

Electrical & Electronics Engineering Department-Newsletter

Volume 2024 Issue 4
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About GMRIT

www.gmrit.edu.in

GMR Institute of Technology is situated in Rajam, a small industrial town approximately 100 kilometers away from the 'city of destiny,' Visakhapatnam in Andhra Pradesh. The institute's campus spans over a sprawling 117 acres of land. The lush, sylvan, and idyllic surroundings in the heart of the agricultural belt provide an ideal setting for higher studies. The institute is affiliated with Jawaharlal Nehru Technological University Gurajada, and approved by AICTE New Delhi. It has been accredited with NAAC - 'A' grade by UGC. The Department of EEE has been accredited by the National Board of Accreditation (NBA) in Tier-I for the academic years 2022-23 to 2024-25.

GMRIT offers 4-year B.Tech. programs in eight core disciplines and 2-year M. Tech programs in five specializations. The institution has received a grant extension of autonomous status for a period of ten years, starting from 2018-19 to 2027-2028.

About EEE Department

Vision

To be a preferred department of learning for students and teachers alike, with a commitment towards Academics & Research, serving the students in an atmosphere of innovation, critical thinking and making them Industry ready.

Mission

- M1. To provide adaptable education in a collaborative and innovative environment in skilling the graduates to solve real world problems in the field of Electrical & Electronics Engineering
- M2. To prepare the students as critical thinking professionals with multidisciplinary research orientation and Innovation
- M3. To instill ethical values and nurture the graduates who will be able to contribute to the society

Overview

The Department of Electrical & Electronics Engineering was established in 1997. The department offers four-year B.Tech and two-year M.Tech programs. It has a rich tradition and well-qualified faculty, along with widely recognized laboratories. The department aims to provide a strong foundation in Electrical and Electronics Engineering fundamentals, emphasizing mathematical and scientific principles. Additionally, the course focuses on developing skills in the application of design processes for innovative engineering solutions. The annual intake of students in this department is 120.

Facilities & Infrastructure

- Sophisticated Laboratories include:
 - Electrical Machines Lab
 - Electrical Engineering Lab
 - Electrical Measurements Lab
 - Power Systems Lab
 - Power Electronics Lab
 - Electrical Systems Simulation
 - Power Electronics and Drives Lab (PG)
- A well-stocked department library
- To enable the students and provide opportunities, to understand in the industrial eco-systems and work on latest technological developments in the industries, MoUs are signed with various industrial organizations
- Committed and dedicated faculty

Major Courses Offered

- Electrical Machines
- Electrical Circuits
- Measurements and Instrumentation
- Semiconductor Devices & Circuits
- Linear and Digital integrated circuits
- Electromagnetic Field Theory
- Control Systems
- Power Generation, Transmission and Distribution
- Power System Protection
- Green Energy Technologies
- Power Electronics
- Electrical Vehicle Technologies
- Signals and Systems Theory
- Electrical Drives
- Power System Analysis and Control
- Engineering Economics and Project management

Research and Academic Achievements

Book chapter

- Rajesh Babu Damala, Rajesh Kumar Patnaik and Korla Praveen, "Distance Measurement by Using Ultrasonic Sensor" published a book chapter in the journal "Smart Grids as Cyber-Physical Systems: Smart Grids Paving the Way to Smart Cities", with ISBN No: 9781394261727

Papers Published in Conferences

- V. Manoj, R. S. R. K. Naidu, and M. R. Reddy, "Fault Mitigation in Seven-Level Diode Clamped

