ELECTRIC ECO

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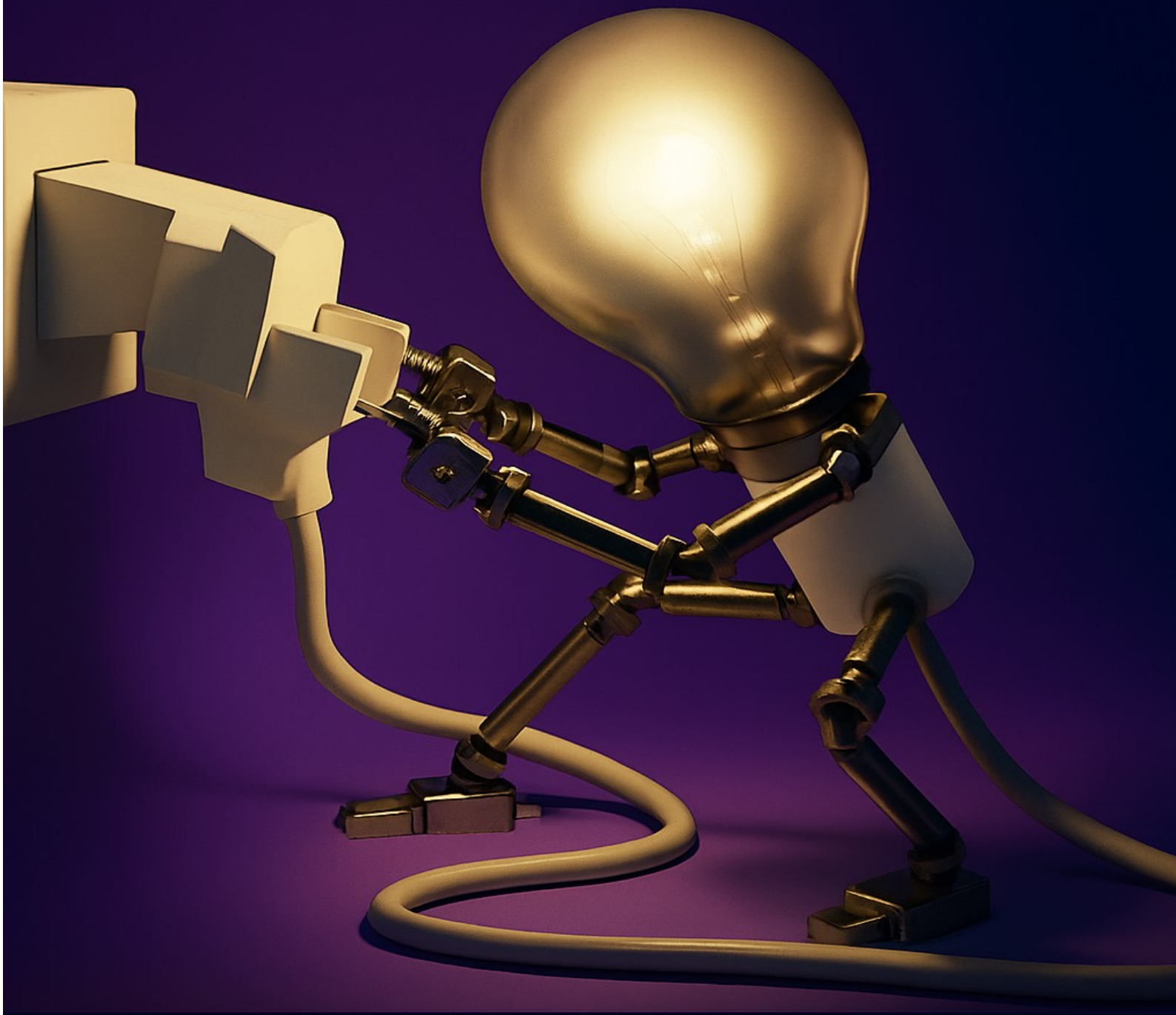

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEEERING

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

Approved by AICTE, New Delhi & Permanently Atfillated to JNTUK , Kakinada

Accredited by NAAC with "A' Grade & NBA(CSE, IT, ECE, EEE, ME)

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"Advancements in electrical engineering do not come from merely understanding existing principles but by challenging them. True innovation happens when we push beyond known limits, automate processes intelligently, and create systems that enhance human capabilities while preserving energy and efficiency."

