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THE SPARK

Igniting Innovations

DEPARTMENT OF
ELECTRICAL AND ELECTRONICS
ENGINEERING

JAN
2026



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

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ACHIEVEMENTS

- Secured **Second Place** in the 36-hour “**Green Energy Hackathon: IoT for Smart Energy**” at **Vellore Institute of Technology, Vellore (8th–9th January 2026)** by developing an **IoT-based Smart Switch Board** for real-time energy monitoring, remote appliance control, and intelligent energy optimization to promote sustainable power usage.
- Presented “**Krishidhara – Smart Irrigation System**”, at **Vellore Institute of Technology, Vellore (8th–9th January 2026)**. A fully automated ESP32-based solution integrating soil moisture and water level sensors, Weather API, and Machine Learning for real-time monitoring, weather-based irrigation scheduling, misuse detection, and live dashboard visualization to enable efficient water management and sustainable agriculture.
- **Ms. K. Kavya, III Year B.Tech (EEE), JNTU Kakinada**, secured the **Second Prize** in the **Essay Writing Competition** conducted as part of the **16th National Voters’ Day Celebrations**, organized by the **Election Commission of India** through the **District Election Office**; the competition was conducted at the college level and the award ceremony was held at the **Kakinada Smart City Conference Hall**, which was graced by the District Collector and senior officials of the Election Commission on **25th January 2026**.
- Student from IV B.Tech **T. Sai Govinda Krishna 22021A0246** from EEE department and have represented JNTUK and participated in Eenuadu Cricket league held at GIET college from Dec 27 2025 to Jan 7 2026



PLACEMENTS



With CTC of 7.5 LPA



AYINELLI MEGHANA



With CTC of 3.36 LPA



GARNEPUDI NAVEEN SAI



With CTC of 5.43 LPA



PYLA MANIKANTA



BODI SIVA KUMAR



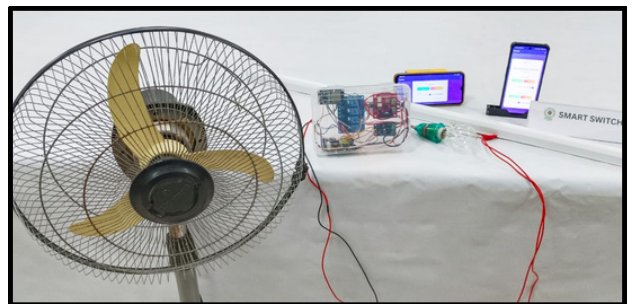
AKULA PRASANNA KUMAR

EVENTS



Shri Nara Lokesh, Hon'ble Minister for IT, Electronics and communication, Dr. C. S. R. K. Prasad Hon'ble Vice-chancellor JNTUK, reviewing the Innovation fair Projects presented by Students of EEE Dept.,

As part of the **Hello Lokesh** Programme and Innovation Fair 2026 held at Jawaharlal Nehru Technological University Kakinada on 30th January 2026, students of the Department of Electrical and Electronics Engineering (EEE) actively participated by presenting innovative engineering projects in the presence of Shri Nara Lokesh, Hon'ble Minister for IT, Electronics and communication, Dr. C. S. R. K. Prasad, Hon'ble Vice-chancellor of JNTUK, and other distinguished dignitaries.



Krishidhara – Smart Irrigation System

“Krishidhara – Smart Irrigation System” in the presence of Nara Lokesh, Hon'ble Minister for Education, IT & Electronics, and other dignitaries; the fully automated system was developed using ESP32, sensors, Weather API, and Machine Learning to enable real-time soil moisture and water level monitoring, weather-based irrigation, misuse detection, and live data visualization through an interactive dashboard, aiming to promote efficient water management and data-driven agricultural practices for sustainable farming, and the project received appreciation from the Hon'ble Vice-Chancellor and faculty members for its innovation and social relevance.

