



INNOVATE • CONNECT • INSPIRE

WAVES

— DEPARTMENT MAGAZINE —

— Connecting Ideas, Transforming Futures —

VOLUME

08

ISSUE

02

ACADEMIC YEAR
2023-24

DEPARTMENT OF
**ELECTRONICS &
COMMUNICATION ENGINEERING**

NBA ACCREDITED | NAAC 'A' GRADE INSTITUTION



INNOVATION

Ideas Today
Impact Tomorrow



**RESEARCH &
DEVELOPMENT**

Advancing Knowledge
Creating Solutions



COMMUNICATION

Connecting Minds
Beyond Boundaries



**STUDENT
ACTIVITIES**

Learn, Lead,
Make an Impact



TECHNOLOGY

Exploring Innovations
Shaping Tomorrow



**ACHIEVEMENTS
& AWARDS**

Recognizing Excellence
Inspiring Success

IGNITING IDEAS • EMPOWERING FUTURES • DRIVING EXCELLENCE

SANTHIRAM ENGINEERING COLLEGE

N A N D Y A L



ACADEMIC
EXCELLENCE



RESEARCH &
DEVELOPMENT



STUDENT
GROWTH



PLACEMENTS
& TRAINING



INDUSTRY
COLLABORATION



SUSTAINABLE
FUTURE



SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering

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**ACADEMIC YEAR
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SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering



EDITORIAL BOARD

Editor-in-Chief: Dr. Y. Mallikarjuna Rao

Associate Editor: E. Subbarayudu



Autonomous



**NAAC
Accredited**



**NBA Accredited
ECE & CSE**



**AICTE
Approved**



ABOUT THE COLLEGE

Santhiram Engineering College (SREC) is sponsored by M/s Sri Shirdi Sai Educational Academy, Nandyal. SREC was established under the able guidance of Dr. M. Santhiramudu, Chairman, in the year 2007 with the noble motto Education for peace and progress. SREC is approved by AICTE, New Delhi; recognized by UGC under 2(f) and 12(B); permanently affiliated to JNTUA, Ananthapuramu; and certified to ISO 9001:2015. The college is ranked as one of the best engineering colleges of JNTUA, Ananthapuramu.

Santhiram Engineering College (SREC), Nandyal, is an autonomous, NAAC accredited institution offering NBA accredited B.Tech programs in ECE and CSE. Approved by AICTE and recognized by UGC under sections 2(f) and 12(B), SREC delivers outcome-based technical education aligned with industry expectations.

The college offers undergraduate and postgraduate programs such as B.Tech in CSE, CSE-AI/ML, CSE-Data Science and ECE, along with M.Tech in CSE, CSE-AI/ML, VLSI System Design (VLSISD), Embedded Systems (ES), MBA and MCA.

With strong placements, research-driven learning, innovation labs and modern infrastructure, SREC prepares students to become industry-ready professionals and future-ready leaders.



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ABOUT DEPARTMENT

Anticipating the growing importance of electronics and wireless communication in modern society, the **Department of Electronics and Communication Engineering** was established in **2007** with a vision to impart quality technical education and nurture innovation among young minds.

The department began with an initial intake of **60** students, which was increased to **90** in 2008 and further to **120** in 2009, reflecting the rising demand for skilled electronics and communication engineers.

To meet the expanding needs of the industry and academia, the department introduced a **Master of Technology (M.Tech) program in VLSI System Design** in **2011** with an intake of **18 students**, recognizing the immense potential in the area of Very-Large-Scale Integration (VLSI) design.

