



Hope Foundation's
**Finolex Academy of Management
and Technology, Ratnagiri**

ELECTRICAL ENGINEERING
DEPARTMENT

Presents

VoltVoice

Ideas Light the Path of Innovation



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ELECTRICAL ENGINEERING DEPARTMENT

VoltVoice

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About Department

This new age, the age of Technology, dawned with the discovery of Electricity and the subsequent development of Electrical Engineering. Equipped with modern infrastructure and supported by a team of competent faculty members, the Electrical Department at FAMT was set up in 1997. FAMT understands the importance of Electrical Engineering and is fully capable of meeting the expectations of young aspiring Engineers.

The Electrical Engineering Department emphasizes rigorous training in analytical and experimental techniques, effectively giving students an integrated approach and a thorough understanding of how to solve problems and, more importantly, equipping them to face the challenges in Industry. These laboratories host a wide range of modern equipment. The Department is also equipped with an advanced computer centre apart from the centralized one, which houses 32 PIV PCs. Modern Engineering simulation software like MATLAB® is used to aid experiments and illustrate the theory.

The Departmental library is an additional academic resource available to students. A separate reading room is also available in the Department for students who wish to access the Departmental library. The success of the Department is reflected in the projects carried out by the students. Some of them, especially the Green House Automation, have received many national awards. Our commitment to holistic development has seen our students perform exceptionally well in many national-level and university examinations and be awarded prizes in various co-curricular activities.

HOD's Desk



It gives me immense pleasure to present this edition of VoltVoice, the official magazine of the Department of Electrical Engineering. VoltVoice is a vibrant platform that showcases our academic pursuits, technological growth, and creative endeavors. Over the past year, our department has strengthened its foundation in core Electrical Engineering disciplines while actively engaging students in hands-on learning experiences.

Through workshops, add on courses, industry expert lectures and student-led projects, we have fostered an environment that encourages curiosity, problem-solving and innovation.

We enhanced our industry interaction through expert sessions, site visits, and internship opportunities, helping bridge the gap between theoretical learning and practical application. Initiatives such as alumni interactions and skill-building programs contributed significantly to the professional development of our students.

VoltVoice captures not only our technical achievements but also the enthusiasm and dedication that define our department. I appreciate the sincere efforts of the editorial team for curating and presenting this edition with such thoughtfulness.

Wishing all members of the Electrical Engineering family continued success and excellence.

Warm Regards,

Dr. Sandeep Chawda
Head of Department



Editorial Board

Greetings from the Editorial Board !!



It is with immense pride and pleasure that we present the May 2022 issue of our Departmental Magazine – VoltVoice. This edition captures the academic commitment and technical endeavors that marked the past year in the Department of Electrical Engineering. Despite the challenges and transitions of the time, our students and faculty continued to demonstrate resilience, innovation, and a passion for learning.

VoltVoice brings together technical articles and content that embody the dynamic spirit of our department. This magazine celebrates the collective efforts of our academic community.

We believe VoltVoice will continue to serve as a source of inspiration and a testimony to the dedication and talent within our department. We invite you to explore its pages and share your feedback to help us grow stronger with each edition.

Sincerely,

Prof. Priya Potdar

Assistant Professor

Department of Electrical Engineering

Student Editorial Team



Omkar Shanbhag



Muktee Kamble



Aditya Jadhav





Institute Vision-Mission



Vision:

The academy aspires to nurture students as leaders who are in tune with global trends, equipped with engineering knowledge and practical skills, to excel in creativity and innovation in order to play their part in technological advancement of the nation.

Mission:

M1: To become foremost seat of advanced technical learning as a center of excellence in the region.

M2: To offer state of the art facilities and quality education at affordable cost.

M3: To inculcate in students the culture of 'Play Hard and Play Fair'.

M4: To advance sustainable development in the region through opportunities for entrepreneurship and industry-institute interaction.

M5: To create a generation of young professionals who appreciate in all its aspects the necessity of balance between technological advances and traditional values.





Department Vision, Mission, PEO & PSO



● **Vision:**

The department shall become foremost seat by imparting advanced and progressive education in Electrical Engineering along with excellent professional skills and character to meet industrial and social challenges.

● **Mission:**

M1: To ascertain qualitative teaching-learning process through the art of teaching pedagogy and meticulous continual assessment.

M2: To provide a supportive environment that facilitates industrial exposure to produce quality engineers who will excel globally.

M3: To promote the versatile development of students through training of soft skills.

