



Message from the Department Chair



Dr. Pallavi R Mane

Welcome dear colleagues and students. It is with great pride and pleasure that I present to you, Department of Electronics and Communication Engineering newsletter: BITS and BYTES, Volume 6, Issue 2 for 2024. This edition marks a significant milestone for the Department of Electronics and Communication Engineering, reflecting our collective efforts and accomplishments over the past year. I would like to extend my heartfelt congratulations to our faculty, staff, and students for achieving the prestigious accreditation from IET, United Kingdom and NBA accredited for our undergraduate BTech ECE and both postgraduate programs MTech Microelectronics and Digital Electronics and Communication Engineering. This recognition is a testament to our commitment to academic excellence and continuous improvement. The department has established state-of-the-art labs this year. One is 5G Lab sponsored by Department of Telecommunications (DoT), Government of India build competencies and engagements in 5G and the other is Advanced Microwave and Antenna Lab with Anechoic chamber. Our new collaborations with various industries and participation in India semiconductor mission, highlight our dedication to bridging the gap between academia and the real world. These partnerships will enhance our research initiatives and provide invaluable opportunities for our students. This issue covers achievements, showcasing activities, featuring insights from our faculty, students and Alumni. Let us continue to work together in fostering an environment of creativity, collaboration, and success to grow with pride and a good reputation. I applaud the editorial team and all the members of the department of ECE. I encourage everyone to read the newsletter and hope it inspires you in your journey of opportunities and challenges towards excellence. Do share feedback: <https://forms.office.com/r/rrDQzHed51>.

Department Activities

Inauguration of Advanced Microwave and Antenna Lab



Inauguration of Advanced Microwave and Antenna Lab by Lt Gen (Dr.) M D Venkatesh, Vice Chancellor, MAHE, Manipal.

ECE department, MIT Manipal, has established a state-of-the-art laboratory on "Advanced Microwave and Antenna Lab" with Anechoic chamber. This laboratory is useful for the experiments and research in the field of Microwaves, Antenna and Wireless Communication. The new laboratory aims to generate revenue by offering measurement facilities for the industry and academia to make it a Centre of excellence.

The laboratory facility on Advanced Microwave and Antenna has been inaugurated by Lt. Gen (Dr.) M D Venkatesh, Vice Chancellor, MAHE, Manipal. Dr. Narayana Sabahit, Pro-Vice chancellor, MAHE and Dr. P. Giridhar Kini, Registrar, MAHE are the Guest of Honours, and the function was presided by Dr. Somashekara Bhat, Joint Director, MIT, Manipal. The event was held on 28th May 2024 at the department of ECE.

Two-Day Workshop on "Role and Significance of Multimodal Registration in Routine Clinical Evaluation"



The two-day workshop on the "Role and Significance of Multimodal Registration in Routine Clinical Evaluation" was jointly organized by the department of ECE and Dr. TMA Pai Endowment Chair on "Multimodal Medical Image Registration". The workshop aimed to explore the opportunities and challenges in the field of Multimodal Image Registration and foster collaboration and innovation in this important domain.

The workshop held on 11th and 12th April 2024 and participants had the opportunity to engage with ten top researchers from prestigious institutions such as NIMHANS Bangalore, IGCAR Kalpakam, GE Healthcare Bangalore, and MAHE. The workshop was inaugurated by Dr. Sathish Rao, Director Research MAHE, Manipal; Commander Dr. Anil Rana, Director MIT; Dr. Niranjan U C, President of the Biomedical Engineering Society of India; Dr. Pallavi Mane, Head of department of ECE. The keynote address delivered by Dr. U. C. Niranjan, President of the Biomedical Engineering Society of India.