- with Static Switch-Based Fourth Leg Inverter Topology for Induction Motor Drives," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 02013, Jan. 2024, doi: 10.1051/e3sconf/202454002013.
- N. V. A. Ravikumar, V. Manoj, and R. S. R. K. Naidu, "Nonlinear Modeling and Control of Unified Power Flow Controller," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 09002, Jan. 2024, doi: 10.1051/e3sconf/202454009002.
 - N. V. A. Ravikumar, M. R. Reddy, and V. Manoj, "Novel Control of Wind-PV-Battery-Based Standalone Supply System with LSTM Controllers," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 01010, Jan. 2024, doi: 10.1051/e3sconf/202454001010.
 - R. Raghutu, V. Manoj, and N. K. Yegireddy, "Novel MPPT of PV System with MIWO Algorithm for Water Pumping Application," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 05006, Jan. 2024, doi: 10.1051/e3sconf/202454005006.
 - V. Manoj, Ch. H. Kumar, and N. K. Yegireddy, "Performance Investigation of SRM-Based In-Wheel Electrical Vehicle," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 02001, Jan. 2024, doi: 10.1051/e3sconf/202454002001.
 - R. Raghutu, V. Manoj, and N. K. Yegireddy, "Shunt Active Power Filter with Three-Level Inverter Using Hysteresis Current Controllers," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 06001, Jan. 2024, doi: 10.1051/e3sconf/202454006001.
 - N. V. A. Ravikumar, V. Manoj, and N. K. Yegireddy, "Speed Control of 6-Phase PMSM Using Fuzzy Controllers," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 02012, Jan. 2024, doi: 10.1051/e3sconf/202454002012.
 - R. Raghutu, V. Manoj, and N. K. Yegireddy, "TS-Fuzzy Associated DTC of Three-Phase Induction Motor Drive for Water Pumping from Single-Phase Supply," *E3S Web of Conferences*, ISSN: 2555-0403, vol. 540, p. 05005, Jan. 2024, doi: 10.1051/e3sconf/202454005005.
 - V. Manoj, V. Guntreddi, P. Ramana, B. V. Rathan, M. S. Kowshik, and S. Pravallika, "Optimal Energy Management and Control Strategies for Electric Vehicles Considering Driving Conditions and Battery Degradation," *E3S Web of Conferences*, vol. 547, p. 03015, Jan. 2024, doi: 10.1051/e3sconf/202454703015.
 - V. Guntreddi, V. Manoj, M. R. Reddy, N. K. Yegireddy, A. Swathi, and R. Raghutu, "Storage Solutions for Sustainable Future: Integrating Batteries, Supercapacitors, and Thermal Storage," *E3S Web of Conferences*, vol. 547, p. 03016, Jan. 2024, doi: 10.1051/e3sconf/202454703016.

- Polamarasetty P Kumar, Ramakrishna S S Nuvvula, Sk. A. Shezan, Vanam. Satyanarayana, R. SivaSubramanyamReddy, Syed Riyaz Ahammed, Ahmed Ali "Grid Stability Enhancement through Machine Learning-driven Control Strategies in Renewable Energy Integration," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 317-321. Doi: 10.1109/icSmartGrid61824.2024.10578070.
- Ramakrishna S S Nuvvula, Polamarasetty P Kumar, Alighazi Siddiqui, S. Thamizharasan, Chai Ching Tan, Raaid Alubady, Baseem Khan "Optimizing Electric Vehicle Fleet Operations with Predictive Analytics: A Renewable Energy-Centric Approach," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 309-311. Doi: 10.1109/icSmartGrid61824.2024.10578265
- Polamarasetty P Kumar, Ramakrishna S S Nuvvula, Sk. A. Shezan, Vanam. Satyanarayana, Syed Riyaz Ahammed, R. SivaSubramanyamReddy, Ahmed Ali "Optimal Sizing and Placement of Renewable Energy Systems in Smart Grids using Machine Learning Optimization," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 312-316. Doi: 10.1109/icSmartGrid61824.2024.10578187
- Ramakrishna S S Nuvvula, Polamarasetty P Kumar, Praveena Akki, Syed Riyaz Ahammed, Sudheer Reddy. J, Hushein R, Ahmed Ali "Federated Learning-Based Energy Forecasting and Trading Platform for Decentralized Renewable Energy Markets," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 277-283. DOI: 10.1109/icSmartGrid61824.2024.10578121
- Polamarasetty P Kumar, Ramakrishna S S Nuvvula, Chai Ching Tan, Ghafar Ahmed Al-Salman, Venkataramana Guntreddi, V. Arun Raj, Baseem Khan "Energy-Aware Vehicle-to-Grid (V2G) Scheduling with Reinforcement Learning for Renewable Energy Integration," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 345-349. (SCOPUS Indexed Conference) doi: 10.1109/icSmartGrid61824.2024.10578230
- J. Chimundu, A. Ali, R. S. S. Nuvvula, B. Khan, V. Venkataramana and Polamarasetty P Kumar, "Predictive Maintenance Method Using Machine Learning, Comparing Classifiers," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 530-538. doi:10.1109/icSmartGrid61824.2024.10578164
- Ramakrishna S S Nuvvula, Polamarasetty P Kumar, Theetchenya S, Syed Riyaz Ahammed, Hushein R, Babu J M, Ahmed Ali "Machine Learning-Driven Predictive Maintenance Framework for Anomaly Detection and

