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ENGINEERING

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UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (A)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA 1

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FDPS ORGANIZED

- Sri. B. Naresh, Associate Professor of EEE, UCEK, and Dr. D. Sudha Rani, Professor & HOD of EEE, Sri Vasavi Engineering College (A), Tadepalligudem, coordinated a One-Week Offline Faculty Development Programme (FDP) on “Next-Gen Electrical Engineering: EVs, Smart Grids, and Energy Analytics” from 15th June 2026 to 19th June 2026. The programme was conducted at UCEK, JNTUK and organized by the Directorate of IQAC & Capacity Building, JNTUK.
- Dr. K. Venkata Reddy, Professor & HOD of EEE, UCEK, and Dr. M. Srinivasa Rao, BVC Engineering College (A), Odalarevu, coordinated a One-Week Offline Faculty Development Programme (FDP) on “Outcome-Driven Electrical Engineering Education using AI and Real-Time Simulation Tools” from 22nd June 2026 to 26th June 2026. The programme was organized by the Directorate of IQAC & Capacity Building, JNTUK at UCEK, JNTUK.

FDPS ATTENDED

- Dr. B. Ajay Babu, Assistant Professor (C), EEE, UCEK, JNTUK, successfully participated the five-day Faculty Development Program on “Sustainable Energy Systems and Electrification Techniques for Future Mobility” conducted in hybrid mode, from 8th June 2026 - 12th June 2026. The program was organized by Department of EEE, Prasad V. Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada, Andhra Pradesh, India.
- Dr. B. Ajay Babu, Assistant Professor (C), EEE, UCEK, JNTUK, successfully completed a five-day Faculty Development Programme on "Recent Technologies in Distribution Networks Modernization" Organized by the Department of EE, Maulana Azad National Institute of Technology (MANIT), Bhopal from 1st June 2026 - 5th June 2026.

PATENTS

- Dr. Ravindra Kollu, Professor, EEE, UCEK, and Sri. Nammi Sagar teja yadav, Assistant Professor (C), EEE, UCEK, have authored a research paper on “Performance Analysis of Improved Half-Bridge NPC Inverter-Fed PMSM Drive With Fault Tolerant Operation” Published in Next Research, vol. 8, p. 101597, June 2026, DOI: 10.1016/j.nexres.2026.101597.
- Smt. Vijaya Bhanu Karri, Assistant Professor (C), EEE, UCEK, has secured a design patent on “Electronic Device for Meditation Tracking and Reminder”. Patent Application No. 497287-001, The patent was filed on 04th April 2026 and was granted on 24th June 2026.
- Dr. Venkata Reddy Kota, Professor & Head, EEE, UCEK, Dr. B. Ajay Babu , Assistant Professor (C), EEE, UCEK, Manchimsetti Soma Sundari, Sattaru Sathish Kumar and Kasilanka Iswarya Sai. has secured a design patent on “A Regenerative Spin Bike”. Patent Application No. 478499-001. The patent was filed on 30th October 2025 and was granted on 5th June 2026.

EVENTS

- The 2022–2026 batch students graduated from the Department of EEE, UCEK, JNTUK, during the institution's Graduation Day ceremony on 27th June 2026. The event was graced by Chief Guest Prof. CSRK Prasad, Hon’ble Vice Chancellor, JNTUK, and presided over by Prof. K. Padma Raju, Principal, UCEK. Key officials on the dais included Prof. G. V. S. R. Deekshitulu, Vice Principal (Academics), UCEK, Dr. M. Swaroopa Rani, Vice Principal (Administration), UCEK and Dr. K. Venkata Reddy, Head of the Department of EEE, UCEK alongside other department heads. This historic celebration marked the successful academic completion and inspiring professional transition of the graduating engineering cohort.