Workshop on "VLSI Physical Design: Techniques, Trends and Future"



The Department of ECE, MIT Manipal, and Marvell Technology, Bengaluru, have jointly organized a one-day Workshop on "VLSI Physical Design: Techniques, Trends and Future", on 19th April 2024. The resource person is Mr. Sai Narayanan Karatholuvu, Director CAD, Marvell Technology, Bengaluru. Mr. Sai has around 18+ years of experience in semiconductor industry. Currently, he works for Marvell as a CAD Director, driving the India Centre CAD and methodology team. The workshop dealt with fundamentals, explaining the design flow, building blocks, and computer-aided design tools in the VLSI Physical Design.

Workshop



Presentation by Mr. Supreeth R in the department of ECE

The department of ECE has organised a half-day workshop on "Machine Learning Opportunities in VLSI Physical Design", on 2nd March 2024. The resource person Mr. Supreeth R. is an EDA Tools Hardware Engineer at Intel Corp. He works in Physical Design domain, particularly on APR Fill, internal and external ML tools, PPA optimization of multiple technology blocks and Platform Validation. Mr. Supreeth is an alumnus of ECE department, MIT having MTech degree in Microelectronics. The workshop is aimed to give insights into the fundamentals of machine learning techniques and its opportunities in VLSI Physical design.

Workshop



Dr. Roshan Joy Martis, the resource person for the workshop.

The Department of ECE, MIT and IAESE jointly organized the half-day workshop on "Resume Crafting and Research Exploration" for UG students, on 28th March 2024. The resource person of the event was Dr. Roshan Joy Martis (ECE Alumnus), currently Associate Professor of Computer Science and Engineering at Global Academy of Technology, Bengaluru. Dr. Roshan pursued his PhD in Biomedical signal processing from IIT Kharagpur.

Seminar and Live Streaming



The Department of Electronics and Communication Engineering has arranged a seminar by Dr. Bhavanari Mallikarjun, Assistant Professor, Dept. of ECE, followed by live streaming of laying of the foundation stones for three mega semiconductor fabrication facilities in Dholera (Gujarat), Sanand (Gujarat) and Morigaon (Assam) by Honourable Prime Minister of India Shri Narendra Modi. Dr. Bhavanari Mallikarjun has given seminar on "India's Semiconductor Mission: Strengthening Facilities and Fostering Innovation" on 13th March 2024.

Fare Thee Well



Farewell to Dr. Mruthyunjaya H S, Professor, ECE Department, MIT, Manipal.

Dr. Mruthunjaya H S, professor, Department of Electronics and Engineering, MIT Manipal has retired from his service on 29th June 2024. Department of ECE organized a farewell function on 28th July 2024, to felicitate 34 years of successful professional service of Dr. Mruthunjaya H S. The event is graced by Director Cdr. (Dr.) Anil Rana, Joint Director Dr. Somashekhara Bhat and Head of the Department Dr. Pallavi R Mane.

I-Connect Program



The Industry-Connect (I-Connect) program is planned for the department PG students with an aim to interact with industry expert, our alumni and prepare students for their industry internship. The "I-Connect" program on the topic "Preparedness for Industry Internship" for the 2023-25 batch of MTech Microelectronics and DEC students has been held on 3rd February 2024 in online mode. Mr. Bharath H B, Design Engineer at NXP Semiconductors Pvt. Ltd, Bengaluru (Alumnus of MTech Microelectronics, 2021-23 Batch) and Mr. Tejas Gopal, ASIC design Engineer (DFT) at Alphawave Semi Pvt. Ltd., Bengaluru (Alumnus of MTech Microelectronics, 2021-23 Batch) were the resource persons for the interaction program.

Alumni-Industry Guest Talk



Dr. Anish Bekal, Entrepreneur, Trachealth technologies (E-LAGORI), delivered a Guest Talk on the topic "Recent trends and innovation in the electronics product development process", on 5th January 2024 at E&C seminar hall, MIT Manipal. Dr. Anish Bekal is an Alumnus of the department of ECE passed out in 2004. He is a visiting researcher at Stanford University and currently he runs his own start-up in embedded systems domain with a Product called "E-LAGORI", which is incubated at IISc and Derbi

