompasses material to device simulation with the utilization of innovative materials. Additionally, he aims to implement circuits employing these newly proposed devices.

Research work details:

- 4th year project students from 2019 EEE batch has designed the Tunnel FET devices for low-power VLSI Applications in the Fall Semester of 2022-23.
- The 3rd year project students are implementing the concept of Negative capacitance on the Tunnel FET devices proposed by the 4th year students. They will design, simulate and compare the NC-TFET devices with the TFET devices.
- Finally, they will use the proposed devices (NC-TFETs and TFETs) to implement the VLSI circuits and compare their performance.

New MTech programs offered by the department

VLSI DESIGN AND EMBEDDED SYSTEMS

Mahindra University offers an M. Tech. degree program in VLSI Design and Embedded Systems. This will be a two-year program where you will be involved in VLSI Design, Advanced Computer Architecture, Advanced Algorithms in Design Automation, Machine Learning for VLSI Design, Low Power VLSI Design, Logic Synthesis, Testability and Design for Testability, Logic Synthesis, and Physical Verification Flows, Device and Process simulation of semiconductor devices.

Mahindra University has recently opened a new laboratory facility that will give students the opportunity to use the latest design automation software from the leading EDA company Synopsys. This lab will be made available to all M. Tech. students to learn using the entire suite of tools from Architectural Design all the way to Physical Verification tools such as are Design Compiler, ICC2, PrimeTime, StarRCXT, Sentaurus TCAD (Device and Process simulation of semiconductor devices, interconnect modeling and extraction). Students will only be limited by their creativity and initiative for the types of designs they can develop using the automation provided by these tools.

Students will have the opportunity to learn analog/digital full custom circuit design using Cadence EDA Virtuoso with Technologies like UMC 65nm, GPDK 45, 90 and 180nm. Cadence tools such as Assura, Innovus, Incisive, Genus are also available to learn circuit level physical design and verification, gate level Physical design and functional simulation, synthesis and pre-layout timing analysis.

Students of the M. Tech. program can expect to work with prospective employers such as Intel, Qualcomm, Synopsys, Broadcom, AMD, NVidia, Apple, TSMC, Global Foundries, Samsung, and many other companies that are in the semiconductor design or manufacturing and are having difficulty in finding talent to meet their needs.

Synopsys Lab

Currently Synopsys lab systems have Siemens (Mentor Graphics Tools) and Synopsys EDA tools.

Siemens Tools: Siemens tools have 30 user licenses. The tools available with the licence are listed below: Analog/Mixed Signal (AMS), Board Station, Calibre, CatapultCoverage, Formal Pro, HDL Designer Series, Leonardo Spectrum, Modelsim, Nitro-SoC (Olympus-SoC), Oasys-RTL, Precision Synthesis, Questa Verification IP, Questa Verification IQ, ReqTracer, Tanner Custom IC Tools, Tessent, Veloce, Vista Visualizer, Xpedition Enterprise, Questa Verification IP OEM Editions etc.

Synopsys EDA Tools: Synopsys EDA tools have 25 user licenses. The tools available with the licence are listed below:

Custom Compiler, Custom Infrastructure, Custom Wave View, Design Compiler, DVE, Finesim, IC Compiler II, IC Validator, IC Validator Workbench, Library Compiler, Primesim, Prime Time suite, Prime Wave, Quickcap, Raphael, Raphael FX, TCAD PCM STUDIO, TCAD Sentaurus, VCS, VERDI etc.

New MTech programs offered by the department

POWER ELECTRONICS AND RENEWABLE ENERGY SYSTEMS



The M Tech program in Power Electronics and Renewable Energy Systems is a master's program offered to students who are interested in learning and building a fruitful career in the broad field of power electronics and drives, which finds wide applications in many industrial, commercial and automotive sectors to name a few. Emphasis is further put on training the students towards the latest developments in renewable energy sector, which finds a promising place in the upcoming and future smart grids.