COMMUNITY SERVICE PROJECT

II B.Tech students of Electrical and Electronics Engineering department, UCEK, JNTUK had collaborated with local NGOs in fulfillment of the 8 week community service project, these 8 week summer internship have engaged students to lead, organize and volunteer various social activities



The Sankurathri Foundation's Community Service Project offered 13 JNTUK II B.Tech students an invaluable experiential learning opportunity. Under Dr. Sankurathri Chandrashekhar's guidance, three student teams applied academic knowledge to real-world service in Thimmapuram, Kakinada, after an orientation on the foundation's history and goals.

Their impactful work included three key surveys: a door-to-door Chebrolu Eye Health Survey for cataract and spectacle needs, a Child Educational Survey to promote school enrollment, and a Mosquito Eradication Survey focused on public health. Additionally, the students volunteered at the Srikirana Institute of Ophthalmology's free eye screening camps, assisting with registration and record management. This fieldwork significantly developed their leadership, teamwork, communication, and civic responsibility skills, showcasing the positive impact of youth-led civic engagement on rural communities.



Students of II B.Tech, EEE department, UCEK, JNTUK have collaborated with KEN FOUNDATION, Visakhapatnam for an 8 Week summer internship. The community service project helped students to Successfully complete the internship heavily focused on community support and environmental efforts. Actively participated in essential

cloth distribution drives to underserved communities within slums and child care homes. A significant portion of the work involved leading and participating in extensive marine cleanup efforts along the coastline. Provided critical assistance in educational activities, including English learning, for children in shelter homes. Further supported environmental stability by participating in various relief and cleanup drives throughout the program. Showed a consistent commitment to teamwork, field coordination, and community service while motivating others to participate in these vital initiatives.



The Indian Red Cross Society, Srikakulam provided JNTUK students with a valuable and meaningful experiential learning opportunity. The initiative connected academic learning with practical humanitarian service through a series of community-oriented activities. The students

actively participated in a blood donation camp, observing donor registration, medical screening, blood collection, and post-donation care, while also understanding the importance of maintaining a safe blood supply. They visited sickle cell anemia and the Red Cross Blood Transfusion Centre, where they interacted with patients and gained awareness of patient welfare, thalassemia, and the importance of continuous blood donation. These hands-on experiences strengthened their leadership, teamwork, communication, empathy, first-aid awareness, and social responsibility, highlighting the importance of youth participation in humanitarian and community welfare activities.

COMMUNITY SERVICE PROJECT



Souls of Humanity in Gajuwaka, Visakhapatnam, provided community service project to IInd B.Tech students EEE Department, UCEK, JNTUK with a deeply impactful experiential learning opportunity under the guidance of Mr. S. Durga Ajay Kumar. The initiative bridged classroom knowledge and grassroots action through a series of impactful civic programs.

The team actively engaged in local public health and environmental stewardship by participating in World Environment Day awareness drives, organizing a blood donation camp, and leading a beach cleaning drive along the coastal belt. Recognizing the critical need for rural hygiene, volunteers also distributed essential supplies—including hand sanitizers and disinfectants—to underserved families. Hands-on participation in these real-world initiatives significantly enhanced the students' leadership, teamwork, communication, and civic responsibility skills, underscoring the transformative power of youth-driven community action.



EEE Students and Lions Clubs International Community Service project. As part of the Community Service Program students from the EEE branch of JNTUK participated in community service activities with Lions Clubs International, Kakinada, under the guidance of Mr. Prasad Naidu, Club President. The students took part in tree plantation in public parks, beach

During the medical camps, doctors conducted health check-ups and provided valuable health awareness and preventive-care guidance to the public. These activities helped the students develop teamwork, social responsibility and environmental awareness, while making a meaningful contribution to the local community.



The Community Service Project (CSP) was conducted at Seetayya Foundation, Mandapalli, Sompeta. The main objective was to support the elderly residents and understand their needs and living conditions. During the project, we actively participated in maintaining the cleanliness and hygiene of the old age home, including rooms, common areas, and surroundings.

