

JULY 2024 | VOLUME 6 | ISSUE 2

MECHATRON



A half yearly newsletter of Dept . of Mechatronics, Manipal Institute of Technology, Manipal, MAHE

HOD's Message

I hope this message finds you well and excited for the year ahead. As we turn the page to a new academic year, I want to extend my heartfelt thanks to each of you for your continued dedication and enthusiasm. Your contributions are vital to the vibrancy and success of our department.

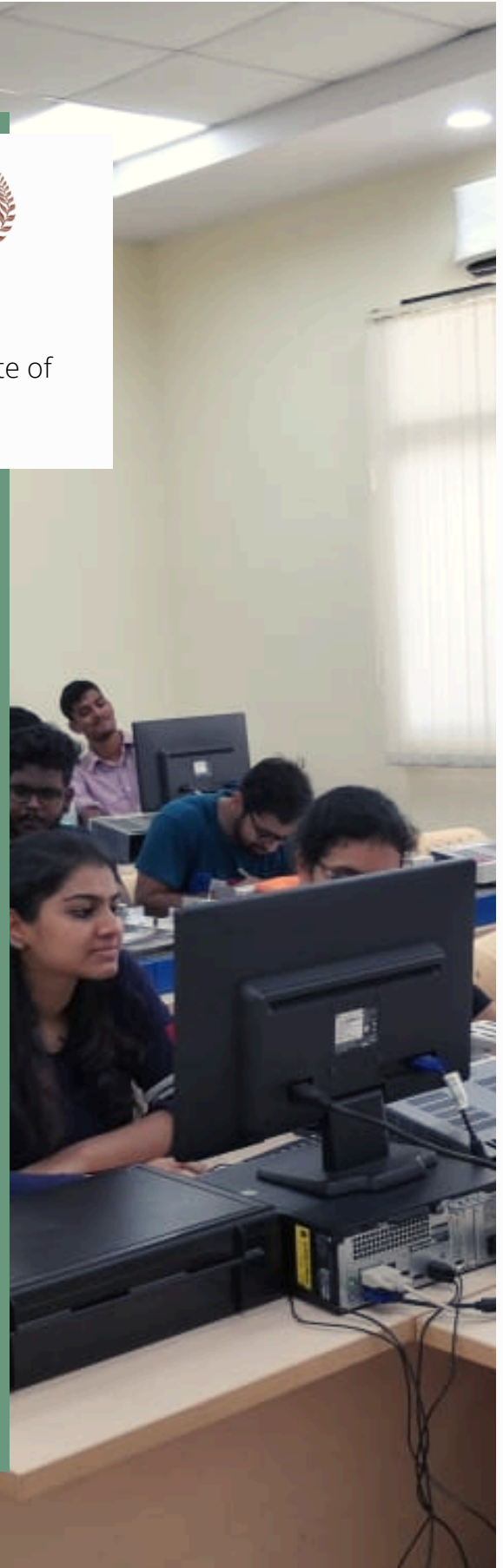
In this edition of our newsletter, we celebrate our achievements, share exciting updates, and look forward to the many opportunities that lie ahead. I encourage everyone to engage with the content, contribute your stories, and take pride in the collective progress we make. Let's work together to make this year outstanding. Here's to a great start!

Dr. DV Kamath
Professor and Head
Dept. of Mechatronics



Editors:

Mr. Mahesh Inamdar (Assistant Professor)



Mission

Educate students professionally to face societal challenges by providing a health learning environment grounded well in the principles of Mechatronics Engineering, promoting creativity and nurturing teamwork

Vision

Excellence in Mechatronics Education through Innovation and Team Work

Department

PROGRAM SPECIFIC OUTCOMES

At the end of the course the student will be able to

- Apply the knowledge of sensors, actuators, controls, mechanical design and modern software tools to integrate a system for performing specified tasks
- Articulate design, modelling, analysis and testing of Mechatronics products, systems and controllers using appropriate technology and software tools.
- Interface devices and elements to a central system having the capability of real time data sharing, storage, retrieval, analysis, decision making with global connectivity features for visibility and intervention

GRADUATE ATTRIBUTES

- Engineering Knowledge
- Problem Analysis
- Design/ Development of Solutions
- Conduct investigations of complex problems
- Modern Tool Usage
- The Engineer and Society
- Environment and Sustainability
- Ethics
- Individual and Team Work
- Communication
- Project Management and Finance
- Life-long Learning

PROGRAM EDUCATIONAL OBJECTIVES

The Mechatronics graduates:

PEO1: Are expected to apply analytical skills and modelling methodologies to recognize, analyze, synthesize and implement operational solutions to engineering problems, product design and development, and manufacturing.

PEO2: Will be able to work in national and international companies as engineers who can contribute to research and development and solve technical problems by taking an initiative to develop and execute projects and collaborate with others in a team.