— **Michael Faraday**

Foreword & Messages

Principal

I am delighted to present this edition of our Electrical and Electronics Engineering (EEE) department magazine, a reflection of the dedication, creativity, and technical excellence of our students and faculty. This publication highlights remarkable projects, achievements, and innovations, showcasing our commitment to academic excellence and industry relevance. I encourage everyone to engage with the content, celebrate the spirit of collaboration, and continue striving for innovation. Together, we can shape the future of technology and inspire the next generation of engineers.

Dr K .Appa rao

HOD

It is with immense pride that I introduce this edition of our Electrical and Electronics Engineering (EEE) department magazine. This publication celebrates the talent, innovation, and dedication of our students and faculty. Inside, you will find an array of projects, research highlights, and insightful articles showcasing the dynamic learning environment we foster. As we embrace both challenges and opportunities in technology, this magazine reflects our commitment to academic excellence and collaboration. I encourage all readers to explore these inspiring stories and continue pushing the boundaries of knowledge and creativity in our field

Dr J.Siva Vara Prasad

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About the department

The Department of Electrical and Electronics Engineering is one of the oldest and most prominent departments of the institute. Established in 1998, it has been actively engaged in teaching and research across diverse domains of electrical and electronics engineering.

The department offers **B.Tech in EEE** and **M.Tech in Power Electronics and Drives** programs, both approved by **AICTE, New Delhi**. It boasts a strong faculty, with several members holding Ph.D. degrees and expertise in various fields. The **B.Tech program**, initially introduced with an intake of **40 students in 1998**, was later expanded to **120 in 2012**. The **M.Tech (PE&D) program** commenced in **2011** with an intake of **18 students**.

With a team of well-qualified faculty, the department covers key areas such as **Power Systems, Power Electronics, Control Systems, Energy Systems, and High Voltage Engineering**, ensuring a strong academic foundation for students.

VISION:

To contribute to the nation and the world through excellence in technical education, research, and consultancy in **Electrical and Electronics Engineering**.

MISSION:

1. Provide a comprehensive education in **Electrical and Electronics Engineering**.
2. Align the curriculum with industry requirements to enhance employability.
3. Undertake sponsored research and offer consultancy services in industrial, academic, and socially relevant domains.
4. Instill ethical and moral values in students, shaping them into responsible professionals.

Program Educational Objectives (PEOs):

PEO1: Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2: Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3: Work effectively as individuals and as team members in multi disciplinary,projects.

PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

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Articles

The Smart Grid: Powering the Future

The global energy sector is undergoing a transformative shift with the advent of Smart Grid technology. The Smart Grid represents a modernized electrical grid that leverages digital communication, automation, and data analytics to improve energy efficiency, reliability, and sustainability. By integrating advanced metering infrastructure, demand response mechanisms, and distributed energy resources, the Smart Grid is reshaping how electricity is generated, distributed, and consumed. A Smart Grid is an intelligent electricity network that utilizes two-way digital communication between utilities and consumers. This network enables real-time monitoring, data collection, and automated decision-making to optimize power distribution. Unlike traditional grids, which rely on centralized power generation and unidirectional energy flow, Smart Grids incorporate decentralized energy sources, such as solar panels and wind farms, to enhance flexibility and resilience.

Presented by

22761A0277- K. HIMA GEETHIKA

Industrial Automation: Transforming Industries for a Smarter Future

Industrial automation has revolutionized the manufacturing sector by improving efficiency, productivity, and quality while reducing costs and environmental impact. This paper explores the evolution of industrial automation, from mechanization to computerization and robotics, and examines the current trends and technologies driving the Industry 4.0 revolution. The benefits and challenges of industrial automation, including increased efficiency, enhanced quality, and reduced costs, as well as the need for high initial investments, complexity, and cyber security risks, are discussed. Finally, the future directions of industrial automation, focusing on the integration of artificial intelligence, machine learning, and the Internet of Things (IoT), are outlined. Industrial automation is revolutionizing the way industries operate, enhancing productivity, efficiency, and safety. The use of advanced technologies such as robotics, artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT) is significantly reducing human intervention in industrial processes.