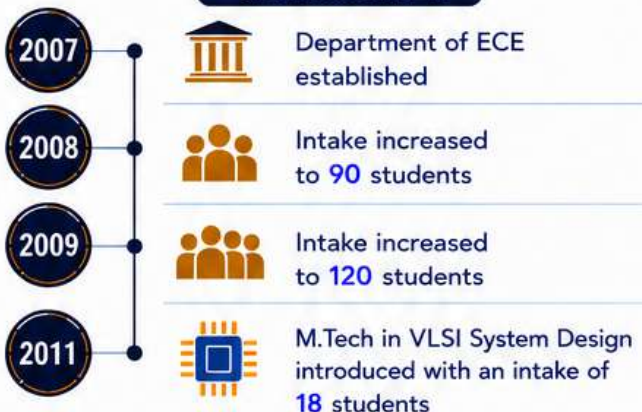
The department's B.Tech-ECE program has been accredited by the **National Board of Accreditation (NBA)** for a period of three years, from the academic year **2023-24 to 2025-26**, in recognition of its robust academic framework, quality teaching, and outcome-based education.

The department is also a recognized research center under **Jawaharlal Nehru Technological University Anantapur (JNTUA)**, facilitating research scholars to pursue Ph.D. programs in both full-time and part-time modes, thereby promoting advanced research and innovation.



A CULTURE OF EXCELLENCE, A LEGACY OF INNOVATION

OUR JOURNEY



NBA ACCREDITED



B.Tech-ECE program accredited
by NBA for
2023-24 to 2025-26

RECOGNIZED RESEARCH CENTER



Research center recognized
by **JNTUA** for Ph.D. programs
(Full-time & Part-time)

VISION & MISSION

Vision

To be a center of excellence in Electronics and Communication Engineering education, research and innovation.

Mission

To impart quality education, foster research and innovation, and develop skilled professionals to meet global challenges.

DEPARTMENT FOCUS AREAS



Wireless
Communication



VLSI System
Design



Signal Processing
& Networks



Embedded Systems
& IoT



Antenna &
Microwave Engineering



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VISION & MISSION

INSTITUTION VISION

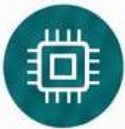


To become a nucleus for pursuing technical education and pool industrial research and developmental activities with social-conscious and global standards.

INSTITUTION MISSION



To provide Advance Educational Programs and prepare students to achieve success and take leading roles in their chosen fields of specialization.



To establish postgraduate programs in the current and Advanced Technologies.



To establish an R&D Consultancy through developing industry institute interaction, building up exceptional infrastructure.



To propel every individual, realize and act for the technical development of the society.

DEPARTMENT VISION



Emerge as a center for quality education in Electronics & Communication Engineering so as to create competent professionals.

DEPARTMENT MISSION



M1: Offer quality programs in Electronics & Communication Engineering aimed at fulfilling the needs of society and industry.



M2: Impart skills and develop scientific temper to solve complex technological problems of current times.



M3: Nurture ethics, talent and entrepreneurship to inculcate professional development of students.

EMPOWERING INNOVATION, BUILDING TOMORROW
THROUGH ELECTRONICS & COMMUNICATION ENGINEERING



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PROGRAM OUTCOMES (POs)

Under Graduate Program Outcomes

01



Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

02



Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

03



Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

04



Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

05



Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

06



The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

07



Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

08



Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

09



Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10



Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11



Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12



Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



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UG PEO'S, PG PO'S & PEO'S



UG PEO's - Under Graduate Program Educational Objectives

UG
PEO
01



UG PEO1: Have in-depth knowledge in Electronics and Communication Engineering to innovate, design, and develop modern electronic systems.

UG
PEO
02



UG PEO2: Sustain intellectual curiosity in professional career through life-long learning.

UG
PEO
03



UG PEO3: Have strong work ethics, professional attitude, team spirit, leadership skills, and enterprising skills to serve industry and society.



PG PO's - Post Graduate Program Outcomes

PG
PO
01



PG PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PG
PO
02



PG PO2: An ability to write and present a substantial technical report/document.

PG
PO
03



PG PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.



PEO's - Program Educational Objectives

PEO
01



PEO1: Identify and apply appropriate Electronic Design Automation software and electronic equipment to analyze, synthesize and evaluate to solve real-world problems in the VLSI domain to create innovative products and systems.

PEO
02



PEO2: Pursue research studies in the core or allied areas of the VLSI circuits and systems.

