Add On Lecture on "Silicon Design for Modern AI and Cloud CPU Processors"

The Department of Electronics and Communication at MVJ College of Engineering organised an insightful add-on lecture titled "Silicon Design for Modern AI and Cloud CPU Processors" on 10th October 2025 at 10:30 AM in Seminar Hall 2, exclusively for 7th semester ECE students. The session was delivered by Mr Anil Kumar Baratam, a distinguished engineer from Ampere, and witnessed the enthusiastic participation of 152 students.

Objectives of the Event

The primary objectives of the add-on lecture on "Silicon Design for Modern AI and Cloud CPU Processors" were to equip students with a comprehensive understanding of the fundamental principles and recent advancements in silicon design, particularly in the context of artificial intelligence and cloud computing. The session aimed to bridge the gap between theoretical academic knowledge and practical industry applications in processor design, offering students a real-world perspective on the challenges and innovations in developing high-performance digital circuits. Additionally, it sought to familiarise students with the practical aspects of designing complex hardware systems and to inspire them to explore promising career opportunities in the rapidly evolving fields of semiconductor technology and AI hardware engineering.

Figure 1: Mr. Anil Kumar Baratam is addressing 7th-semester ECE students on the future of silicon design in AI and cloud computing.

Event Overview

The Department of Electronics and Communication organised an insightful add-on lecture titled "Silicon Design for Modern AI and Cloud CPU Processors" on 10th October 2025. The session was delivered by Mr Anil Kumar Baratam, a Distinguished Engineer from Ampere, a leading company in cloud-native processor design.

The session commenced with a foundational overview of electronic components such as transistors, flip-flops, MOS and CMOS circuits, and their fabrication processes. Mr Baratam then transitioned into the realm of Artificial Intelligence (AI), elaborating on the major functions of data centres and the role of silicon design in supporting AI workloads.

He provided a comprehensive explanation of various AI algorithms, natural language processing (NLP), and the training of AI models. The audience was introduced to Ampere's contributions to the field, highlighting their innovations in energy-efficient, high-performance processors tailored for cloud and AI applications.

The lecture delved into the design of complex digital circuits capable of operating with throughput in the picosecond range. Mr Baratam discussed CMOS-based digital design, emphasising the journey from logic design to physical implementation, including synthesis tools, design constraints, netlist generation, and layout processes.

A detailed explanation of the pipeline mechanism and various digital circuit blocks was provided, followed by a refresher on critical concepts such as Design for Testability (DFT) and Clock Tree Synthesis (CTS). The session concluded with a comparative analysis of CPU, GPU, and NPU architectures, highlighting their respective roles in modern computing.

The final segment of the lecture focused on the design and synthesis of Static RAM (SRAM), after which an engaging Q&A session allowed students to clarify doubts and interact directly with the expert

Outcome and Impact

- Students gained a deeper understanding of the end-to-end silicon design process for AI and cloud processors.

- The session enhanced awareness of current industry trends and the practical applications of theoretical concepts.

- Exposure to real-world tools and methodologies used in digital system design and synthesis.

- Encouraged students to explore career paths in VLSI design, AI hardware, and data centre technologies.

- Strengthened the department's industry-academia connection through collaboration with Ampere.

Figure 2: Students attentively listening to the technical session on CMOS circuits and digital design methodologies.

![MVJ College of Engineering logo]

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Figure 3: A glimpse into the discussion on CPUs, GPUs, and NPUs – understanding the hardware behind modern AI.

Conclusions

The add-on lecture by Mr Anil Kumar Baratam was a resounding success, offering a rich blend of theoretical knowledge and practical insights into silicon design for AI and cloud computing. The enthusiastic participation of 152 students reflects the growing interest in advanced processor technologies. The Department of Electronics and Communication remains committed to organising such impactful sessions that prepare students for the evolving demands of the electronics and semiconductor industries.

Figure 4: A group photograph with Mr Anil Kumar Baratam and the enthusiastic participants of the session.

Report by: Dr. Shima Ramesh Maniyath

Affiliation: HOD, ECE, MVJ College of Engineering