We assisted the staff in organizing the premises and spent time interacting with the residents. These activities helped us understand the importance of proper sanitation, care, companionship, and emotional support for senior citizens. The project was a valuable learning experience that developed our empathy, teamwork, discipline, communication skills, and sense of social responsibility. Interacting with the elderly taught us to respect their experiences and understand the importance of kindness and compassion. We also realized the significant role of NGOs in providing care and support to vulnerable sections of society. Overall, our work at Seetayya Foundation was meaningful and rewarding, and it motivated us to continue contributing to community welfare and becoming responsible citizens.

INTERNSHIPS



- BODDU UDAY LAKSHMI (23021A0204), in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **HMIES solutions PVT. LTD.**, Visakhapatnam from 18-05-2026 to 11-07-2026.



- Geeda Srinivas Reddy (23021A0210), in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **TTE Electronics Ltd.**, Visakhapatnam from 18-05-2026 to 11-07-2026.



- Ankana Adarsh (23021A0202), in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **Reliance industries, Kakinada** from 18-05-2026 to 11-07-2026.



- P.Harika (23021A0238), from III B.Tech in University College of Engineering Kakinada(A), JNTUK has done INTERNSHIP



- Gopanaboyna. Bhavitha (23021A0212), in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **AP Transco, Vijayawada** from 18-05-2026 to 11-07-2026.

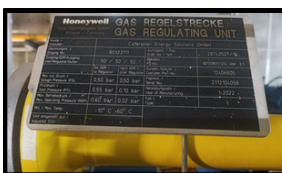
in BHEL, Hyderabad from 18-05-2026 to 11-07-2026.



- R. Keerthi (23021A0240), P. Prasanthi (23021A0235), M.N.V. Manasa, P. Praneeth (23021A0234), M.V.N. Lakshman Kumar (23021A0227), K.V.V. Sai Sriram (23021A220), B. ManiPrudhvinaadh (24025A0254), D. Raj Gopal Sai (2301A0209) III B.Tech in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **Dr.NTTPS (APGENCO)** from 18-05-2026 to 11-07-2026.



- Sudheer (23021A0217), V.J.S.N. Kiran (23021A0251), R.S.S. Karthikeya (24025A0258), Ch. Venkatesh (23021A0205) G. Lasya Santoshi (23021A0211), J. Jyothsna (23021A0218), K. Vijay (23021A219), K. Satish (23021A0221), K. Sai Satvika (23021A0225), Md. Azeem (23021A0226), M. Nagendra (23021A0228), M. Akash (23021A234), S. Ruchitha (23021A0246) from III B.Tech in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **Sai Sudheer Energy Ltd.**, from 18-05-2026 to 11-07-2026.



- A. Adarsh (23021A0202), B. Karthikeya (23021A0203), Ch. Sree Niteesh (23021A0206), G.Niharika (23021A0214), M. Sharon (23021A0230), P. Priskilla (23021A0236), R. Harshini (23021A241), T. Meghana (23021A0247), from III B.Tech in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **Sai Sudheer Energy Ltd.**, from 18-05-2026 to 11-07-2026.



- G. Satya Swaroopa (23021A0213), Hansika (23021A0216), M. Yaswanth Surya (23021A0229) from III B.Tech in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **Coromandel International Ltd.**, from 18-05-2026 to 11-07-2026.



- K. Durga Lakshmi (23021A0222), V. Sai Sri Narsamani (23021A0252), M. Yaswanth Surya (23021A0229) from III B.Tech in University College of Engineering Kakinada(A) JNTUK has done INTERNSHIP in **Bharat Electronics Limited** from 18-05-2026 to 11-07-2026.

EMERGING TECHNOLOGIES IN ELECTRICAL & ELECTRONICS ENGINEERING

Introduction

Electrical and Electronics Engineering (EEE) sits at the core of nearly every major technological shift underway today. From the way electricity is generated and delivered to the chips that power our devices, the field is being reshaped by a wave of innovations aimed at higher efficiency, greater intelligence, and tighter integration between the physical and digital worlds.