Alumni Guest Talk



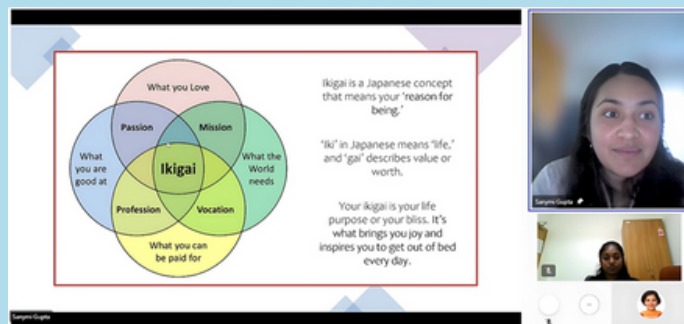
Mr. Nabeel Koya, Scientist-F, CDAC Trivandrum, delivered an Alumni Guest Talk on the topic "Cybersecurity- Digital Forensics", on 31st January 2024 at department of ECE, MIT Manipal. Mr. Nabeel Koya did his Masters in Digital Electronics and Communication from the department of ECE, MIT.

Industry Guest Talk



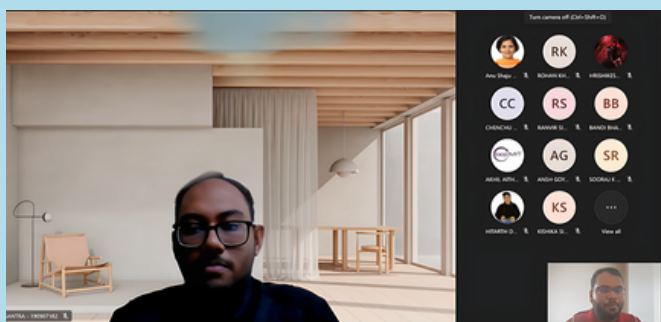
The Department of Electronics and Communication Engineering, MIT Manipal, organized an Industry Expert Guest talk on 9th January 2024, featuring Mr. Devarajan Srinivasan, professional Chartered Engineer working for Transport Department New South Wales, Australia. He has delivered a talk on "Technological Advancements in Rail Signaling Systems" at ECE department. Mr. Devarajan Srinivasan has more than 17 years of experience in the rail industry and working in various signalling and Train Control Systems.

Alumni Guest Talk



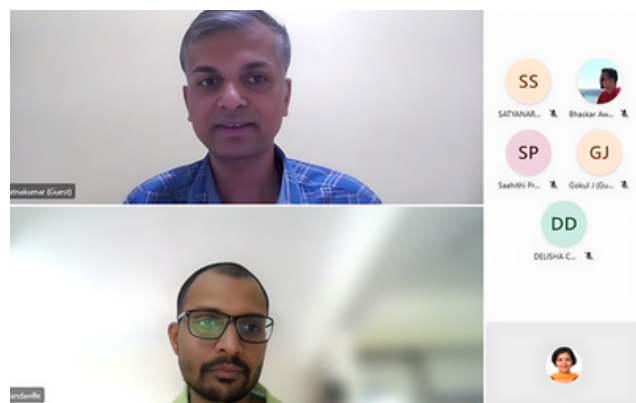
The Dept of ECE is organising an Alumni Guest Talk by Ms. Sanymi Gupta, Leadership Advisory Expert, Egon Zehnder, on "Stepping into the Classroom of Life: Sharing pivotal moments of my journey since I stepped out of the college classroom into a promising corporate career, only to realize it was something that I didn't want". The talk has been delivered in online mode on 23rd January 2024. Ms. Sanymi has over 11 years of experience in the area of learning and leadership development. She holds a bachelor's degree in Electronics and Communication Engineering from Manipal Institute of Technology.

Alumni Guest Talks



Department of Electronics and Communication organized an insightful online Alumni Guest Lecture on 25th January 2024. The session was led by Alumni speakers: Mr. Jethu Krushi (Machine Learning Engineer at Quantiphi), and Mr. Aritro Santra (Analyst at Deloitte). The Guest Lecture aimed to introduce B.Tech. students to the fundamental concepts of deep learning for computer vision applications with a focus on practical examples and real-world applications.