Presented by

23761A02A7-Sk.Sameer

Powering the Future: How Artificial Intelligence is Transforming Electrical Engineering

The integration of Artificial Intelligence (AI) in electrical engineering is revolutionizing the way we design, operate, and maintain power systems. This transformation is enabling the creation of more efficient, sustainable, and resilient electrical grids. AI-powered technologies such as predictive maintenance, smart energy management, and real-time fault detection are optimizing energy distribution, reducing power outages, and promoting renewable energy integration. This article explores the current state of AI in electrical engineering, its applications, and future directions, highlighting the potential of AI to power a more sustainable and connected future. The electrical engineering landscape is undergoing a rapid transformation due to advancements in Artificial Intelligence (AI). AI-driven solutions are improving power system efficiency, reliability, and sustainability. With the increasing global demand for energy and the push for cleaner alternatives, AI is playing a crucial role in optimizing operations, reducing energy waste, and ensuring grid stability.

Presented by

22761A0263- Ch.Tarun

Wireless Power Transfer: Revolutionizing Energy Transmission

Wireless Power Transfer (WPT) is a revolutionary technology that enables the transfer of electrical energy without physical contact, transforming the way we power devices and systems. This article explores the principles, applications, and advancements of WPT, including magnetic resonance coupling, inductive coupling, and capacitive coupling. We discuss the benefits of WPT, such as increased convenience, reduced maintenance, and improved safety, as well as its potential applications in various fields, including consumer electronics, medical devices, electric vehicles, and industrial automation. The article also highlights the current challenges and future directions of WPT research, paving the way for a wireless and sustainable energy future.In an era of increasing technological advancements, Wireless Power Transfer (WPT) is emerging as a groundbreaking innovation that eliminates the need for traditional wired connections to transmit electricity. WPT technology enables the transfer of energy across air or other mediums, offering a seamless and efficient method to power various devices.

Presented by

22761A02-P.Dola Srinivas

Wireless charging technology for electric vehicles (EVs)

Wireless charging technology for electric vehicles (EVs) has gained significant attention due to its convenience and potential to enhance vehicle adoption. Integrating renewable energy sources with wireless charging can further promote sustainability and reduce dependence on fossil fuels. This article explores the feasibility, advantages, challenges, and future prospects of implementing wireless charging for EVs using renewable energy sources such as solar, wind, and hydroelectric power. As the world transitions towards sustainable energy solutions, electric vehicles have emerged as a promising alternative to traditional fuel-powered cars. However, the efficiency and accessibility of EV charging infrastructure remain critical concerns. Wireless charging technology eliminates the need for physical connectors, offering a seamless charging experience. When combined with renewable energy sources, wireless charging presents an eco-friendly and efficient solution to meet the growing energy demand of EVs.Wireless power transfer (WPT) is the core technology behind wireless EV charging. It operates on the principle of electromagnetic induction or resonant inductive coupling.

Presented by

22761A0267-G.Yahwanth

Innovative Ideas & Projects

EPT (Electrically Propelled Tricycle)

The term electrically-propelled refers to a class of technologies that uses electric power to propel the vehicle with batteries rather than making use of I.C. engines. EPT (Derive from electric propelling) uses electric energy to propel the tricycle. With EPT, a disabled person can travel from one place to another place reducing fatigue. EPT is one such vehicle that can be used by most disabled people who cannot afford a standard electric wheelchair. EPT uses E.V. (electric vehicle) technology which uses electric power to propel the vehicle from one place to another with best-in-class efficiency. This technology is widely spread in human life all around the globe. The most appealing feature about EPT is that it has a manufacturing price that is 5X more minor than the electric wheelchair. Most people handicapped from legs in a government hospital require 15-20 min to have a person assisting them to move on their conventional wheelchair. With EPT, they need not face such a problem as it is electrically propelled. The person can move without taking anyone's help for assistance. It uses the battery and electric controller kit technology, which is currently reliable to propel electric vehicles. Compared to other electric wheelchair technologies, the difference in price makes EPT unique. EPT (Electrically propelled tricycle) uses electrical energy to propel it with motors rather than an engine with its miscellaneous

components. With EPT, a disabled person can move for short distances, with a reduction in fatigue. EPT promises to provide every disabled person with the benefits of an electric wheelchair at an affordable price. EPT requires an electric motor. EPT is a tricycle with wheels used when walking is difficult or impossible due to illness, injury, or disability. In many present cases, it has been observed that it takes around 15 – 20 minutes for an attendant to assist a disabled person with a wheelchair in a government-aided hospital.

Figure: Shows the final model of EPT.