Retrofitted Smart Switch Board

“Retrofitted Smart Switch Board”, which converts conventional switchboards into Wi-Fi enabled smart control systems using ESP32, relay modules, and TRIAC-based AC dimming for light intensity and fan speed regulation through a mobile application; the project emphasized low-cost implementation, and was reviewed and appreciated by the Hon'ble Vice-Chancellor and senior faculty members for its practical utility and innovative approach, while also enhancing students' knowledge of power electronics controllers, PWM triggering techniques, IoT systems, and mobile application interfaces.

WORKSHOPS



- Students of the Department of Electrical and Electronics Engineering (EEE), University College of Engineering Kakinada, Jawaharlal Nehru Technological University Kakinada, participated in a Two-Day Training programme on **“Semiconductor Circuit Design and Simulation”** organized by the School of Electrical Engineering, Vellore Institute of Technology, from 10th - 11th January 2026, sponsored by the British Council; the programme offered hands-on training using Cadence tools and covered CMOS logic simulation, parametric analysis, power and delay estimation, Verilog HDL, RTL simulation and synthesis, and physical design, providing students with practical exposure to semiconductor circuit design and advanced VLSI simulation techniques.

- 7 Members of M.Tech from the Power Electronics and Drives (PED) and Advanced Electric Power Systems (AEPS) specializations of the Dept of EEE attended a two-day workshop on **“Building CAES-Integrated Solar Cold Storage Systems”** organized by the Department of Energy Science and Technology, Periyar University, Salem, Tamil Nadu on 29th–30th January 2026.



- M.Tech students, research scholars and faculty members from EEE department attended One-Day Workshop on **“Simulation of Modern Power Systems using ETAP”** on 30th January 2026, conducted by Dept of EEE

FDPS ATTENDED

- Mr. Shanmukha Naga Raju Vonteddu**, Assistant Professor(c), Jawaharlal Nehru Technological University Kakinada, successfully participated in the **AICTE Training and Learning (ATAL) Academy Faculty Development Program** on **“Future Innovations: Energy and Sustainability”**, conducted at the **National Institute of Technology Durgapur** from 12th January 2026 to 17th January 2026.
- Sri V.S.N.K. Chaitanya**, Assistant Professor (C), Jawaharlal Nehru Technological University Kakinada, successfully completed a 6-day online **Faculty Development Programme (FDP)** on **“Future Innovations: Energy and Sustainability”** conducted from 12th to 17th January 2026. The programme was organized by the **National Institute of Technology (NIT) Durgapur** under the **AICTE-ATAL Academy**.

EXPERT LECTURE

- An expert lecture on **“Open-End Winding Drives for Electric Vehicle Applications”** was delivered on JAN2026 for the students and faculty of the Department of Electrical and Electronics Engineering, JNTUK. The session was presented by **Dr. Rajeevan P. P.** from the Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram. The lecture highlighted the significance of open-end winding configurations in improving efficiency, fault tolerance, and power capability of EV drive systems.



FPGA DESIGN OF A PARAMETERIZED ALU

DIGITAL DESIGN USING USING VERILOG HDL IN XILINX VIVADO

Field-Programmable Gate Array (FPGA)

The concept of the Field-Programmable Gate Array (FPGA) was pioneered by Ross Freeman, co-founder of Xilinx, in the mid-1980s. Freeman envisioned a programmable logic device that could be configured after manufacturing, allowing designers to implement custom digital logic without fabricating a new chip.

Design Objective

The design was planned around two 4-bit inputs and a 4-bit selection signal, allowing a single hardware block to perform multiple functions. Based on this control input, the ALU was designed to handle arithmetic operations such as addition, subtraction, multiplication, and division, along with logical, shift, rotation, and comparison operations.

Building the ALU in Xilinx Vivado

The design was developed using Xilinx Vivado, which served as the complete environment for writing and simulating the hardware logic. A new RTL project was created using Verilog as the description language, with the work intentionally limited to simulation rather than physical FPGA deployment.