PEO
03



PEO3: Inculcate positive attitude, professional ethics, effective communication, and interpersonal skills to succeed in the profession exhibiting creativity and innovation through research and development both as a team member and leader.

MESSAGES

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CHAIRMAN MESSAGE



Dear Readers and Well-wishers,

I am delighted to present this edition of WAVES. Our department continues to strive for excellence in technical education, research, and innovation.

This magazine reflects the dedication, talent, and teamwork of our students, faculty, and staff.

I appreciate everyone's efforts in contributing valuable articles and activities that inspire and inform. Let us keep pushing boundaries, embracing new ideas, and shaping a brighter future together. Wishing you an insightful and enjoyable read!

Dr. M. Santhiramudu

Chairman / Founder



MD'S MESSAGE



Dear Students, Faculty and Readers,

I am happy to see WAVES continue as a strong platform for sharing knowledge, creativity, and achievements. It showcases the hard work and enthusiasm of our students and the guidance of our faculty. I congratulate the editorial team for their commitment and dedication in bringing out this magazine successfully.

Let us continue to learn, innovate, and work together to achieve greater heights.

Best wishes to the entire team for a wonderful and impactful edition!

Mr. M. SivaRam

Managing Director

“

*WAVES is not just a magazine,
it is the voice of ideas, the rhythm of innovation,
and the reflection of our vibrant ECE community.*

”



MESSAGES

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PRINCIPAL'S MESSAGE



It gives me immense pleasure to present Volume 8, Issue 2 of WAVES.

This edition is a testament to the relentless pursuit of knowledge, innovation, and excellence by the students and faculty of the Electronics and Communication Engineering Department. The rapid advancements in technology demand continuous learning and adaptability, and I am proud to see our department embracing these challenges with enthusiasm and dedication.

I congratulate the entire team behind this issue for their commendable efforts and the valuable contributions that make WAVES a beacon of technical insight and creativity.

I encourage our students to keep exploring, innovating, and striving for excellence in all their endeavors.

Let us continue to work together to build a brighter, more innovative future.

Dr. M.V. Subramanyam

Principal



HOD'S MESSAGE



I am delighted to present Volume 8, Issue 2 of WAVES.

This issue reflects the vibrant academic spirit and innovative mindset of our department community. The contributions in this edition highlight the diverse interests and technical proficiencies of our students and faculty, covering emerging technologies, research insights, and practical applications.

I extend my heartfelt appreciation to the editorial team, faculty members, and student contributors for their dedication and hard work in bringing out this issue. I also encourage all students to participate actively, share their ideas, and continue to push the boundaries of creativity and innovation.

Together, let us strive to uphold the legacy of excellence and make our department a center of learning, discovery, and growth.

Dr. Y. Mallikarjuna Rao

HOD-ECE



TECHNOLOGY

CATHMENT

ACADEMIC YEAR 2023-24

In today's fast-evolving world, technology is no longer a luxury but a necessity. It has become an integral part of our daily lives, shaping the way we learn, communicate, work and innovate. From artificial intelligence and cloud computing to smart devices and automation, technology continues to break barriers and open doors to endless possibilities.

Education has been one of the greatest beneficiaries of technological advancement. Digital classrooms, learning management systems and interactive tools have transformed traditional teaching methods into engaging and student-centered experiences. Technology not only enhances access to knowledge but also encourages collaboration, critical thinking and creativity among learners.

In the field of communication, technology has brought the world closer. With a click, we can connect across continents, share ideas instantly and build networks that inspire growth and understanding. Social media, video conferencing and instant messaging platforms have redefined human interaction in remarkable ways.



Moreover, technology drives innovation and economic growth. It empowers industries to improve efficiency, reduce costs and deliver better services. Startups and entrepreneurs leverage technology to solve real-world problems and create impactful solutions.

However, with great power comes great responsibility. As we embrace technology, we must also be mindful of its ethical use. Issues like data privacy, cyber security and digital addiction remind us to strike a balance between innovation and human values.