Designed by

21761A0202 – A. Vamsi

21761A0212 – G. Vinod Babu

21761A0221 – K.V.Sai

21761A0237 – R. Sai Kiran

IoT-Based Attendance System Using a Fingerprint Sensor

The IoT-Based Attendance System Using a Fingerprint Sensor is a smart and efficient solution for tracking student attendance with high accuracy and security. This system utilizes an ESP32 microcontroller connected to an R307 fingerprint sensor to verify students' identities and log their attendance in real time. Once a student scans their fingerprint, the system matches it with pre-enrolled data, displays the result on an I2C 16x2 LCD screen, and automatically updates a Google Sheet using IFTTT webhooks. With WiFi connectivity, attendance records are seamlessly stored in the cloud, ensuring accessibility and reliability. The system is designed to handle a large number of students, making it ideal for educational institutions. Additionally, it offers easy customization, troubleshooting options, and a user-friendly setup process. By eliminating manual attendance marking, this project enhances efficiency, reduces errors, and provides a modern, automated solution for attendance management. Additionally, the system offers high flexibility and customization, allowing administrators to update student records, modify authentication parameters, and adjust fingerprint confidence thresholds for optimal performance. The use of the ESP32 microcontroller ensures low power consumption and efficient processing, making it a cost-effective and scalable solution for institutions of all sizes. The integration with Google Sheets via IFTTT enables real-time monitoring and easy access to attendance data from anywhere, facilitating better record management. Furthermore, the project can be extended by incorporating features such as RFID-based authentication, face recognition, or SMS notifications to

parents, making it a versatile and future-ready attendance system.