As shown in the Fig.01, Inside the design module, a combinational logic structure was implemented where the ALU's behavior changes based on the selection input. A case-based control structure allowed the same output register to represent different results—ranging from arithmetic outputs to bitwise logic and comparisons—depending on the chosen operation. A separate carry signal was also generated to reflect overflow during addition, mirroring real ALU behavior.

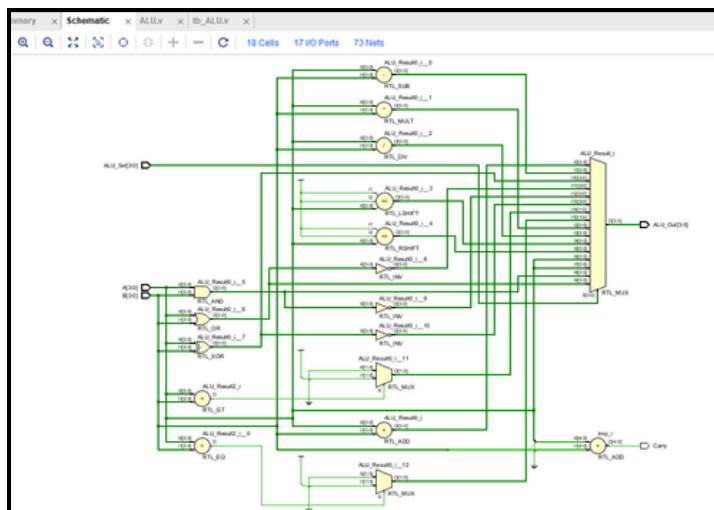


Fig.01
Elaborated Design

A Targeted Test Environment

To verify the design, a separate testbench was written specifically to exercise the ALU under controlled conditions. Fixed input values were applied to the ALU, while the selection signal was stepped through all possible operation modes one by one.

Each operation was given sufficient simulation time before moving to the next, ensuring that the output could be clearly observed and interpreted. This method allowed every arithmetic, logical, and comparison function implemented in the design to be checked independently, without modifying the ALU code itself.

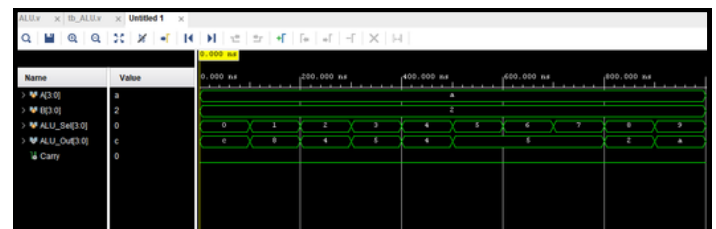


Fig.02
Simulation Waveforms

Observing Behavior Through Simulation

Simulation was executed using Vivado's built-in behavioral simulator. Once launched, as shown in the Fig.02, the simulator displayed the evolution of inputs, outputs, and control signals over time in waveform form.

By examining these waveforms, it became possible to visually confirm how each ALU operation responded to changes in the selection signal. Shifts, rotations, logical operations, and comparisons could all be traced precisely, reinforcing the idea that digital hardware is best understood through time-based behavior rather than static values.

Final Outcome

The outcome of the work was a fully functional 4-bit ALU, capable of performing sixteen distinct operations and verified entirely through simulation. While no physical FPGA board was used, the design is structured in a way that allows straightforward synthesis and implementation in future stages.

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INDIA'S ROLE IN THE GLOBAL ENERGY TRANSITION

India is advancing its position in the global energy landscape, harmonizing energy security, economic growth, and sustainability. In recent years, the nation has moved from expansion-focused energy measures to a more integrated, climate-aligned approach that strengthens domestic energy systems while contributing to global transition objective

Strategic Policy Reforms

To meet rising energy demand, India has implemented comprehensive regulatory and policy reforms across the hydrocarbon sector. Simplified licensing, streamlined compliance, and investor-friendly measures have enhanced domestic exploration and production, reducing import dependency and reinforcing long-term energy security. These reforms reflect a shift from a heavily regulated system to a more efficient, transparent, and sustainable framework.