The future belongs to those who are tech-ready and adaptable. It is essential that we continue to learn, unlearn and relearn to keep pace with change. Institutions, educators and students must work hand in hand to build a future that is inclusive, sustainable and driven by technology.

In conclusion, technology is a powerful enabler that has the potential to transform lives and shape a better tomorrow. Let us harness its potential wisely and responsibly to create a world where progress and humanity go hand in hand.

“

“Technology is best when it brings people together.”

– Matt Mullenweg

”



Mrs .P.MARY SWETHA ,

ASST.PROFESSOR

TECHNOLOGY

CATHMENT

ACADEMIC YEAR 2023-24



VLSI IN IOTs

The Internet of Things (IoT) has revolutionized the way devices communicate and interact with the world. At the heart of this revolution lies VLSI (Very Large Scale Integration) technology, which enables the design and fabrication of highly compact, efficient, and intelligent chips that power IoT devices.

VLSI technology allows the integration of millions (or even billions) of transistors onto a single chip, significantly reducing the size, power consumption, and cost of electronic systems. These features are essential for IoT devices, which are often battery-operated, space-constrained, and required to perform specific tasks such as sensing, processing, communication, and actuation.

In IoT applications, VLSI chips are used in a wide range of components including sensors, microcontrollers, memory, wireless communication modules, and signal processing units. These chips ensure real-time data acquisition, efficient processing, secure transmission, and reliable operation in diverse environments.



Advanced VLSI design techniques such as low-power design, system-on-chip (SoC) integration, and hardware acceleration are widely adopted in IoT devices to optimize performance and extend battery life. Technologies like FinFET, FD-SOI, and 3D ICs further enhance the efficiency and scalability of IoT systems.

Additionally, VLSI plays a key role in ensuring security and data privacy in IoT by integrating encryption engines, secure boot, and trusted execution environments directly into hardware.

As IoT continues to grow in sectors like smart homes, healthcare, industrial automation, agriculture, and smart cities, the demand for intelligent and energy-efficient VLSI solutions will continue to rise.

The synergy between VLSI and IoT is shaping a smarter, safer, and more connected world. Future innovations such as AI edge chips, neuromorphic processors, and ultra-low-power designs will further empower IoT devices to make real-time decisions and operate autonomously.

In conclusion, VLSI technology is a fundamental enabler of IoT systems. It not only provides the hardware foundation for IoT devices but also drives innovation through compactness, intelligence, and connectivity.

VLSI brings intelligence to tiny devices and connects the world through IoT.



APPLICATION AREAS



SMART HOMES

HEALTHCARE
DEVICESINDUSTRIAL
AUTOMATIONSMART
AGRICULTURESMART
CITIESSECURITY &
SURVEILLANCEMR K. MAHENDRA
REG NO: 20X51A0416

TECHNOLOGY

CATHMENT

ACADEMIC YEAR 2023-24



VLSI WITH SIGNAL PROCESSING

The fusion of VLSI (Very Large Scale Integration) and Signal Processing has revolutionized the way we acquire, analyze, and interpret data in the modern world. As technology advances, the demand for faster, smaller, and more efficient systems continues to grow—and this powerful combination is at the heart of it all.

VLSI enables the integration of millions (or even billions) of transistors onto a single chip, allowing complex digital systems to be realized in compact and low-power forms. On the other hand, Signal Processing focuses on the analysis, modification, and synthesis of signals such as audio, images, video, and sensor data.

When these two domains work together, they bring intelligence to devices. For example, in a smartphone, VLSI chips process camera signals, remove noise, enhance image quality, and enable features like face detection and HDR. In medical imaging, VLSI-based processors help in real-time image reconstruction and filtering, improving diagnostic accuracy.



The use of VLSI in signal processing allows for parallel processing, reduced delay, and increased throughput. It enables the implementation of complex algorithms like FFT, FIR/IIR filters, and adaptive algorithms in hardware, making systems more real-time and reliable.