This article surveys nine of the most consequential emerging areas in EEE: smart grids and renewable integration, wide-bandgap power semiconductors, electric-vehicle power electronics, the Internet of Things with edge AI, next-generation wireless networks, flexible and wearable electronics, silicon photonics, embedded-systems cybersecurity, and the hardware foundations of quantum computing.

1. Smart Grids and Renewable Integration

Traditional one-directional power grids are giving way to smart grids that combine real-time sensing, two-way communication, and AI-based load forecasting. Distributed energy resources such as rooftop solar, wind farms, and battery storage now feed power back into the network, requiring intelligent control systems to balance supply and demand dynamically. Phasor measurement units (PMUs), advanced metering infrastructure, and machine-learning forecasting models allow operators to detect faults within milliseconds and reroute power before outages cascade.

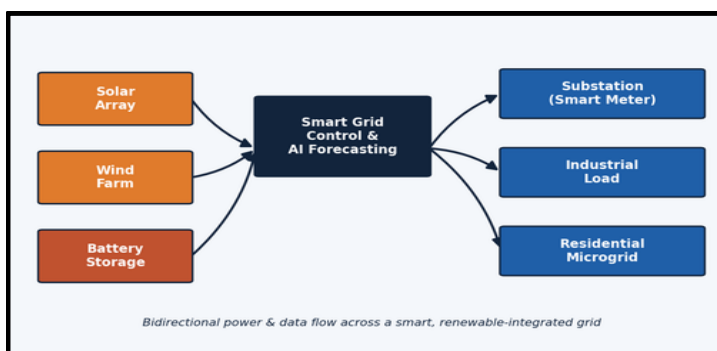


Figure 1: A smart grid coordinates renewable sources, storage, and loads through an AI-based control layer.

2. Wide-Bandgap Power Semiconductors

Silicon carbide (SiC) and gallium nitride (GaN) devices are steadily replacing conventional silicon in power-conversion circuits. These wide-bandgap materials tolerate higher voltages and temperatures and switch at much higher frequencies, which shrinks passive components and boosts overall system efficiency.

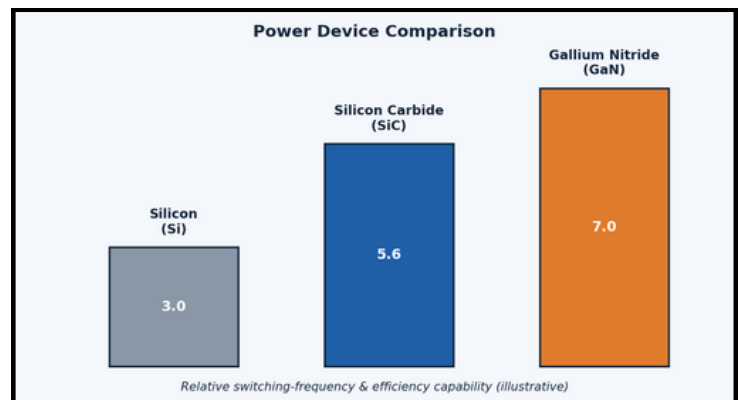


Figure 2: Wide-bandgap materials outperform silicon in switching frequency and thermal tolerance, enabling smaller, more efficient power converters.

In practice, this translates into smaller EV chargers, lighter power adapters, and more compact inverters for solar and industrial drives. SiC MOSFETs are now standard in traction inverters, while GaN is rapidly gaining ground in fast chargers and data-center power supplies.

Key Advantages

- Higher breakdown voltage for compact high-power designs.
- Switching frequencies up to 10x higher than silicon.
- Reduced cooling requirements and system weight.