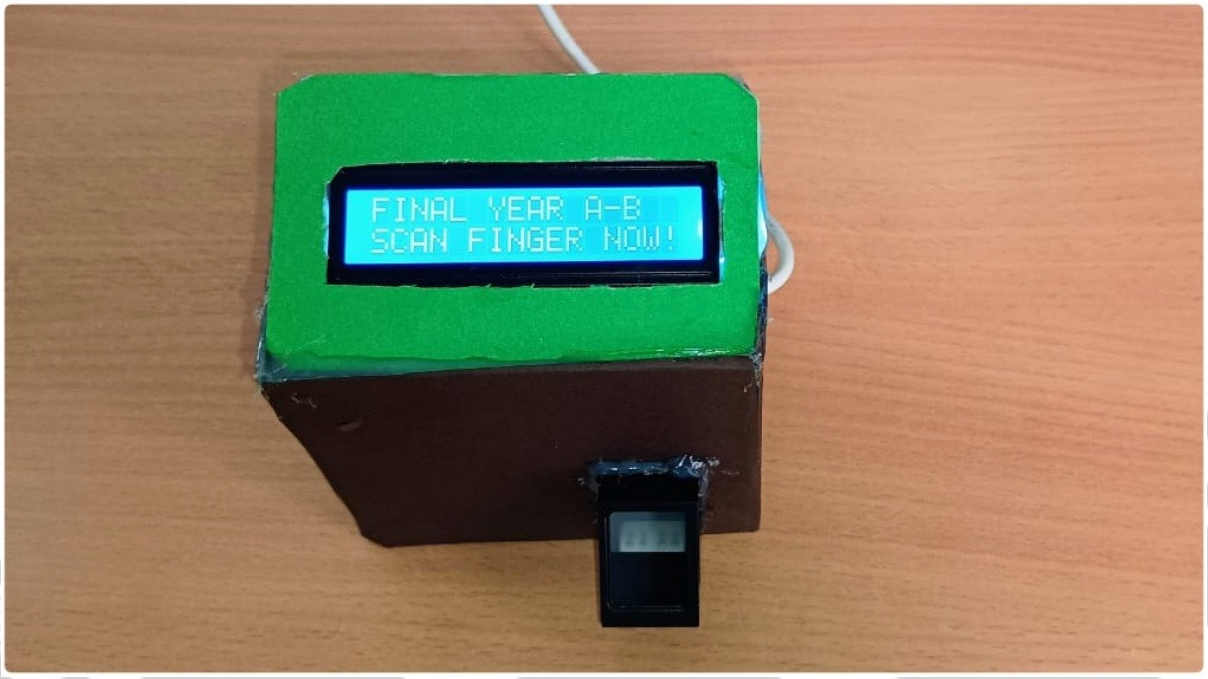

Figure : Final model of Attendance System

Designed by

21761A0248 – Y. Praveen

IoT Based Motor Health Monitoring System for predictive Analysis

Three-phase induction motors are widely used in industries due to their high efficiency, reliability, low maintenance, and high power output**,** making them preferable over other types of motors. However, these motors degrade over time due to factors such as excessive load and overheating, which can lead to performance issues and failures. To address this, continuous monitoring of key parameters such as temperature, current, and vibration is essential. To achieve this, we propose the implementation of an Industry 4.0-driven IoT-based Motor Health Monitoring System using an STM32 microcontroller**.** This system enables predictive analysis, which prevents unnecessary maintenance by servicing only when needed, detects hidden issues early to prevent unexpected breakdowns and extend equipment life, and minimizes downtime by identifying and resolving potential failures before they disrupt production. By integrating real-time monitoring and data-driven insights**,** our system enhances the efficiency, reliability, and longevity of three-phase induction motors, contributing to smarter and more sustainable industrial operations. Furthermore, our system leverages cloud-based analytics and machine learning algorithms to process real-time data, enabling more accurate fault detection and trend analysis. By

utilizing wireless communication protocols such as LoRa or Wi-Fi, the monitored data can be seamlessly transmitted to a centralized dashboard for remote access and decision-making. This connectivity allows maintenance teams to receive instant alerts in case of abnormal motor behavior, ensuring timely intervention and reducing the risk of costly failures. Additionally, the integration of user-friendly visualization tools enhances data interpretation, empowering industries to optimize motor performance and energy consumption. Through these advanced capabilities, our IoT-based Motor Health Monitoring System aligns with Industry 4.0 principles, fostering automation, efficiency, and sustainability in modern industrial environments.

Presented by

22761A0297-Abdul Rahaman Shaik

Automated Power Factor Correction system using STM32 MCU

An Automated Power Factor Correction (APFC) system using an STM32 microcontroller is designed to optimize the power factor in industrial and commercial electrical systems by dynamically compensating for reactive power. Poor power factor, often caused by inductive loads such as motors and transformers, results in increased power losses and higher electricity bills. The STM32 microcontroller continuously monitors the power factor by analyzing voltage and current waveforms and then determines the required reactive power compensation. By controlling capacitor banks through relay switching or thyristors, the system automatically corrects the power factor, ensuring it remains close to unity. This automated approach eliminates the need for manual adjustments, enhances system efficiency, and reduces energy costs for industrial applications.

The integration of the STM32 MCU in the APFC system provides real-time data processing, improved accuracy, and seamless communication with industrial automation networks. With advanced peripherals and low-power operation, the STM32 ensures high-speed computations for precise reactive power compensation. The system can also be integrated with IoT-based monitoring platforms, allowing remote access and control through cloud-based dashboards. Additionally, predictive maintenance capabilities can be implemented by analyzing historical power factor data and detecting anomalies, preventing potential equipment failures. By automating power factor correction, this system enhances the reliability of electrical networks, reduces stress on transformers and

generators, and promotes energy conservation in industries and commercial establishments.

Presented by

22761A0269-G.Vishnu Vardhan Reddy

Industry Interaction & Guest Lectures

Concepts & Comparison of Renewable Energy Sources

The Department of Electrical and Electronics Engineering organized an insightful guest lecture on "**Concepts & Comparison of Renewable Energy Sources**" on **18th October 2024**. The session was conducted by **Dr. M. Ravindra Babu**, an esteemed industrial expert, who shared his in-depth knowledge on various renewable energy technologies, including **solar, wind, hydro, biomass, and geothermal energy**. He elaborated on the fundamental working principles of these sources, their efficiency, sustainability, and potential to replace conventional fossil fuels. The lecture provided students with a deeper understanding of the **importance of transitioning to green energy** in response to global energy demands and environmental concerns.

Dr. M. Ravindra Babu also emphasized the **comparative advantages and challenges** of different renewable energy sources in industrial applications. He highlighted factors such as **cost-effectiveness, energy storage challenges, grid integration, and government policies** influencing renewable adoption. The interactive session allowed students to explore **real-world case studies and innovative solutions** in renewable energy. The lecture was highly engaging and encouraged future engineers to **contribute to sustainable energy solutions**, aligning with the department's commitment to fostering research and innovation in **Electrical and Electronics Engineering**.