- Prognostics in Wind Farm Operations," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 284-289. Doi:10.1109/icSmartGrid61824.2024.10578083
- Ramakrishna S S Nuvvula, Polamarasetty P Kumar, Syed Riyaz Ahammed, Vanam. Satyanarayana, Bachina Harish Babu, R. Siva Subramanyam Reddy, Ahmed Ali "Distributed Multi-Agent Reinforcement Learning for Autonomus Management of Renewable Energy Microgrids," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 298-304. doi: 10.1109/icSmartGrid61824.2024.10578150
 - Nayana Shetty, Polamarasetty P Kumar, Ramakrishna S S Nuvvula, Sanjeev Kumar Thalari, Muhammad Waqas Arshad, Raaid Alubady, Baseem Khan "AI-Driven Energy Forecasting for Electric Vehicle Charging Stations Powered by Solar and Wind Energy," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 336-339. doi: 10.1109/icSmartGrid61824.2024.10578078
 - Polamarasetty P Kumar, Dexter Woodward, A. Bamini, Chai Ching Tan, Ghafar Ahmed Al-Salman, Ahmed Ali, Ramakrishna S S Nuvvula "Grid-Interactive Electric Vehicles: Intelligent Scheduling and Energy Trading in a Renewable Energy-Powered Ecosystem," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 340-344. doi:10.1109/icSmartGrid61824.2024.10578113
 - G. S. Rupa, R. S. S. Nuvvula, Polamarasetty P Kumar, A. Ali and B. Khan, "Machine Learning-Based Optimization Techniques for Renewable Energy Systems," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 389-394. doi: 10.1109/icSmartGrid61824.2024.10578295
 - Ramakrishna S S Nuvvula, Polamarasetty P Kumar, Syed Riyaz Ahammed, Hushein R, R.Siva Subramanyam Reddy, Bachina Harish Babu, Ahmed Ali "Distributed Reinforcement Learning Framework for Autonomous Optimization of Grid-Scale Energy Storage Systems in Renewable Energy Integration," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 290-297. doi: 10.1109/icSmartGrid61824.2024.10578068
 - Ramakrishna S S Nuvvula, Nayana Shetty, Chai Ching Tan, Deepa A, Sandeep Sharma, Mohammed Yousif Oudah, Polamarasetty P Kumar "Distributed Control and Optimization of Electric Vehicle Charging Stations in a Microgrid with Renewable Energy Sources," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 305-

308.doi:10.1109/icSmartGrid61824.2024.10578147

- Polamarasetty P Kumar, Ramakrishna S S Nuvvula, Sk. A. Shezan, Syed Riyaz Ahammed, Babu J M, Vanam Satyanarayana, Ahmed Ali "Intelligent Energy Management System for Microgrids using Reinforcement Learning," 2024 12th International Conference on Smart Grid (icSmartGrid), Setubal, Portugal, 2024, pp. 322-328.doi:10.1109/icSmartGrid61824.2024.10578215.

Papers Published in Journals

- Karthick K., Aruna S.K., Dharmaprakash R. & Gokulan Ravindiran "Integrating machine learning techniques for Air Quality Index forecasting and insights from pollutant-meteorological dynamics in sustainable urban environments", Earth Science Informatics, Springer (2024), ISSN : 18650473 (Indexed by SCI-E, Q2, IF:2.7, <https://doi.org/10.1007/s12145-024-01382-8>).
- Karthick K, Krishnan S, Rajavinu N, Muthuraj B., "Seasonal Performance Analysis and Comparative Evaluation of Wind Power Prediction Models Using Machine Learning Techniques", Journal of Sustainability Research, Hapres, 2024, vol.6, no.2, e240029, ISSN 26326582 (Scopus Indexed, Q2, <https://doi.org/10.20900/jsr20240029>).