Infrastructure and Energy Access

India has significantly expanded its energy infrastructure. The national gas pipeline network now spans over 25,000 kilometers, supporting nearly universal city gas distribution.

The growth of piped natural gas and CNG infrastructure ensures broader access, affordability, and environmental benefits across urban and rural areas. These initiatives exemplify the transition from regionally limited infrastructure to nationwide integration.

Clean Cooking and Social Impact

Access to clean cooking fuel has been substantially improved, with over ten crore households now connected to LPG. Subsidy mechanisms ensure affordability and sustained usage, reducing reliance on traditional fuels. The initiative has positively impacted public health, lowered indoor pollution, and enhanced social welfare, particularly for women and vulnerable communities.

Renewable Energy and Low-Carbon Initiatives

India has made significant strides in renewable energy, with non-fossil fuel sources now accounting for half of installed electricity capacity, achieving 2030 targets ahead of schedule. The ethanol blending programme has expanded to over 19 percent, lowering emissions, supporting domestic agriculture, and reducing crude import dependence. These measures reflect a deliberate alignment of energy security with sustainable development goals.

Global Engagement

India has strengthened its role in international energy forums, actively contributing to discussions on clean energy technologies, biofuels, and sustainable transition pathways. From being a participant, India has evolved into a contributor shaping global dialogue, reinforcing its growing influence and leadership in the energy domain.

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Fig 01

Source : Ministry of Petroleum & Natural Gas

VIKSIT BHARAT – 2047

India stands at a defining moment in its history as it moves toward the centenary of its independence in 2047. The vision of Viksit Bharat 2047 represents the nation's ambitious commitment to transform itself into a fully developed country within the next two decades. A developed nation is not defined merely by high economic output, but also by strong human development, advanced infrastructure, social equity, technological leadership, environmental sustainability, and effective governance. Through this bold vision, India aims to ensure prosperity, dignity, and opportunity for every citizen while strengthening its position as a leading global power.

The primary objective of Viksit Bharat is to build a strong, inclusive, and self-reliant economy. India aims to expand its Gross Domestic Product (GDP) to nearly USD 30–40 trillion by 2047 and significantly increase per capita income to match global developed standards. Sustaining an annual growth rate of around 7–8% over the next two decades will be crucial to achieving this target. The focus will be on strengthening manufacturing, expanding services, boosting exports, promoting digital transformation, and encouraging innovation. Initiatives such as infrastructure modernization, improved logistics, and increased investment—both domestic and foreign—will play a key role in accelerating economic growth.

However, economic growth alone is not sufficient. The vision of Viksit Bharat emphasizes inclusive social development.

Universal access to quality education and healthcare is central to this transformation. Reforms in the education system aim to enhance literacy, promote research and innovation, and equip youth with future-ready skills. Healthcare initiatives focus on affordable medical services, improved life expectancy, and stronger public health systems. Poverty eradication remains a top priority, with the goal of ensuring that no citizen is left behind. Women's empowerment, social justice, and financial inclusion are vital components of this inclusive growth strategy.

Infrastructure development forms the backbone of India's transformation journey. The country is investing heavily in highways, railways, airports, ports, smart cities, and digital networks to improve connectivity and efficiency. Renewable energy expansion and green technologies are being prioritized to ensure sustainable development. Digital Public Infrastructure, including digital payments and identification systems, is strengthening economic participation. By modernizing both physical and digital infrastructure, India aims to enhance productivity and improve the quality of life for its people.