The program is flexible enough to allow a student to specialize in any topic of interest by taking elective courses and working on a research project in that area. The program is also intended to have a design project in their first two semesters. The program is a 60+ degree program, which is spread over 4 semesters for a full-time student. About two-thirds of the credits involve coursework, and the remainder consists of project work. The emphasis is on conducting original research and writing a thesis that reports these results.

Courses: The courses proposed are in the diverse categories of power electronics, electric drives and renewable energy systems. The courses on power electronics will cover the design, implementation and control of various power converters with emphasis on the newly developing devices based on wide bandgap semiconductors. The courses on electric drives will cover different electric drive systems, with emphasis on the working principle, modelling, design and high-performance control. This will include the recent developments like speed and position sensorless drives, application of artificial intelligence and new topologies for electric motor drives. The courses related to renewable energy systems will cover the various renewable energy resources, their conversion to electrical energy and integration to the grid. Microgrids with standalone operation and grid connected modes will be dealt with in detail, including their design and control aspects. The electives are proposed in each of these domains to introduce the student to specific recent developments like application of artificial intelligence and machine learning to power and energy domains.

Potential Industrial Collaboration: Course curriculum and syllabus development – While the broad framework of the curriculum has been presented in this document, it is subject to change as per the requirements of the industry. Both the courses and their contents will be developed in discussion with relevant industry partners. The courses (core/electives) can also be offered by industry personnel. **Live Student projects and Internships** – In order to enhance real-world practical skills of a student, they shall be allowed to work on live industry projects during their coursework, and final year thesis work. Also, the final year of studies can also be utilized by students to intern at companies in the power electronics, electric vehicles, automation and renewable energy ecosystems.

Other MTech program offered by the department

AUTONOMOUS ELECTRIC VEHICLES (A-EVS)

The M. Tech. programme in A-EVs is a master's programme offered to students who are interested in advanced learning and research in the field of automotive engineering with a focus on Electric Vehicles, Intelligence, and connectivity. Applicants to this programme are expected to already have a strong background in control systems and programming.

Students graduating from this program are expected:

1. To be able to comprehend and understand the various components of an Electric Vehicle, individually as a whole.
2. To be able to conceptualize, design and implement an electric drive system for automobiles, along with associated electronic circuitry.
3. To be able to characterize, and design Battery Management Systems (BMS) for Electric Vehicles.
4. To be able to comprehend and understand the nature of intelligence in automobiles.
5. To be able to synthesize intelligent mechanisms for improving vehicle operation.



Eligibility Norms:

- Candidates should have graduated with a full-time degree from any recognized University/Institute with a minimum aggregate of 60% or equivalent grade point.
- B.E./B.Tech in Electrical Engineering/ Electrical and Electronics Engineering / Electronics and Communication Engineering / Instrumentation Engineering.
- Candidates appearing for their final semester exam in the current year are also eligible to apply.
- Candidates from other branches viz Automobile, Mechanical and Mechatronics seeking admission may need to complete the prerequisite courses i.e. Basic Electrical Engineering, Basic Electronics Engineering, Control Systems, Power Electronics and Programming in C/Python.

M.Tech. student testimonials



Aditya Jadhav

"As a master's student at Mahindra University in Hyderabad, India, I can confidently say that this institution has provided me with an exceptional educational experience.

From the moment I stepped on campus, I was impressed by the quality of the faculty, the state-of-the-art facilities, and the vibrant student community. The professors at Mahindra University are experts in their fields, and they are always available to provide guidance and support to their students. The curriculum is challenging, but it is designed to help us develop the skills and knowledge we need to succeed in our chosen fields.

The campus itself is modern and well-maintained, with all the amenities we need to study, relax, and socialize. There are plenty of opportunities to get involved in extracurricular activities, clubs, and events, which has helped me to meet new people and expand my horizons.

One thing that really stands out about Mahindra University is its commitment to innovation and academic inquiry. The university has a strong focus on research and development, and it encourages students to think critically and pursue their own research ideas. This has inspired me to think differently about my future career and has given me the confidence to pursue my own research goals.