Additionally, Dr. M. Ravindra Babu introduced the concept of **Industry 4.0** and its integration with **Artificial Intelligence (AI)** in the energy sector. He explained how **smart grids, IoT-enabled monitoring systems, predictive maintenance, and AI-driven optimization** are transforming renewable energy management. By leveraging AI algorithms, industries can enhance **energy efficiency, fault detection, and real-time decision-making**, ensuring **reliable and automated power generation**. This discussion provided students with a **broader perspective on the future of energy systems**, emphasizing the growing role of **digitalization, automation, and intelligent control in modern power networks**.

UAV Design and Development & Career and Motivation-UAV

The Department of Electrical and Electronics Engineering organized a guest lecture on "**UAV Design and Development & Career and Motivation in UAV**" on **19th December 2024**. The session was delivered by an **Associate Professor from Universiti Sains Malaysia**, who provided valuable insights into the **fundamentals of Unmanned Aerial Vehicle (UAV) technology**, including aerodynamics, control systems, propulsion, and sensor integration. The lecture highlighted the **growing significance of UAVs** in various fields such as **aerospace, defense, surveillance, disaster management, and industrial automation**. Students gained a deeper understanding of UAV design principles and **the role of electrical and electronics engineering** in enhancing drone performance, efficiency, and reliability.

The speaker also addressed **career opportunities and motivation in UAV technology**, emphasizing the increasing demand for skilled engineers in **drone development, AI-powered autonomous systems, and real-time data analytics**. He shared valuable insights into **emerging research trends, industry expectations, and higher education opportunities** in UAV-related fields. By discussing real-world applications and advancements in drone technology, the session inspired students to explore careers in **aerospace, robotics, and automation**. The lecture provided an excellent platform for aspiring engineers to **understand the evolving UAV**

landscape and the critical role of innovation in shaping the future of aerial systems.

Additionally, the professor showcased the design of a **small aircraft equipped with solar panels**, demonstrating how it utilizes **solar energy to generate the necessary voltage for flight**. This innovative approach highlighted the potential of **renewable energy integration** in UAV technology. She also discussed the **advancements in drone technology** and their practical applications, particularly in **delivering lightweight substances** such as medical supplies, food, and emergency aid. The session provided students with a **comprehensive perspective on the latest developments in UAVs**, inspiring them to explore sustainable and efficient drone technologies for future applications.

Internships

Advanced Embedded Systems Workshop & Internship

From **August 12th to 17th, 2024**, the Department of **Electrical and Electronics Engineering** at **Lakireddy Balireddy College of Engineering** organized an intensive **one-week workshop** for **III B.Tech students**. This workshop was conducted in collaboration with **Dr. S. Madhavapandian, Director of Embedded at Taras Systems & Solutions**, and **Tessolve Semiconductor Private Ltd.** The program aimed to bridge the gap between **academic learning and industrial expertise**, focusing on **Embedded Systems and IoT applications**. Throughout the session, students were exposed to **advanced concepts in microcontroller programming, real-time interfacing, and embedded development workflows**.

As a result of this rigorous training, **32 outstanding students** were selected for a **six-month internship**, where they are gaining hands-on experience with **industry-standard software tools** such as **Proteus, Code Composer Studio, STM32CubeIDE, and Ubuntu (Linux)**. The internship emphasizes **practical exposure to microcontroller architectures**, particularly the **MSP430** and **STM32 MCU** families. Interns are being trained in **embedded system design, firmware development, and peripheral interfacing**, strengthening their skills to meet **industry demands**. The program also provides insights into **power optimization techniques, real-time debugging, and sensor integration** for **smart applications**.

The workshop covered a **broad range of topics** essential for **modern embedded systems development**. Key subjects included **ARM Cortex-M architecture, low-power embedded design, RTOS (Real-Time Operating Systems), industrial IoT applications, and Linux-based embedded development**. Participants explored **real-world case studies**, working on **hardware prototypes and software simulations** to reinforce their theoretical knowledge. This initiative has significantly enhanced students' **technical competency**, preparing them for careers in **embedded systems, automation, and semiconductor industries**. The collaboration between **academia and industry** continues to pave the way for **innovation**, ensuring that students are well-equipped for the evolving **technological landscape**.