Alumni Guest Talk



The Department of Electronics and Communication, MIT Manipal, organized a compelling online guest talk on 27th Jan 2024, featuring an esteemed alumni speaker, Mr. Vinay Raj Kumar, Associate Vice President, Revenue Strategy at Viacom18 Sports. He has delivered an online session on "Sports Ecosystem in India and Career Opportunities" and explored the diverse career opportunities available within the burgeoning sports industry. Mr. Vinay did his Bachelors in Electronics and Communication Engineering at MIT Manipal, passed-out in 2008.

Guest Talk



Department of Electronics and Communication and Department of Physics, Manipal Institute of Technology, jointly organized a talk on the topic "Experimental Demonstration of Quantum Communication", by Mr. Rounak, Kiran, and Sonali, research scholar from the Tata Institute of Fundamental Research (TIFR), Mumbai, on 16 February 2024.

Alumni Visit



Mr. Vaibhav Gadgil, Alumnus of ECE department (2012 passed out batch) has visited the department on 24th May 2024.

Alumni Visit and Interactions



Mr. Montu Makadia, Alumni of ECE department (1993 batch), has visited the department on 22nd March 2024. Mr. Montu is working as Technical and Business Consultant of Semiconductor Fabless Accelerator Lab (SFAL). During the visit, he was accompanied by Mr. Kunal and Ms. Anagha Ghosh, from VLSI System Design Corporation (VSD). The team interacted with the faculty of ECE department and given an outline on the VSD Squadron development board. The team has discussed on the various training opportunities to help students in building a career in the semiconductor industry.

Technical Publications

Faculty members and students of the department have published 34 technical articles in various reputed Scopus indexed journals during the period from January to June 2024. Also, there are 5 conference paper presentations and publications by the department faculty and students in this period.

Faculty Achievements

Lifeathon 2024 Award



Dr. Bhavanari Mallikarjun has participated in the Lifeathon 2024 and his team has won the Award of Rs ONE Lakh. The event was held on 8th June 2024, jointly organized by Innovation Centre, MAHE, Kasturba Medical College, Manipal and Manipal Institute of Technology Manipal.

Publication in Top Q1 Journal

Dr. Subramanya G. Nayak, Professor in the Department of Electronics & Communication Engineering, MIT, Manipal, co-authored a research article titled "Machine Learning Enabled Photoacoustic Spectroscopy for Noninvasive Assessment of Breast Tumor Progression in vivo": A Preclinical Study published in ACS Sensors Journal 2024, Volume 9, Issue 2, pp 589–601 (Publisher: American Chemical Society) on 23 February 2024. The journal has an impact factor of 9.618 and first quartile (Q1) with 99 percentiles in Scopus. The work has been carried out in collaboration with Dr. Krishna Kishore Mahato, Professor and Head, Department of Biophysics, Manipal School of Life Sciences, Manipal along with other faculty co-authors: Dr. Sharada Rai, Professor, Department of Pathology, Kasturba Medical College, Mangalore, Dr. Satadru Ray, Professor, Department of Surgical Oncology, Kasturba Medical College, Manipal.

Best Paper Award

Dr. Ramya S, Associate Professor, Department of ECE has been honoured with the Best Paper Award for the research entitled "Deep Neural Network as a Tool to Classify and Identify the 316LSS And AZ31BMg Metal Surface Morphology: An Empirical Study" at International Conference on Innovative Discoveries and Emerging Advancements in Applied Sciences (IDEAAS-2024), in association with MAHSA University, Malaysia. The conference organized by MAHSA University, Malaysia on 19th April 2024. The research article is co-authored by Pushpanjali Bhat, Tanmay Shukla, Nithesh Naik, Daniel Korir, Princy Randhawa, Antony V Samrot, Ramya S and Salmataj S A.