M4: To imbibe moral, ethical and social values among students.

● **Program Educational Objectives (PEOs):**

PEO1: Students should be able to have successful career or pursue higher studies to meet future challenges of technological development.

PEO2: Students should be able to pursue analytical and logical skills that will enable them to analyse and design Electrical Systems and its Controls.

PEO3: Students should be able to undertake research and development activities in emerging multidisciplinary fields.

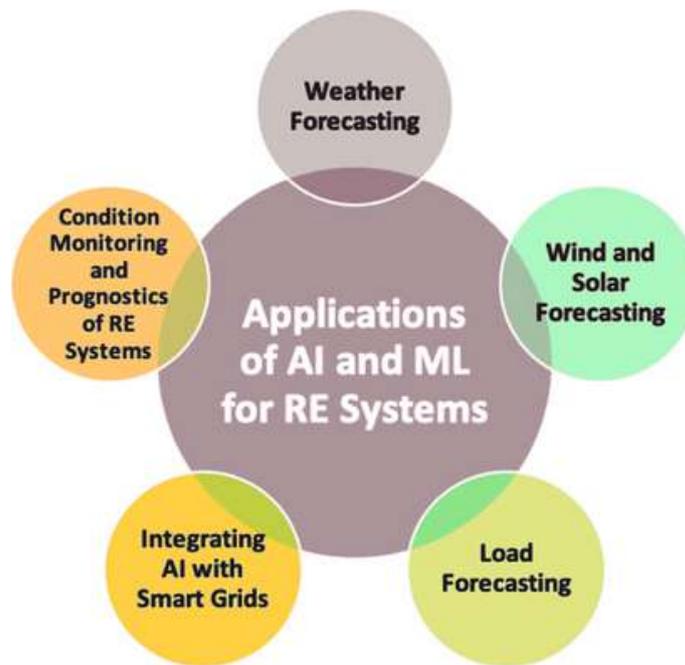
PEO4: Students should be able to achieve professional and interpersonal skills by giving an opportunity as an individual as well as a team.

● **Program Specific Outcomes (PSOs):**

PSO1: Students will be able to design, simulate and analyze electrical systems using software tools.

PSO2: Students will be able to understand, implement concepts of electrical systems through experiments and apply it to solve industry specific problems.

Machine Learning for Sustainable Energy Systems



In recent years, machine learning (ML) has emerged as a powerful tool for driving innovation in sustainable energy. With the pressing need to transition to cleaner energy sources, ML provides intelligent solutions to optimize every aspect of the energy system – from generation and storage to distribution and consumption. Unlike traditional approaches that rely heavily on deterministic models, ML leverages vast datasets to uncover patterns, make predictions, and improve operational efficiency.

In our Power Systems course, we explored how ML can enhance solar energy forecasting, wind power prediction, and battery performance modeling. These capabilities are essential for integrating renewables into the grid, given their intermittent nature. During a seminar on green technologies, industry experts demonstrated how ML algorithms are being used to predict energy demand, detect anomalies in power networks, and even recommend maintenance schedules for renewable energy installations.

As future electrical engineers, we are excited by the potential of combining data science with electrical engineering to create intelligent, adaptive, and sustainable energy systems. Machine learning is not just a buzzword – it is a cornerstone of the energy revolution.

Advancements in Wireless Power Transfer



Wireless Power Transfer (WPT) has long captured the imagination of engineers and researchers. From charging mobile phones without cables to powering electric vehicles on the move, WPT is now closer to mainstream adoption thanks to recent technological breakthroughs.

Using principles of electromagnetic induction, resonant coupling, and microwave transmission, WPT systems are being designed to transfer power over varying distances with minimal energy loss. One innovative application we studied was wireless EV charging stations, where embedded coils in the road surface charge the vehicle as it moves – reducing downtime and enhancing convenience.

Recent developments also focus on enhancing power transmission efficiency, improving coil alignment using AI-based positioning systems, and ensuring safety through electromagnetic shielding. Moreover, researchers are now exploring laser-based wireless power transmission for space applications, such as powering drones and satellites remotely.

As engineers of tomorrow, exploring WPT allows us to rethink conventional infrastructure and create user-friendly, futuristic solutions.

Varad Karandikar - BE Electrical Engg.

Electricity Price Forecasting with Machine Learning



The increasing complexity of modern power markets demands smarter solutions, and Electricity Price Forecasting (EPF) using machine learning is one such innovation transforming the energy sector. Accurate price forecasting is vital for utilities, traders, and consumers to make informed decisions and manage risks. Traditional statistical models often fall short due to the nonlinear and volatile nature of electricity prices, especially in deregulated markets.