This integration is also vital in communication systems, where VLSI chips perform tasks like modulation, channel coding, filtering, and equalization at high speeds with minimal power consumption.

Advanced DSP algorithms implemented on VLSI platforms are used in applications like noise cancellation, voice recognition, radar systems, autonomous vehicles, and IoT devices. The key advantage is real-time processing with high efficiency and reliability.

As we move towards AI and edge computing, VLSI with Signal Processing will continue to play a critical role in developing smart, responsive, and energy-efficient systems that shape our tomorrow.



"The future is intelligent because VLSI makes it possible and signal processing makes it powerful."



Signal Acquisition



VLSI Processing



Signal Processing



Data Analysis



Real-world Applications



MR.ESWANTH

REG NO: 20X51A0413

TECHNOLOGY — CATHMENT —

ACADEMIC YEAR 2023-24

VLSI WITH FPGAs

VLSI (Very Large Scale Integration) technology has revolutionized the design and fabrication of integrated circuits, enabling the creation of complex, high-performance systems on a single chip. Field Programmable Gate Arrays (FPGAs) have emerged as a powerful complement to VLSI by offering unparalleled flexibility, reconfigurability, and rapid prototyping capabilities.

Unlike traditional ASICs, FPGAs can be programmed by the user after manufacturing, making them ideal for applications where requirements evolve or time-to-market is critical. FPGAs consist of an array of configurable logic blocks (CLBS), interconnects, and I/O blocks, which can be customized using Hardware Description Languages (HDLs) like Verilog or VHDL.

In VLSI systems, FPGAs are widely used in digital signal processing, communication systems, image processing, AI accelerators, and embedded applications.



They enable hardware designers to implement and test complex digital systems without the high cost and long development cycle associated with ASICs. Moreover, FPGAs support parallel processing, which significantly enhances performance and throughput.

With advancements in FPGA architecture (Xilinx, Intel/Altera, Lattice, Microchip), modern FPGAs integrate high-speed transceivers, DSP blocks, and embedded processors, blurring the line between hardware and software. This synergy between VLSI and FPGAs is driving innovation in reconfigurable computing and adaptive systems.

FPGAs also play a crucial role in hardware acceleration of algorithms such as FFT, filtering, encryption, and machine learning. Their ability to update functionality in the field makes them suitable for evolving applications such as 5G, IoT, and aerospace systems.

In education and research, FPGAs provide an excellent platform for learning, experimentation, and innovation. FPGA boards are inexpensive compared to ASIC prototyping and allow real-time validation of VLSI designs.

In conclusion, VLSI with FPGAs offers the perfect blend of performance, flexibility, and cost-effectiveness. As technology continues to scale and adapt, FPGAs will remain a key enabler in building the intelligent and connected systems of tomorrow.

FPGAs turn ideas into intelligent hardware, enabling innovation at the speed of change.



DEPARTMENT ACHIEVEMENTS

1. Department of ECE Received ₹97,500/- for conducting FDP from JNTUA.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
 Anantapur Pr (Gub. ST B.T., P.G. No. 59 of 2013)
 ANANTHAPURAMU - 515 002 (A.P.) INDIA.

Prof. C. Sashidhar
 M. Trelo, P.G.

Registrar

Proc.No.CS/JNTUA/Entt./Recent Trends in VLSI/FDP/2023

Sub: JNTUA Ananthapuramu - Entt. - Permission to conduct Five-day Faculty Development Program (FDP) on "Recent Trends in VLSI Technologies and Practical Approaches towards IP Using EDA Tools" for the Faculty Members of the Department of ECE, JNTUA Ananthapuramu, for the period 09-13 October 2023.

Resol: 1. L.Nr.BKBC/PRO/E-99/2023, dt. 30.09.2023 from the Principal, JNTUA Ananthapuramu, for the permission to conduct FDP on "Recent Trends in VLSI Technologies and Practical Approaches towards IP Using EDA Tools" for the Faculty Members of the Department of ECE, JNTUA Ananthapuramu, for the period 09-13 October 2023.