Good governance and institutional reforms are equally essential for achieving the goals of Viksit Bharat. Efforts to simplify regulations, reduce bureaucratic hurdles, enhance transparency, and promote digital governance are creating a more business-friendly environment. Efficient service delivery, accountability, and rule of law will foster trust and ensure effective implementation of policies. Public participation and youth engagement are encouraged to make development a collective national effort.

Despite its promise, the journey toward becoming a developed nation is not without challenges. Sustaining high economic growth, addressing income inequality, creating sufficient employment opportunities, managing rapid urbanization, and combating climate change are significant hurdles. India must avoid the middle-income trap and ensure that development benefits all sections of society. Strategic planning, policy consistency, innovation, and collaborative efforts between government, private sector, and citizens will be essential to overcoming these challenges.

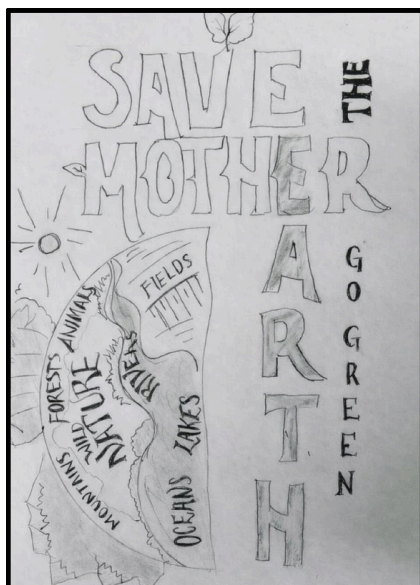
In conclusion, Viksit Bharat 2047 represents a bold and inspiring roadmap for India's future. It is not merely an economic goal but a comprehensive national mission to uplift every citizen and build a resilient, equitable, and globally respected nation. With sustained commitment, inclusive policies, and collective determination, India can transform its aspirations into reality and step confidently into 2047 as a developed country. The vision is bold, the challenges are real, but the future can indeed be brighter for a Viksit India.



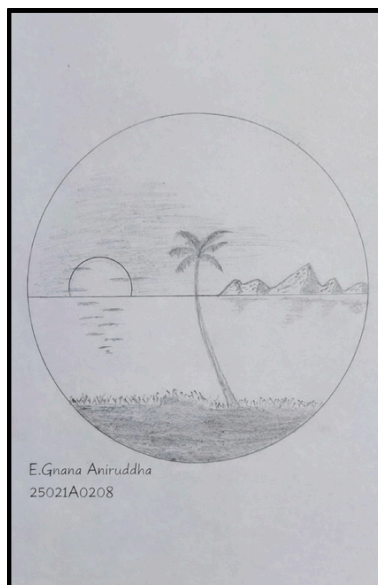
Source : <https://viksitindia.com/>

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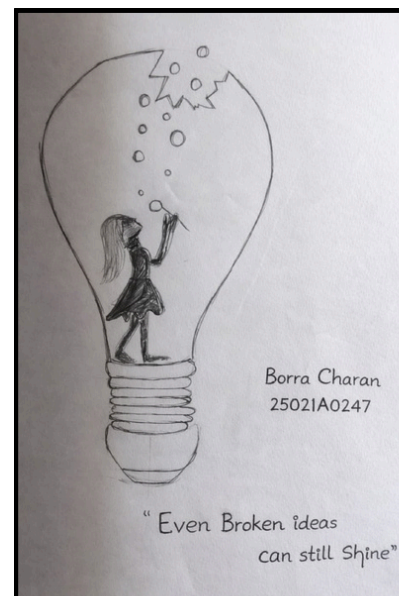
ARTS AND CULTURALS