PEO3: Shall be capable of pursuing higher education in globally reputed universities by conducting original research in related disciplines or interdisciplinary topics, ultimately contributing to the scientific community with novel research findings.

PEO4: Are envisioned to become technology leaders by starting companies based on societal demands and national needs.

PEO5: Shall develop flexibility to unlearn and relearn by being in pursuit of research and development, evolving technologies and changing societal needs thus keeping themselves professionally relevant.

Department AT A GLANCE

- Inception 2012
- 7+ MOUs with Industry and Academia
- 10 State of Art Labs
- 5 Student Startups

PROGRAMS OFFERED

- B.Tech-Mechatronics Engineering(2006)
- M.Tech-Industrial Automation and Robotics (2015)

ACCREDITATION

- The National Board of Accreditation has accredited the "B-Tech in Mechatronics" program for a period of 6 years (2019 - 2025).
- Department of Mechatronics also applied for the Institution of Engineering and Technology (IET) Accreditation UK for its B.Tech and M.Tech courses.

UG Program Outcomes

The POs are exemplars of the attributes expected of a graduate of an accredited programs

PO 1-Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2-Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3-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.

PO 4-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.

PO 5-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.

PO 6-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.

PO 7-Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8-Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9-Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10-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.

PO 11-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.

PO 12-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.

PG Program Outcomes

The POs are exemplars of the attributes expected of a post-graduate of an accredited programs


- 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 program.
- PO4-Able to apply the knowledge of electronic circuits, mechanical systems, control engineering, drives, sensors, computer vision, artificial intelligence, computational techniques, engineering practice to analyse and design the solutions for automation, robotic and other applications.
- PO5-Able to model, analyse, design, validate, develop the automation, robotic and other applications using modern tools..

Department Activities

Insightful Guest Talk by Ms. Madhuri Nagre from Purdue University 23rd Jan 2024

The Mechatronics Department, in collaboration with IEEE CAS, recently hosted an enriching guest talk by Ms. Madhuri Nagre, an esteemed researcher from Purdue University. Ms. Nagre shared her expertise on the applications of deep neural networks in medical imaging, focusing on denoising CT images while maintaining texture integrity. She addressed the challenges of controlling the bias-variance trade-off in DNNs and preserving the Noise Power Spectrum (NPS). Her proposed solution involved innovative algorithms, including a bias-reducing cost function and a texture-matching GAN. The session concluded with an engaging Q&A, where participants had the opportunity to interact directly with Ms. Nagre, deepening their understanding of this cutting-edge research.




Department of Mechatronics,
MIT, Manipal
invites you to guest talk on

"Real time and simultaneous measurement of spirometry and pulse oximetry – A next generation breath analyser"

By
Dr. Hithesh Kumar Gatty,
CEO, Gatty Instruments, Sweden.
Adjunct Faculty,
Department of Mechatronics

on
1st April 2024, 04:00 pm (IST)



Department of Mechatronics. He is also the CEO of Gatty Instruments, Sweden. Dr. Hithesh Kumar Gatty is currently collaborating with Department of Information Technology at Uppsala University, Uppsala, Sweden. He is a member of Swedish medical technology organization, International association of breath research and myFab – a microfabrication association in Sweden. He has a doctorate from the KTH Royal Institute of Technology with a thesis in MEMS - based amperometric sensor for diagnosis and monitoring of asthma and he did his postdoc research in CNRS, Toulouse, France on microsensors. His main interest lies in understanding various sensing principles and miniaturized sensor fabrication. He has competency in sensor development based on novel materials applicable for medical industry.

About the Topic

The next generation breath analyzers, from a simple spirometry to breath gas sensors are evolving to contain more and more sensors, we can imagine the plethora of connected systems that is enabling the detection of lung function through these sensors. These sensors are small and fast! The challenge is to connect these sensors and read the data from them in a real-time mode, especially in a remote handheld systems. Due to the short time required for breathing and obtaining results, often 10s,

Real time and simultaneous measurement of spirometry and pulse oximetry -A next generation breath analyser 1st April 2024

We are thrilled to share highlights from Dr. Hithesh Kumar Gatty's recent guest lecture on next-generation breath analyzers. Dr. Gatty, CEO of Gatty Instruments and collaborator with Uppsala University, discussed the advancements in breath gas sensors and the challenges of real-time data collection in remote handheld systems. He provided insights into overcoming bottlenecks through embedded systems, enhancing our understanding of medical sensor technology. The lecture was open to students, research scholars, and faculty members, and held online via Microsoft Teams.



Solar Electric Vehicle Championship (SEVC) 2024



We are delighted to share that the Solar Electric Vehicle Championship (SEVC) 2024, hosted by the Manipal Institute of Technology in collaboration with the Coimbatore Society of Racing Minds (CSRM), was a tremendous success! Held from March 27th to March 31st, 2024, this one-of-a-kind event brought together talented students from across India to compete in a thrilling showcase of solar electric vehicle technology.