3. Power Electronics for Electric Mobility

Electric vehicles depend on a tightly integrated chain of power electronics: the battery pack, a bidirectional inverter, the traction motor, and a battery-management system that monitors cell health in real time. Wide-bandgap inverters and higher-voltage architectures (800V and beyond) are pushing charging times down and driving range up.

EMERGING TECHNOLOGIES IN ELECTRICAL & ELECTRONICS ENGINEERING

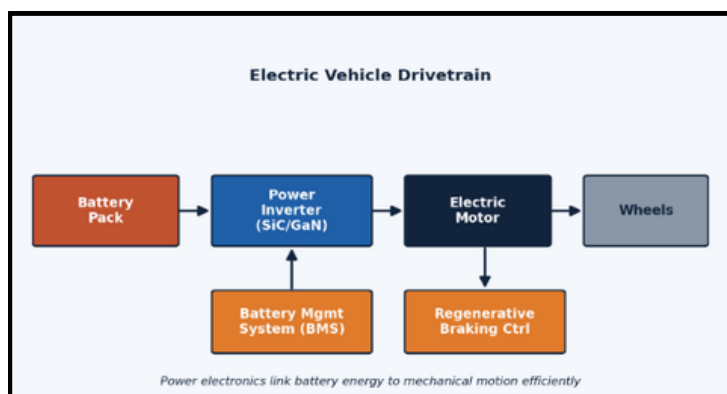


Figure 3: The EV drivetrain converts stored battery energy into mechanical motion through a chain of power-electronic stages

Regenerative braking recovers kinetic energy back into the battery, while onboard chargers increasingly support bidirectional vehicle-to-grid (V2G) operation, letting parked EVs supply power back to homes or the grid during peak demand.

Solid-State Batteries

Beyond power electronics, solid-state battery chemistries promise higher energy density and improved safety over liquid-electrolyte lithium-ion cells, and several automakers are targeting limited production within the next few years.

4. IoT and Edge AI

The Internet of Things continues to expand, but the newer trend is pushing intelligence out to the network edge. Instead of streaming raw sensor data to the cloud, low-power microcontrollers now run compact neural networks locally, cutting latency, bandwidth use, and energy consumption.

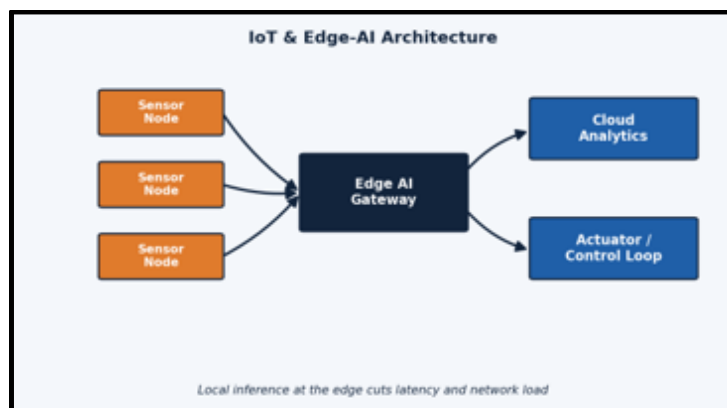


Figure 4: Edge-AI gateways perform local inference before relaying summarized data to the cloud and issuing real-time control actions.

TinyML frameworks allow models to run in kilobytes of memory, enabling always-on voice detection, predictive-maintenance sensors on industrial motors, and wearable health monitors that respond instantly without needing a constant network connection.

5. 5G, 6G, and Next-Generation Wireless

5G networks have matured with dense small-cell deployments and massive MIMO antenna arrays, delivering the low latency needed for autonomous systems and industrial automation. Research is now shifting toward 6G, which targets terahertz band spectrum, AI-native radio-access networks, and integrated sensing-and-communication capabilities. For electronics engineers, this shift drives demand for RF front end components that operate efficiently at higher frequencies, beamforming ICs, and antenna arrays small enough to embed in consumer devices while meeting strict thermal and power budgets.