Overall, I would highly recommend Mahindra University to anyone looking for a world-class education in a supportive and inspiring environment. Whether you are pursuing a master's degree or an undergraduate program, this institution has everything you need to succeed and thrive."

MTech student testimonials

Sidhartha Mohanta

"As a Master of Technology Student in Autonomous Electric Vehicles at Mahindra University, Hyderabad, India, I am honored to share my testimonial for the department newsletter. Since joining the program in 2022, I have been consistently impressed with the quality of education, resources, and support provided by the Institution including all the amenities we need to study, relax and socialize.

I am grateful to have had the guidance and support of esteemed faculty members such as Dr. Sreedhar Madichetty, Dr. Bharghava Rajaram, Dr. Subbarao Boddu, Dr. Gopinath GR, and Dr. Ankita Jain. Their extensive knowledge and dedication to their students' success have been invaluable. They are always available to answer questions and provide guidance, going above and beyond to ensure that students have the support they need to excel.

I would also like to express my appreciation for the support and mentorship provided by the PhD students. Their contributions have further enriched my learning experience and have been instrumental in my growth as a student and researcher.

Moreover, the department fosters a collaborative and inclusive learning environment. I have had the pleasure of working with a diverse group of students from different backgrounds and cultures, which has further enhanced my learning experience and broadened my perspective.

All in all, I am extremely grateful for the opportunity to be a part of this program and to learn from such talented and dedicated individuals. The education, support, and resources provided by the department have been instrumental in my personal and academic growth. I am confident that the skills and knowledge I have gained will serve me well in my future endeavours.

I highly recommend the Autonomous Electric Vehicle program at Mahindra University to anyone interested in pursuing a career in this exciting and rapidly evolving field."



MTech student testimonials



J. Nagaraju

"I have always been passionate about electric vehicles and their potential to reduce pollution and dependence on fossil fuels. That's why I decided to pursue M. Tech. in Autonomous Electric Vehicles at Mahindra University, one of the few institutions in India that offer this unique and futuristic program. It was a great learning experience to study the various aspects of electric vehicles, such as drivetrain, chargers, battery management system, vehicle dynamics, autonomous and connected vehicles, etc. The program also gave me an opportunity to work on real-world projects and learn from expert faculty and mentors. I think M. Tech. in Autonomous Electric Vehicles is the best degree for anyone who wants to be part of the electric mobility revolution and make a positive impact on the environment and society."



CONGRATULATIONS



Our inaugural batch of M.Tech. AEV students has achieved an exceptional milestone, with several remarkable internship offers. These offers come from prestigious companies such as India Nippon Electricals Limited India (INEL, India), Siemens, and ETrio, among others. The internships not only provide invaluable industry exposure but also come with generous stipends, with some of our students securing a maximum monthly stipend of INR 65,000. Additionally, some of our students have received placement offers with attractive annual packages of INR 16 lakh from these renowned organizations!

MEET THE TEAM



Ankita Jain
Faculty advisor



Shubhika Yadav



Rithvik Kaliga



Harshita Kasina



NL Supraja



Lakshmi Narayana

It's All In the State of Mind

by Walter D. Wintle

**If you think you are beaten, you are,
If you think that you dare not, you don't,
If you'd like to win, but you think you can't,
It's almost certain you won't.
If you think you'll lose, you've lost,
For out in the world you'll find
Success begins with a fellow's will—
It's all in the state of mind.**

**Full many a race is lost ere even a step is run,
And many a coward falls ere even his work's begun,
Think big, and your deeds will grow;
Think small, and you'll fall behind;
Think that you can, and you will—
It's all in the state of mind.**

**If you think you are out-classed, you are;
You've got to think high to rise;
You've got to be sure of yourself before
You ever can win a prize,
Life's battles don't always go
To the stronger or faster man;
But soon or late the man who wins
Is the man who thinks he can.**



Mahindra
University

Mahindra
UNIVERSITY
SCHOOL OF CENTRAL
SCHOOL OF ENGINEERING
SCHOOL OF LAW