Faculty Publications

1. Chernobyl Disaster Optimizer-Based Optimal Integration of Hybrid Photovoltaic Systems and Network Reconfiguration for Reliable and Quality Power Supply to Nuclear Research Reactors

Authors: Sobha Rani Penubarthi, Radha Rani Korrapati, Varaprasad Janamala, Chaitanya Nimmagadda, Arigela Satya Veerendra, Srividya
Journal: *Modelling 2024 (MDPI) — SCIE Indexed*
Date of Publication: January 10, 2024

This research introduces a groundbreaking optimization technique—Chernobyl Disaster Optimizer (CDO)—for the integration of hybrid photovoltaic systems and network reconfiguration in nuclear research facilities. The study models the complexities of balancing load demands and enhancing power quality through a nature-inspired metaheuristic approach. The proposed model improves the operational stability and reliability of sensitive nuclear loads under real-world grid disturbances.

By integrating renewable energy sources into high-risk environments like nuclear reactors, the work makes a notable contribution to clean energy advancement and grid resilience. Simulation outcomes validate the CDO's effectiveness over traditional algorithms in voltage stability and loss minimization. This research sets a strong foundation for intelligent hybrid energy systems prioritizing safety and environmental sustainability.

2. Adaptive Extreme Learning Machine Using Soft Computing Fuzzy Propositions—Validating Operating State of Solar Energy System

Author: K. Harinadha Reddy
Journal: *Applied Soft Computing — SCIE Indexed*
Date of Publication: February 5, 2024

This paper explores the application of an Adaptive Extreme Learning Machine (AELM) model infused with soft computing fuzzy propositions for real-time monitoring and validation of solar energy systems. The method aims to detect operational anomalies and efficiency losses with high precision using minimal computational overhead. The integration of fuzzy logic enhances interpretability, making it suitable for deployment in dynamic and data-scarce environments.

The innovation lies in its adaptive feedback mechanism that self-tunes to changing environmental conditions like irradiance and temperature. This ensures robust performance under uncertainty, a key requirement for large-scale renewable energy deployment. The research offers promising pathways for developing autonomous monitoring systems that not only boost energy yield but also extend the lifespan of solar power infrastructure.

3. Distribution System State Estimation Using Physics-Guided Deep Learning Approach

Authors: Y. Raghuvamsi, Kiran Teeparthi, Vinod Kumar D.M., Imran Abdul, Srihari Parri
Journal: *Electrical Power Systems Research — SCIE Indexed*
Date of Publication: March 18, 2024

This publication proposes a novel Physics-Guided Deep Learning (PGDL) model to perform state estimation in modern distribution networks. By embedding domain-specific physical laws into the neural architecture, the model enhances accuracy and reliability, even under noisy and incomplete measurement scenarios. This hybrid approach bridges the gap between conventional model-based techniques and data-driven methods in power system analytics.

The paper showcases how PGDL not only improves prediction fidelity but also drastically reduces training times, making it practical for real-world implementation. The model's ability to generalize across varying grid topologies and loading patterns opens new avenues in predictive grid monitoring and fault detection. It signifies a leap toward smarter, AI-enabled distribution systems for the future.

4. FruitFly Algorithm Optimised Degree of Freedom Controller for the Dynamical Stability of the Renewable Energy Penetrated Multi Area Power System

Authors: Ch. Naga Sai Kalyan, Pasala Gopi, Priyanka Joshi, T. Hima Bindu, Mohit Balaji
Journal: *E3S Web of Conferences — SCOPUS Indexed*
Date of Publication: January 24, 2024

The paper presents a unique control strategy involving a FruitFly Optimization Algorithm for designing a Degree of Freedom (DOF) Controller to enhance stability in renewable energy-penetrated multi-area power systems. With increasing integration of intermittent sources like wind and solar, conventional control methods fall short in maintaining dynamic stability. The proposed model intelligently adjusts frequency and tie-line power flow using optimized tuning parameters.

The novelty of using bio-inspired algorithms for DOF control in a multi-area grid makes this work a significant step in evolutionary control engineering. Simulation studies under various load perturbations demonstrate the controller's superior performance in damping oscillations and reducing frequency deviations. This innovation is timely and relevant, considering the growing need for flexible and adaptive control systems in green power grids.