Emerging RF Materials

- Gallium nitride RF amplifiers for higher power density
- Metamaterial and reconfigurable intelligent surfaces
- Integrated photonics for optical backhaul links

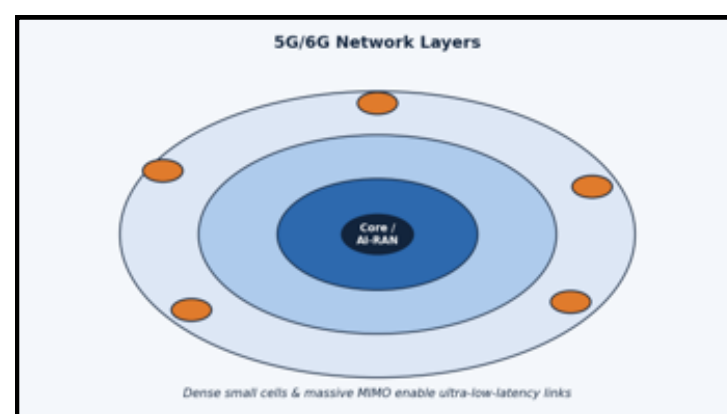


Figure 5: Layered small-cell and mmWave deployments densify capacity around a shared AI-managed radio-access core.

6. Flexible and Wearable Electronics

Printed and flexible electronics are enabling circuits that bend, stretch, and conform to skin or fabric. Thin-film transistors, stretchable interconnects, and printed sensor arrays are combining to create health patches, smart textiles, and conformable displays.

EMERGING TECHNOLOGIES IN ELECTRICAL & ELECTRONICS ENGINEERING

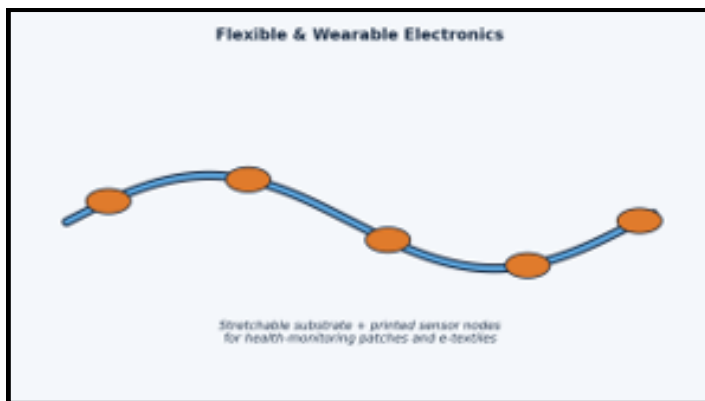


Figure 6: Stretchable substrates with printed sensor nodes support continuous, comfortable health monitoring.

These devices increasingly pair with energy harvesting elements, such as flexible photovoltaic films or piezoelectric generators, reducing dependence on battery replacement for long-term wear.

7. Silicon Photonics

As data rates climb, copper interconnects struggle with signal loss and heat over longer distances. Silicon photonics addresses this by moving data as light through on-chip waveguides, using integrated lasers, modulators, and photodetectors fabricated with familiar semiconductor processes.

Data centers are early adopters, using optical links to move enormous traffic volumes between racks with a fraction of the energy that equivalent copper links would need. Co-packaged optics, where the optical engine sits directly beside the switch silicon, is emerging as a way to push bandwidth even further while containing power budgets.

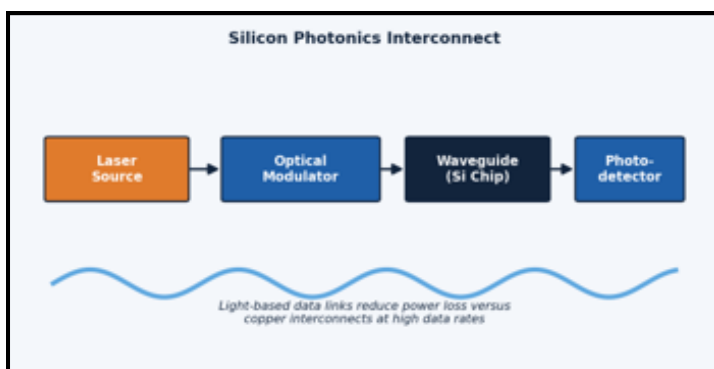


Figure 7: A silicon-photonic link modulates light onto a waveguide and recovers the signal at a photodetector, cutting interconnect power loss.