- Rifat Al Mamun Rudro, Kamruddin Nur, Md. Faruk Abdullah Al Sohan, M.F. Mridha, Sultan Alfarhood, Mejdli Safran, Karthick Kanagarathinam, SPF-Net, "Solar panel fault detection using U-Net based deep learning image classification", Energy Reports, Elsevier, Vol. 12, 2024, pp. 1580-1594, ISSN 2352-4847, (SCI-E, Q2 & Scopus indexed, Impact Factor 2024: 4.7, <https://doi.org/10.1016/j.egy.2024.07.044>)
- Varaprasad M.V.G., Nuvvula R.S.S., Kumar P.P.; Radwan N., Dhanamjayulu C., Shaik M.R.; Khan B., "Design and implementation of single DC-link based three-phase multilevel inverter with CB-PWM techniques", Scientific Reports, Vol. 14, no.1, 18078 ISSN 2045-2322. (WoS and scopus indexed, I.F: 3.8, <http://doi.org/10.1038/s41598-024-68293-y>)

Guest Lecture / Expert talk / Events Organized

- The Department of Electrical and Electronics Engineering (EEE) at GMRIT organized a two-day induction program for 3rd semester B.Tech students on August 8-9, 2024. The program covered a variety of topics essential for academic and professional growth, including academic regulations, dress code, discipline, and curriculum overview. Students were also briefed on professional society and club activity, NBA and NAAC accreditations, employability skills,

career opportunities in EEE, and the significance of MOOCs, LMS, and audit courses.



Selvamurthy, President of ASTIF and Chancellor of Amity University, Chhattisgarh, inaugurated the conference as the Chief Guest on July 5th, 2024.



- GMR Institute of Technology successfully organized the "International Conference on AI-Powered Technology Integration for Sustainability (AI-PTIS-2024)" on July 5th and 6th, 2024, in a hybrid mode. The conference focused on three key themes: Artificial Intelligence & Machine Learning Applications, Renewable Energies, and Science, Engineering & Technology. Accepted papers were published in the AIP Conference Proceedings, indexed by Scopus and Web of Science. Around 135 papers were presented during the event. Dr. W.



➤ The Department of Electrical and Electronics Engineering (EEE) organized a department-level startup idea competition on August 9, 2024.



➤ An institute-level startup idea competition was organized by the Entrepreneurship Development Cell (EDC) on August 17, 2024.



Guest Lectures / Technical Contributions to the External World by Faculty Members

- Prof. Dr. G. Chandra Sekhar served as a technical committee member at the 8th International Conference on Green Energy and Applications (ICGEA 2024), held on March 14-16, 2024, in Singapore.
- Dr S P Mishra conducted Guest Lecture title “ Electric Vehicle Technology ” at “Gandhi Institute for Education and Technology” to EEE Department on 03.08.2024
- Dr.K.Karthick delivered an expert lecture on the topic 'Battery Life Forecasting: A Machine Learning Approach for Eco-Friendly Transportation' on August 17, 2024, during the One-Week Faculty Development Program on 'Renewable Energy, Electric Vehicle Charging, and Grid Integration: An Introduction,' held from August 12 to 17, 2024, at Sri Sai Ram Institute of Technology, Chennai, Tamil Nadu.

Professional Development Activities by Faculty Members

- Dr. G. Chandra Sekhar participated in a five-day online FDP on 'Recent Trends in Renewable and Electric Vehicle Technologies,' organized by the Department of Electrical and Electronics Engineering, Lakireddy Bali Reddy College of Engineering, Mylavaram, NTR District, A.P., from June 3, 2024, to June 7, 2024.
- Dr. G. Chandra Sekhar successfully completed and received a passing grade in 'MLo101EN:

Machine Learning with Python: A Practical Introduction,' a course of study offered by IBM, an online learning initiative of IBM.