5. A Novel Framework for AI-Driven, Cloud-Integrated Energy-Efficient IoT Solutions in Smart Homes

Authors: Dankan Gowda V, Ratidev Samal, Premkumar Reddy, A.V.G.A. Marthanda, Ravikiran Kamath Billady, P.V.Rajlakshmi
Journal: *IEEE Xplore — SCOPUS Indexed*
Date of Publication: March 7, 2024

This research presents an integrated IoT framework powered by Artificial Intelligence and Cloud Computing for energy-efficient smart home environments. The system architecture is designed to learn user behavior, predict energy demand, and automate energy management decisions in real-time. The fusion of AI with cloud infrastructure enables scalable deployment and remote monitoring, aligning with global sustainability and smart city goals.

What sets this work apart is its multi-layered approach—covering data acquisition, processing, and actionable automation—while minimizing latency and power consumption. The framework enhances user convenience and energy savings, supported by a robust security layer for safe data exchange. This publication marks a critical contribution to next-gen intelligent building systems, where energy and automation coexist seamlessly.

Patents

Granted Patent: Design and Fabrication of Hybrid Dryer

Inventor: Dr. G. Nageswara Rao
Title: *Design and Fabrication of Hybrid Dryer*
Patent Number: 202441048345 A
Publication Date: July 2024

This patent presents an innovative hybrid dryer system that integrates multiple drying technologies to enhance efficiency and reduce energy consumption. The design optimizes heat transfer mechanisms to achieve uniform drying, making it suitable for applications in agriculture, food processing, and industrial drying processes. By combining conventional and renewable energy sources, the hybrid dryer offers an eco-friendly and cost-effective solution, contributing to advancements in sustainable engineering. The successful grant of this patent reflects the department's commitment to research-driven innovation and technological development, reinforcing its excellence in applied engineering research.

The hybrid dryer's novel approach improves drying performance while significantly reducing operational costs and environmental impact. Its modular and scalable design allows for customization based on industry-specific needs, making it a versatile solution across various sectors. Additionally, the integration of automation and smart control mechanisms enhances precision in moisture removal, ensuring better product quality and energy efficiency. This patent strengthens the institution's research portfolio and highlights its contribution to sustainable and energy-efficient technological advancements.

Books Written

Books Authored – Academic Year 2024-25

1. Review of Effects on the Power Grid from Plugging in Electric Vehicles and Renewable Energy Sources

Authors: Dr. G. Nageswara Rao, Srikumar K, Ananda Kumar A, Mosherani V
Publisher: Elsevier, Megan Ball
ISBN: 978-0-443-28955-2

This book provides a comprehensive analysis of the impact of electric vehicles (EVs) and renewable energy integration on power grids. With the rapid transition towards sustainable energy solutions, the increasing penetration of EVs and renewable energy sources introduces new challenges in grid stability, power quality, and demand-supply balancing. The book explores various strategies for mitigating grid disturbances, including energy storage solutions, demand response mechanisms, and smart grid advancements. By presenting in-depth case studies and mathematical modeling approaches, this work serves as a valuable resource for researchers, policymakers, and industry professionals working on the future of power distribution networks.

With a focus on sustainable grid management, the book also delves into the role of artificial intelligence and machine learning in optimizing energy distribution. It highlights innovative control strategies for load management, real-time monitoring techniques, and

predictive analytics for grid performance assessment. The insights provided in this publication contribute to the advancement of smart energy systems, making it a significant academic and industrial reference for addressing the challenges posed by large-scale electrification and renewable energy adoption.

2. Battery Monitoring System for Electric Vehicles

Authors: Dr. P. Sobha Rani, B. Jyothi, S. K. Nagoor, S. Meghanadh
Publisher: Springer (Lecture Notes in Electrical Engineering)
ISBN: 978-981-99-9053-5

This book presents a detailed exploration of battery monitoring technologies for electric vehicles, emphasizing advanced diagnostic techniques and predictive maintenance strategies. As the demand for electric mobility continues to rise, efficient battery management becomes critical to ensuring vehicle safety, longevity, and optimal performance. The authors discuss state-of-charge (SOC) and state-of-health (SOH) estimation methods, thermal management solutions, and fault detection mechanisms to enhance battery reliability. The book serves as a crucial guide for students, researchers, and professionals engaged in EV technology development.

The publication further addresses the integration of Internet of Things (IoT) and artificial intelligence in battery monitoring, enabling real-time data analysis and remote diagnostics. By exploring the latest advancements in lithium-ion battery technologies and energy management systems, this work significantly contributes to the knowledge base required for sustainable electric vehicle innovations. The book not only strengthens the academic curriculum in electrical engineering but also aligns with industry trends in green transportation and smart energy solutions.