PhD Award

Dr. Akshatha K R has successfully defended her doctoral thesis entitled "Development of an Intelligent system for Person Detection in UAV Images" for the award of PhD degree by the Manipal Academy of Higher Education on 16th February 2024. The research work has been guided by Dr Karunakar A Kotegar, Professor, Department of Data Science and Computer Applications, MIT and Dr. Satish Shenoy B, Professor, Department of Aeronautical and Automobile Engineering, MIT.

Dr. Tanya Mendez, full-time research scholar, Department of Electronics and Communication Engineering, has successfully defended her Doctoral thesis entitled "Development of ASIC based Computational Unit for Standalone Image Processing Applications" for the award of PhD degree by the Manipal Academy of Higher Education (MAHE), Manipal on 24th May 2024. The research work was guided by Dr. G. Subramanya Nayak, Professor, Department of Electronics and Communication Engineering, MIT, Manipal.

Elevations

Dr. Kanthi M., Professor, Department of ECE has been appointed as Associate Director-Alumni Cell, Public & International Relations, MIT, Manipal with effect from 01st January 2024.

Dr. Yashwanth N., Assistant Professor-Senior Scale, Department of ECE has been appointed as Assistant Director-Faculty Development & Welfare, MIT, Manipal with effect from 01st January 2024.

Invited Talks



Dr. Arjun Rao delivered talk at St Joseph Engineering College, Mangaluru.

Dr. Arjun Rao has been invited to give a technical presentation at St Joseph Engineering College (SJEC), Mangaluru on May 17, 2024. He has delivered technical session on the topic "VCSI Fundamentals: Building Blocks of Modern Electronics". The event is organised by Department of Electronics and Communication Engineering, in association with IE Student Chapter at SJEC.



Dr. Arjun Rao delivering invited talk at Central Power Research Institute (CPRI), Bengaluru.

Dr. Arjun Rao has been invited to give a technical presentation at two-day workshop on "Clean Energy Innovations: Hydrogen Fuel Cells for a Sustainable Future" at Central Power Research Institute (CPRI), Bengaluru. He has delivered a talk on "High Efficiency Direct Methanol Fuel Cells" during the workshop conducted between May 30 and 31, 2024. The workshop is organised by CPRI, Bengaluru in association with Alva's Institute of Engineering and Technology, Mijar, Moodbidri and GITAM (Deemed to be University), Bengaluru.

Patents

Dr. Arjun Sunil Rao, Assistant Professor, Department of ECE has following three patents filed

- The application for the patent invention entitled "Solar Dryer For Agricultural Harvest Using Hybrid Photovoltaic Thermal Collector" has been published on 24th May 2024.
- The patent invention entitled "Enhancement of Direct Methanol Fuel Cell Performance with Nafion Proton Exchange Membrane Optimally Exposed to Ultraviolet Rays" has been granted on 30th May 2024.
- The patent invention entitled "An Eco-Friendly Interlocking Paving Block Production" has been granted on 25th June 2024.

Student Achievements

Lifeathon 2024 Award



Mr. Lakshya Patel, 4th year student in department of ECE, MIT, has won the first place for designing a human exoskeleton aimed at aiding patients with paraplegia. He has been funded with Rupees One lakh.

Summer School at IISC

The department students, Ms. Kashin Mittal (7th Semester), Mr. D.V. Vishnu Gupta (5th Semester), Mr. Pranel S V (5th Semester), and Mr. Manthri Reddy (5th Semester) have participated in CeNSE Summer School on "Semiconductor Technology and Microfabrication" during 3rd and 14th June 2024, at IISC Bengaluru.

Mr. Sri Karthik Chigurpathi and Mr. Vishan Narayan Raju have been selected for AISSM Summer school at NCKU, Taiwan and have travelled to NCKU, Taiwan on 15th July 2024.

Alumni Achievements

Mr. Adithya Narayan, Alumnus of department of ECE 2021 pass-out batch has joined for his Master of Science program at the School of Computer Science (majoring in Computer Vision) at Carnegie Mellon University.

