P.V.P SIDDHARTHA INSTITUTE OF TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Guest Lectures

Department of Electronics and Communication Engineering

Department OF ECE				
S. No.	Department	Title and dates of programmes	Resource Persons	participants
PERIOD FROM 01.7.2024 to 1.6.2025				
1	ECE	Opportunities for Higher Education, 24-07-2024	E. Ramarao Sr. Counselor & Marketing Trainer GLOBAL DEGREES EDUCATION Vijayawada	IVECE (105)
2	ECE	Artificial Intelligence based Speech Processing,16-08-2024	Anil Kumar Vuppala. Associate Professor, IIIT Hyderabad.	IIECE& IVECE(143)
3	ECE	Energy Efficient VLSI Circuit Design with CMOS Devices, 6-2-2025	Dr Ramesh Vaddi Associate Professor, Electronics and Communication Engineering SRM University Amaravati Andhra Pradesh	IIIECE
4	ECE	Circuits for energy efficient processing of Deep Neural Networks on AI Edge,6-2-2025	Dr V Udaya Sankar Assistant Professor, Electronics and Communication Engineering SRM University Amaravati Andhra Pradesh	IIIECE
5	ECE	Quantum Computing,17-05-2025	Dr. Ch. Gangadhar, Assoc. Professor, ECE Dept., PVPSIT	Faculty of ECE

Guest Lecture Analysis Report

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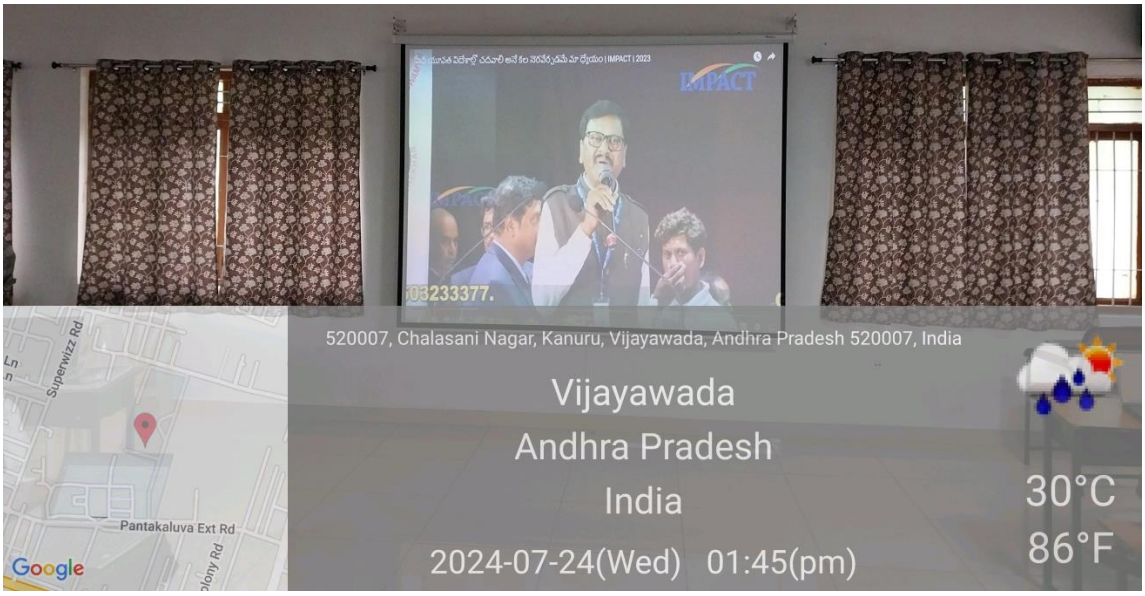
1. Opportunities for Higher Education

- **Date:** 24-07-2024
- **Resource Person:** Mr. E. Ramarao
- **Designation:** Senior Counselor & Marketing Trainer
- **Organization:** GLOBAL DEGREES EDUCATION, Vijayawada
- **Organized By:** IVECE (105)

Overview:
Mr. Ramarao provided valuable insights into the global and national opportunities available for pursuing higher education. He covered application strategies, university shortlisting, scholarship avenues, and visa processes.



Impact:

- Raised awareness among students regarding international education pathways.
- Clarified doubts related to exams like GRE, TOEFL, IELTS, etc.
- Encouraged students to plan their academic careers with a global perspective.

Feedback from students: Guest lecture was much interesting and more informative related to Opportunities for higher Education.

2. Artificial Intelligence based Speech Processing

- **Date:** 16-08-2024
- **Resource Person:** Dr. Anil Kumar Vuppala
- **Designation:** Associate Professor, IIIT Hyderabad
- **Organized By:** IIECE & IVECE (143)

Overview:

Dr. Vuppala delivered an in-depth session on AI-driven speech processing systems, focusing on deep learning models used in speech recognition, synthesis, and enhancement.