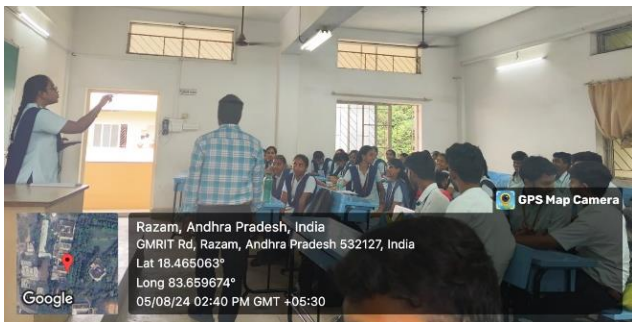
- Dr. K. Karthick, has successfully completed two four-week courses on Coursera: 'Ask Questions to Make Data-Driven Decisions' and 'Foundations: Data, Data, Everywhere,' which are online non-credit courses authorized by Google and offered through Coursera.

Student-Centric Events and Engagement

- **ELECTROMINDS Event:** The ELECTROMINDS event, organized by ISTE student coordinators V. Hari and K. Harika, tested participants' foundational knowledge and problem-solving abilities through two challenging rounds: Electro Doubt and Ladder Challenge. In the first round, students tackled questions on basic electrical concepts, while in the second round, they applied logic by building ladder diagrams using universal gates. With 36 students from the EEE department participating, the event witnessed exceptional performances and active involvement. The 2-hour competition culminated with the selection of the top teams based on creativity, accuracy, and presentation of solutions.

Winner: M. Bala Prasad (23345A0208) and T. Karthik (22341A02B6)

Runner-up: S. Triveni (22341A02A5) and P. Padma (22341A0289)

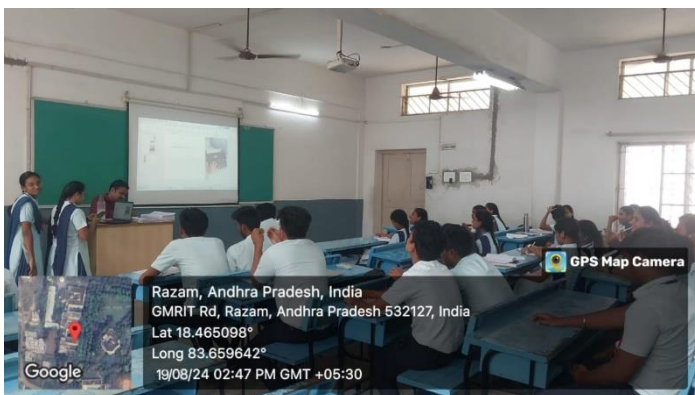


➤ **CIRCUIT SPOTLIGHT Event:** Circuit Spotlight, organized by student coordinators K. Vinaykumar and L. Nirupama, provided a platform for students to engage in circuit-based problem-solving and technical presentations. The event comprised two rounds: Solving Circuit Puzzles and Explaining an Electrical Element. Participants first applied logical reasoning to solve electrical circuit problems and then presented and explained an electrical element in the second round.

A total of 61 students from the EEE department actively participated, showcasing impressive analytical and presentation skills. The 2-hour event concluded with the selection of the best teams based on their problem-solving, technical clarity, and presentation.

Winner: M. Bala Prasad (23345A0208), T. Vasu (22341A02B8), S. Tirumala Rao (22341A02B4)
 Runner-up: P. Siva Sai (23345A0214), P. Manikanta (22341A0287), L. Tharun Kumar (22341A0275)