Mr. Arunabha Bhattacharya, 2016 Batch of ECE department is Co-founder, CTO. He has been the part of ICMR launched drone service in Nagaland for vaccine deliveries. The project I-drone was made possible by Redwing Aerospace, a last mile healthcare logistics company that connects hard to reach areas.

Vision, Mission and Program Outcomes Department of Electronics and Communication Engineering

Department Vision

Excellence in Electronics & Communication Engineering education through research, innovation and teamwork.

Department Mission

M1: To impart core engineering skills in Electronics and Communication Engineering through effective teaching-learning practices.

M2: To provide an academic environment that promotes creative thinking, teamwork and research.

M3: To enable the graduates to face societal challenges and provide holistic solutions

B. Tech in Electronics and Communication Engineering:

Program Educational Objectives (PEOs)

- **PEO1:** Engage in design of systems, tools and applications in electronics, communication and allied engineering domains.
- **PEO2:** Apply the knowledge of electronics and communication engineering to solve problems of social relevance, and pursue higher education and research.
- **PEO3:** Carry out core engineering and managerial tasks in multi-disciplinary and multi-cultural environments.
- **PEO4:** Communicate effectively, demonstrate leadership qualities, and exhibit professional conduct.
- **PEO5:** Engage in lifelong learning, career enhancement, and adapt to changing professional and societal needs.

Program Outcomes (POs)

- **PO1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2:** 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.
- **PO3:** 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.
- **PO4:** 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.
- **PO5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
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- **PO6:** 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.
- **PO7:** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development.
- **PO8:** Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
- **PO9:** Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11: 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.
- **PO12: 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.

Program Specific Outcomes (PSOs)

- **PSO1:** Apply principles of analog and digital electronic circuit design and develop efficient electronic circuits to meet specified design objectives.
- **PSO2:** Architect, partition and select appropriate technologies for implementation of specified wired and wireless communication systems.
- **PSO3:** Plan, design and test device integration technologies and signal processing techniques to meet customer requirements.

MTech Digital Electronics and Communication Engineering

Program Educational Objectives (PEOs)

- **PEO1:** Engage in the design and development of systems in digital electronics, communication, and allied engineering domains.
- **PEO2:** Apply the knowledge of digital electronics and communication engineering to solve engineering problems.
- **PEO3:** Carry out core engineering and managerial tasks in multi-disciplinary and multi-cultural environments.
- **PEO4:** Communicate effectively, demonstrate leadership qualities, and exhibit professional conduct.
- **PEO5:** Engage in lifelong learning, career enhancement, research, and adapt to changing professional and societal needs.

Program Outcomes (POs)

- **PO1:** An ability to independently carry out research/investigation and development work to solve practical problems.
- **PO2:** An ability to write and present a substantial technical report/document.
- **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's program.
- **PO4:** Identify, analyze and solve problems related to digital circuits using VLSI Design.
- **PO5:** Design and implement modern digital communication systems and processor-based solutions for desired performance using appropriate software tools.

MTech Microelectronics

Program Educational Objectives (PEOs)

- **PEO1:** Engage in the design and development of circuits and systems in microelectronics, and allied engineering domains.
- **PEO2:** Apply the knowledge of microelectronics to solve engineering problems.
- **PEO3:** Carry out core engineering and managerial tasks in multi-disciplinary and multi-cultural environments.
- **PEO4:** Communicate effectively, demonstrate leadership qualities, and exhibit professional conduct.
- **PEO5:** Engage in lifelong learning, career enhancement, research, and adapt to changing professional and societal needs.

Program Outcomes (POs)

- **PO1:** An ability to independently carry out research/investigation and development work to solve practical problems.
- **PO2:** An ability to write and present a substantial technical report/document.
- **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's program.
- **PO4:** Identify, analyze, and solve problems related to digital, analog, and mixed-signal circuits using VLSI Design.
- **PO5:** Design and implement microelectronic systems and processor-based solutions for desired performance using appropriate EDA tools.

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