2. From the Principal, JNTUA Ananthapuramu, for the permission to conduct FDP on "Recent Trends in VLSI Technologies and Practical Approaches towards IP Using EDA Tools" for the Faculty Members of the Department of ECE, JNTUA Ananthapuramu, for the period 09-13 October 2023.

3. Note orders of the Hon'ble Vice-Chancellor, dt: 02.09.2023

ORDER :

The Principal, Santhiram Engineering College (Autonomous) Nandyal, in the light of the sanction order of the Vice-Chancellor, JNTUA Ananthapuramu, for the permission to conduct FDP on "Recent Trends in VLSI Technologies and Practical Approaches towards IP Using EDA Tools" for the Faculty Members of the Department of ECE, JNTUA Ananthapuramu, for the period 09-13 October 2023, is hereby sanctioned for the conduct of FDP on "Recent Trends in VLSI Technologies and Practical Approaches towards IP Using EDA Tools" for the Faculty Members of the Department of ECE, JNTUA Ananthapuramu, for the period 09-13 October 2023, for a sum of Rs.97,500/- (Rupees ninety seven thousand five hundred only).

FDP Sanction Order from JNTUA

2. Department of ECE faculties were attended to regional IIC meet in Hyderabad.



ECE Faculty Participation in Regional IIC Meet, Hyderabad

PROGRAMS ORGANISED

1 Faculty Development Program

"Recent Trends in VLSI Technologies and Practical Approaches towards IP Using EDA Tools"

09 – 13 October, 2023

A one-week faculty development program was conducted by the Department of ECE in association with JNTUA. Resource persons from reputed institutes and industries delivered expert sessions. A total of 30 faculty members participated in the program.

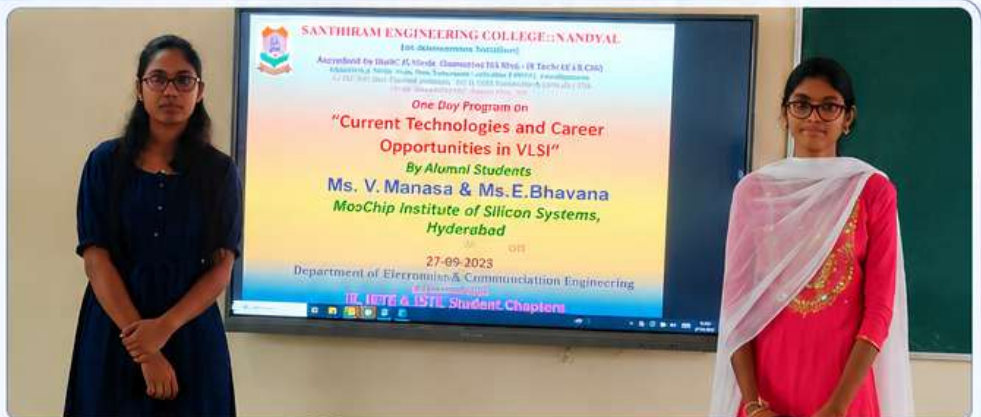


2 Alumni Program

"Current Technologies and Career Opportunities in VLSI"

27 September, 2023

A one-day program was conducted by the Department of ECE. Resource persons Ms. V. Manasa and Ms. E. Bhavana from MOS Chip Institute of Silicon Systems, Hyderabad shared valuable insights on VLSI technologies and career opportunities. A total of 240 students attended the program.



3.1 Career Guidance Program – Webinar

"Recent Trends and Challenges in VLSI and Career Opportunities"

05 October, 2023

A webinar was conducted by the Department of ECE with Mr. Sreenivasa Reddy, Founder & Director, VLSIGURU as the resource person.



3.2 Career Guidance Program

"Career Opportunities in VLSI Design and Manufacturing"

12 October, 2023

A one-day program was conducted by the Department of ECE. Resource person explained career opportunities in VLSI design and manufacturing. A total of 85 students attended the program.



DEPARTMENT GALLERY