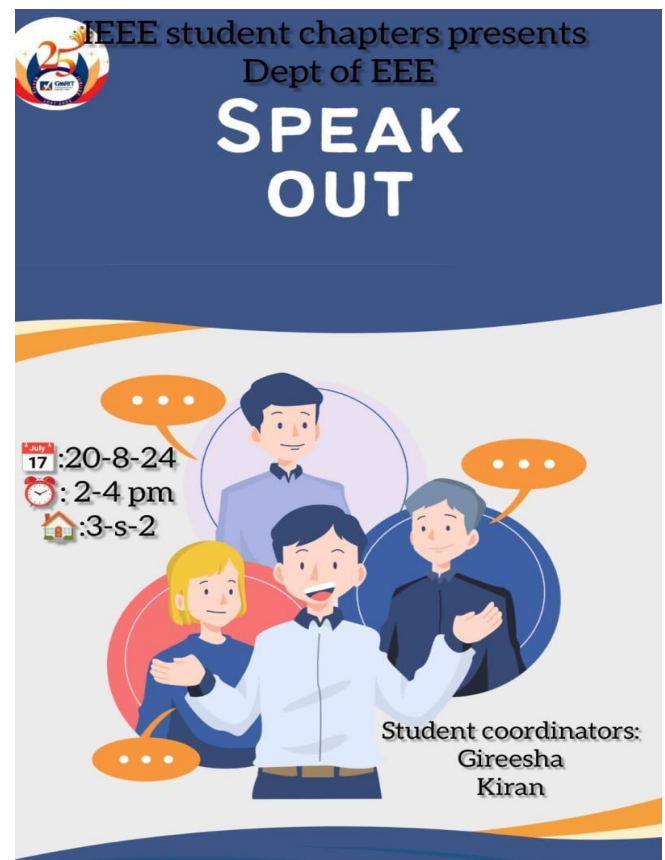




technical topics of their choice in multiple parallel sessions. With 57 enthusiastic participants from the EEE department, the event showcased impressive performances, fostering clarity and confidence in presenting technical concepts. The platform successfully helped students refine their communication abilities.

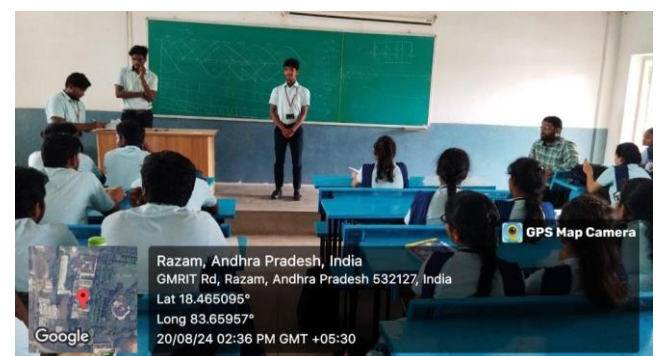
Winner: G. Harsha Vardhan (22341A0249)

Runner: G. Kamal (22341A0253).

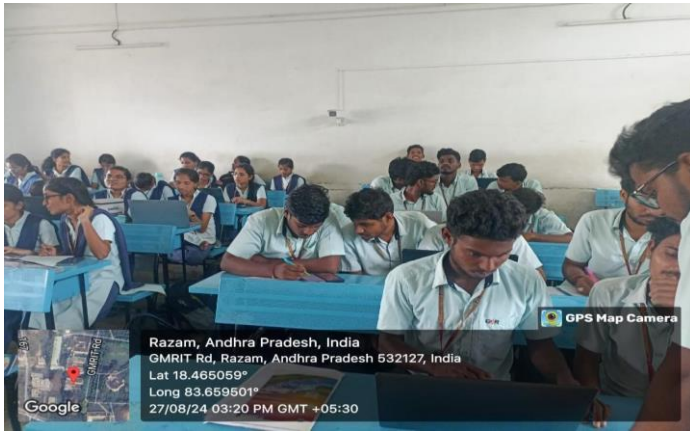


Faculty co-ordinator

HOD-EEE



- **SPEAK OUT Event:** The IEEE Student Coordinators, B. Gireesha and T. Kiran, organized SPEAK OUT, an interactive event aimed at enhancing students' technical communication and presentation skills. Participants delivered five-minute speeches on



Editorial Borad Members

Chief Editors

Dr.Ramana Pilla

Dr.K.Karthick

Section Editors (Faculty)

Research and Academic Achievements

Dr G Indira Kishore

Guest Lecture / Expert talk / Events Organized

Dr. Rajesh Kumar Patnaik

Dr L V Suresh Kumar

Guest Lectures / Technical Contributions to the External World by Faculty Members

Dr. Hemanth Kumar Chappa

Section Editors (Students)

Student-Centric Events and Engagement

Budumuru Gireesha (22341A0225)

Turubilli Kiran (23345A0206)

Gandreti Sai Varun (22341A0244)

Guddala Harshitha (22341A0252)

Kondaka Harika (22341A0266)

Vangapandu Hari (22341A02C3)

Koneti Vinay Kumar (22341A0267)

Lenka Sai Nirupama (22341A0273)