Challenges and Outlook

None of these advances arrive without friction. Wide-bandgap devices remain costlier to manufacture than silicon, grid modernization requires massive infrastructure investment, and quantum hardware still needs breakthroughs in qubit stability before it reaches widespread industrial use. Talent is another bottleneck: many of these domains demand engineers comfortable working across disciplines that were once taught separately, from materials science to machine learning.

Even so, the direction is clear. Each of these technologies reduces some form of waste, whether it is energy lost as heat, latency lost to distant servers, or time lost to manual grid balancing, and that efficiency pressure is unlikely to let up.

Conclusion

Across power systems, mobility, connectivity, wearable devices, photonics, and quantum hardware, a common thread runs through these emerging technologies: the push for greater efficiency, intelligence embedded closer to the source, and tighter coupling between electronics and the physical world they sense and control. For engineers entering the field, fluency across power electronics, embedded AI, security, and RF or photonic design is quickly becoming the new baseline.

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PHOTOGRAPHY



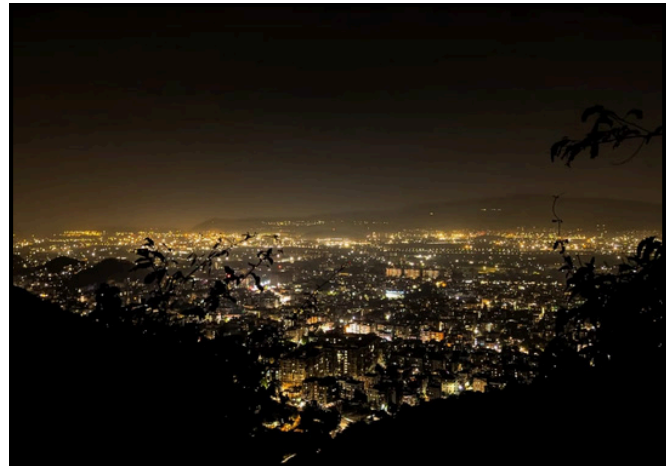
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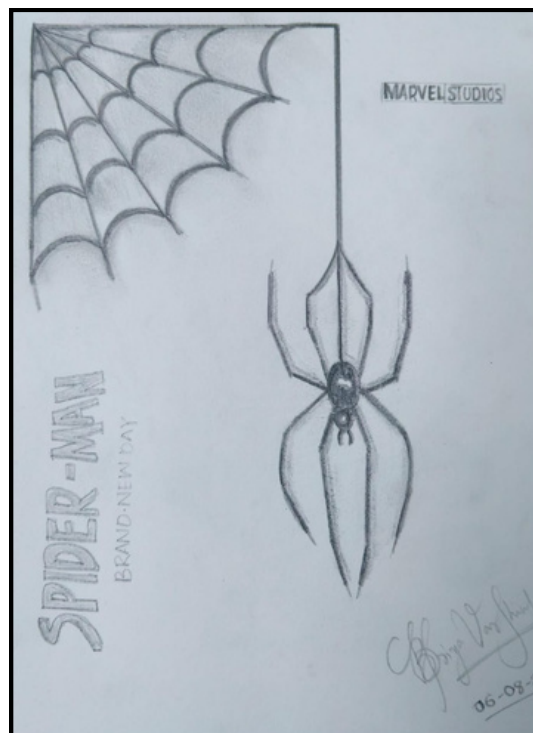
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