Machine learning algorithms like decision trees, support vector machines, and neural networks can process vast amounts of historical data, including weather patterns, demand fluctuations, generation capacity, and fuel prices, to predict future prices with greater accuracy. This predictive capability helps utilities optimize procurement, minimize generation costs, and balance supply-demand mismatches efficiently.

Beyond forecasting, machine learning is being used in real-time price adjustment models and dynamic pricing mechanisms, which can benefit both utilities and consumers. Smart meters combined with price forecasting enable demand response programs, where consumers shift their usage to off-peak hours, leading to cost savings and load smoothing.

As future engineers, mastering such predictive techniques can give us a competitive edge in the energy domain.

Ruthik Mulik - TE Electrical Engg.

Integration of AI in Smart Grids



The integration of Artificial Intelligence (AI) in smart grids is revolutionizing how electricity is generated, distributed, and consumed. As grids evolve to accommodate distributed energy resources and growing demand, AI is playing a crucial role in making energy systems more intelligent, adaptive, and resilient.

AI-driven technologies enable real-time demand forecasting, fault prediction, load balancing, and optimal energy dispatch. In our SCADA and automation lab, we saw how machine learning models could detect grid anomalies such as voltage sags, line losses, or frequency deviations faster than traditional systems – reducing the risk of blackouts and equipment failure.

AI also enhances the capabilities of predictive maintenance, where sensors and algorithms monitor the health of transformers, lines, and circuit breakers. By identifying early warning signs, maintenance can be scheduled proactively, minimizing downtime and reducing operational costs.

As budding electrical engineers, we are entering an era where traditional power systems and modern data science converge. The integration of AI in smart grids is not just an upgrade—it represents a fundamental shift in how we approach energy management, and it opens new doors for innovation, research, and sustainable development.

Swapnil Paradkar - BE Electrical Engg.

HVDC Transmission: Bridging Long Distances



High Voltage Direct Current (HVDC) transmission technology has revolutionized the way electrical power is transferred over long distances. Unlike traditional AC transmission, which suffers from significant losses and stability issues over vast distances, HVDC systems offer lower line losses, enhanced control, and the ability to interconnect asynchronous grids. This makes HVDC ideal for linking remote renewable energy sources, such as offshore wind farms, to urban consumption centers.

In India, major HVDC projects such as the North-East Agra link demonstrate the importance of this technology in transmitting bulk power efficiently across large geographical areas. HVDC converter stations use advanced power electronics devices like thyristors and IGBTs to convert AC to DC and vice versa, ensuring smooth and reliable power flow.

HVDC also allows for precise control of power flow, which helps in stabilizing interconnected grids and managing load variations. Another significant advantage is its ability to connect grids operating at different frequencies or without synchronization, facilitating cross-border power trading and regional grid integration.

For electrical engineers, working with HVDC systems involves expertise in high-voltage engineering, power electronics, control systems, and system protection, presenting exciting career opportunities in cutting-edge power transmission technology.

Shruti Phepade - BE Electrical Engg.

Electric Vehicles and the Future of Transportation



Electric Vehicles (EVs) are rapidly transforming the global transportation sector by offering a cleaner, more sustainable alternative to traditional fossil-fuel-powered vehicles. Powered primarily by lithium-ion batteries, EVs use electric motors that provide high efficiency and reduced emissions. The rise of EVs is supported by advancements in battery technology, power electronics, and motor control systems, enabling longer driving ranges and faster charging times.

Governments worldwide are promoting EV adoption through subsidies, infrastructure development, and regulatory incentives aimed at reducing carbon footprints. The expansion of charging infrastructure—from slow home chargers to ultra-fast public charging stations—is critical for widespread EV use. Innovations in battery management systems ensure safety, longevity, and thermal regulation of batteries.

EVs also play a vital role in smart grid integration through vehicle-to-grid (V2G) technology, where parked EVs can supply stored electricity back to the grid during peak demand periods. This bidirectional energy flow helps stabilize the grid and supports renewable energy integration. Furthermore, regenerative braking systems in EVs recover kinetic energy to recharge batteries, improving overall energy efficiency.

The future of transportation lies in e-mobility, which demands expertise in electrical engineering fields such as power electronics, control systems, and energy storage. As EV technology continues to evolve, it presents exciting opportunities for innovation and sustainable development in the energy and transportation sectors.



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