Key Highlights:

AI-based speech processing, also known as automatic speech recognition (ASR) or speech-to-text, enables machines to understand and respond to human speech. This core technology involves converting spoken words into a format machines can interpret and act upon. The process relies heavily on deep learning techniques, especially various types of neural networks, to analyze complex speech patterns. Natural Language Processing (NLP) is also a crucial element, helping systems to understand the meaning and context of words, leading to more accurate and meaningful responses. ASR finds widespread use in everyday applications like virtual assistants such as Siri, Google Assistant, and Alexa, transcription services, and accessibility tools. It enhances efficiency, improves accuracy in tasks, and makes technology more accessible. While challenges remain, particularly with diverse accents and noisy environments, ongoing advancements are continuously refining the technology.

Impact:

- Bridged the gap between theoretical knowledge and current AI research.
- Motivated students to explore speech technology projects.
- Encouraged interest in interdisciplinary areas such as AI, linguistics, and signal processing.

Feedback from students: Guest lecture was much informative and have learnt about the innovative technologies in Artificial Intelligence based Speech Processing.

3. VLSI Circuit Design with CMOS Devices

- **Date:** 06-02-2025
- **Resource Person:** Dr. Ramesh Vaddi
- **Designation:** Associate Professor, SRM University, Amaravati
- **Organized By:** IIIECE

Overview:

Dr. Vaddi’s session focused on low-power design techniques, VLSI circuit optimization, and advanced CMOS technologies used in modern ICs.

Key Highlights:

Very Large Scale Integration (VLSI) involves creating complex integrated circuits by combining millions of transistors onto a single silicon chip. CMOS (Complementary Metal-Oxide-Semiconductor) technology is the predominant method for fabricating these VLSI chips due to its low power consumption, high noise immunity, and excellent integration capabilities. CMOS circuits utilize both n-type (NMOS) and p-type (PMOS) transistors which operate in a complementary fashion to achieve logic functions like inverters, NAND, and NOR gates, forming the fundamental building blocks of digital systems. The design process entails converting boolean expressions into circuit representations, considering speed and power requirements, and verifying correctness and timing through simulations. CMOS technology's ability to integrate high density logic and its efficiency makes it the dominant choice for modern electronic devices, including microprocessors, memory chips, and various digital systems. While challenges include managing design complexity and optimizing power consumption, CMOS remains vital in the evolution of miniaturized and powerful electronics.

Impact:

- Strengthened understanding of VLSI system design.
- Provided insights into energy efficiency challenges in ICs.
- Inspired students interested in semiconductor careers and research.

Feedback from students:

Guest lecture was much informative and have learnt about the innovative technologies in VLSI Circuit Design.

4. Circuits for Energy Efficient Processing of Deep Neural Networks on AI Edge

- **Date:** 06-02-2025
- **Resource Person:** Dr. V. Udaya Sankar
- **Designation:** Assistant Professor, SRM University, Amaravati
- **Organized By:** IIIECE

Overview:

Dr. Sankar explained how AI edge devices can be optimized using hardware-aware neural network designs, and explored design considerations for low-power deep learning applications.

Key Highlights:

Edge AI requires extremely energy-efficient circuits to run Deep Neural Networks (DNNs) on devices with limited power and computational resources. This involves specialized hardware accelerators like ASICs or FPGAs with optimized Multiplier-Accumulator (MAC) units and efficient memory systems. Key techniques for power optimization include clock gating, power gating, dynamic voltage and frequency scaling (DVFS), and multivoltage design. Algorithm-hardware co-design is crucial, employing techniques like quantization (reducing data precision) and pruning (removing redundant connections) to simplify models and reduce energy consumption without significantly impacting accuracy. Neuromorphic computing, inspired by the brain's energy efficiency, also holds promise for future edge AI applications.

Impact:

- Encouraged exploration of AI hardware co-design.
- Provided knowledge on edge computing and embedded AI.
- Helped students understand practical implementation challenges of DNNs.

Feedback from students:

Guest lecture was much informative and have learnt about the innovative technologies in Circuits for Energy Efficient Processing of Deep Neural Networks on AI Edge.

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5. Quantum Computing

- **Date:** 17-05-2025
- **Resource Person:** Dr. Ch. Gangadhar
- **Designation:** Associate Professor, ECE Dept., PVPSIT
- **Organized By:** Faculty of ECE

Overview:

Dr. Gangadhar provided an introduction to quantum computing fundamentals, qubits, quantum gates, and future applications in cryptography and communication.`

Key Highlights:

Quantum computing is a revolutionary field harnessing quantum mechanics to solve complex problems intractable for classical computers. Instead of bits (0 or 1), it uses quantum bits or qubits, which can represent both 0 and 1 simultaneously through a phenomenon called superposition. Coupled with entanglement (where qubits become linked, affecting each other's state) and interference, quantum computers can process exponentially more information, potentially achieving immense speedups for specific tasks.

While still in development, potential applications include breaking modern encryption (leading to the need for post-quantum cryptography), simulating molecular behavior for drug discovery and materials science, and optimizing complex systems. Though faced with

significant engineering hurdles, particularly qubit stability and error correction, quantum computing promises breakthroughs in various fields, complementing rather than replacing classical computing

Impact:

- Exposed students to emerging technologies in computing.
- Sparked curiosity in quantum mechanics and computation.
- Paved way for interdisciplinary research in physics and engineering.

Feedback from students:

Guest lecture was much informative and have learnt about the innovative technologies in Circuits for Energy Efficient Processing of Deep Neural Networks on AI Edge.