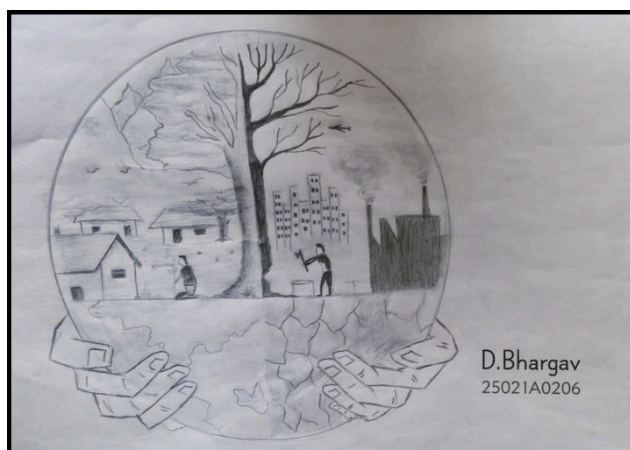
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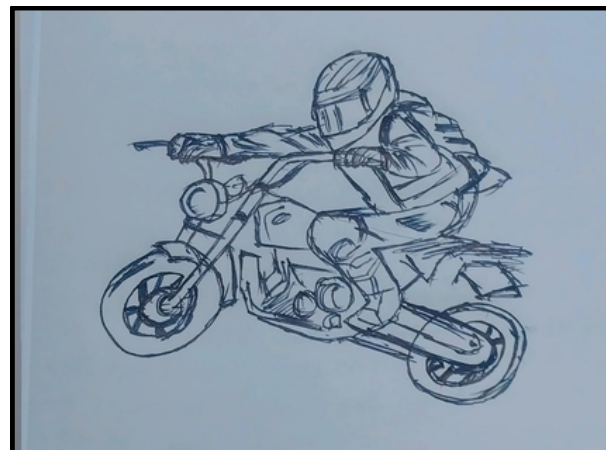
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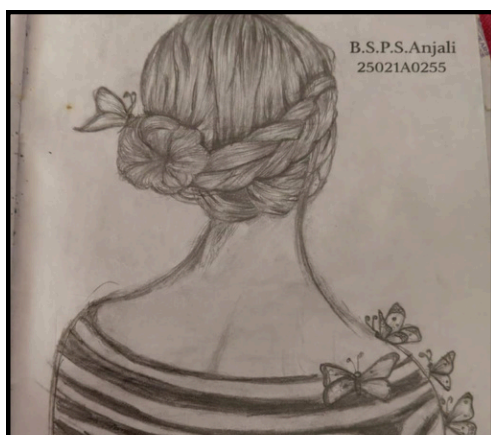
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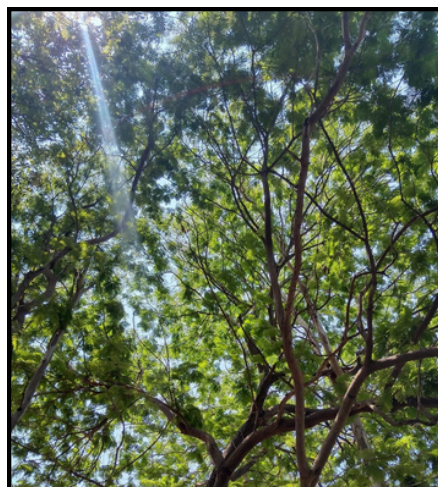


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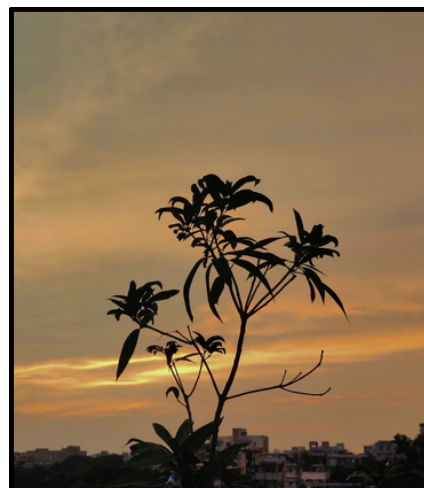
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