Organized by the Mechatronics, Aeronautical, and Automobile Engineering Departments, SEVC 2024 highlighted the ingenuity and dedication of the participants. The event was a true celebration of innovation and teamwork, setting new standards in sustainable vehicle design. Congratulations to all the teams for their outstanding efforts!

Hands-On Robotics: Enhancing Skills through the RPSM 2024 Workshop (March 4-9, 2024) - Department of Mechatronics, MIT



The Department of Mechatronics at Manipal Institute of Technology (MIT), in collaboration with JANYU Tech Pvt. Ltd., successfully organized a one-week workshop titled "Elemental Robotic Programming with Service and Maintenance (RPSM 2024)" from March 4-9, 2024. Held in memory of the 125th birth anniversary of Dr. T. M. A. Pai, the event saw 24 participants from MIT and Dr. T. M. A. Pai Polytechnic. Through a combination of theoretical sessions and hands-on exercises, participants explored various facets of robotics, including industrial and underwater robotics, as well as service and maintenance strategies. The workshop concluded with a valedictory function where participants expressed interest in future workshops

Advancing Mechatronics: A Week of Cutting-Edge Training with Altair's AI and Simulation Tools Skill Training Workshop - Department of Mechatronics, MIT

The Department of Mechatronics at Manipal Institute of Technology successfully hosted a five-day training program on "Design of Hi-Performance Mechatronic Systems with Altair's Simulation and Artificial Intelligence Platform" from March 4-8, 2024. This program attracted undergraduate and postgraduate students, along with faculty members from various departments. Led by experts from Altair, the sessions covered topics ranging from machine learning workflows to structural optimization and digital twin technology. Participants explored innovative tools like RapidMiner, SimSolid, and Altair Flux, gaining practical insights into the integration of AI and simulation to enhance engineering design.



Faculty Corner

First Prize Win at MAHE Lifeathon 2024



Congratulations to Dr. Jeane Marina D'Souza (Department of Mechatronics, MIT), Dr. Rajesh Navada (Department of Physiotherapy, MCHP), Mr. Lakshya Patel (3rd year, E&C, MIT), and Dr. Bhagya R Navada (ICE Department, MIT) for securing first place at the MAHE Lifeathon on June 8th, 2024.

Their project, titled "Striding Forward: Exoskeletons Redefining Walking After Paraplegia," was recognized for its innovative approach to enhancing mobility for individuals with paraplegia. This remarkable achievement highlights the interdisciplinary collaboration and cutting-edge research within the MAHE community.

New Faculty Dr. Abhishek Kashyup



We are thrilled to have Dr. Abhishek kumar Kashyup as a faculty member in the Department. He has this PhD in Robotics and have profound experience in the domain. We wish and hope students will have a best experience with him and will benefit from this knowledge. We wish him all the luck!

Student Corner

Spotlight on Excellence: Best Paper Award Winner

We are delighted to share the exciting news that Mr. Tejas Malokar MTech student at has been awarded the Best Paper Award at International conference on advances in Engineering design, manufacturing and Mobility 2024.

Their exceptional paper, titled *Enhancing Electric Vehicle Efficiency: Exploring AI-enhanced battery management systems for performance.* delves. This recognition highlights [Student's Name]'s unwavering commitment to excellence, rigorous research, and impactful contributions to the field.

Congratulations, Tejas! 🎉👏



Post Graduate Student's Testimonies



Mr. Tejas Malokar

The five-day training program on 'Design of Hi-Performance Mechatronic Systems with Altair's Simulation and Artificial Intelligence Platform' was a remarkable experience. As an undergraduate student in the Mechatronics department, I found the sessions incredibly insightful and practical. This workshop has undoubtedly enhanced my skills and broadened my perspective on modern engineering techniques."



Ms. Aishwarya
Lakshmi

"Participating in the 'Design of Hi-Performance Mechatronic Systems' workshop was a fantastic opportunity for me as a postgraduate student. The sessions were well-structured and covered a wide range of topics from structural optimization to advanced simulation techniques. The exposure to Altair's tools, especially Altair Flux, has been incredibly beneficial. Overall, this workshop has significantly enriched my knowledge and skills in mechatronics and AI integration."



Ms. Noorain Zehra

The 'Elemental Robotic Programming with Service and Maintenance (RPSM 2024)' workshop was an outstanding experience. As a postgraduate student at MIT, I was thrilled to delve into the world of robotics, particularly industrial and underwater robotics, which were new areas for me. I came away with a deeper understanding of robotic systems and maintenance strategies, and I'm eagerly looking forward to participating in similar workshops in the future."

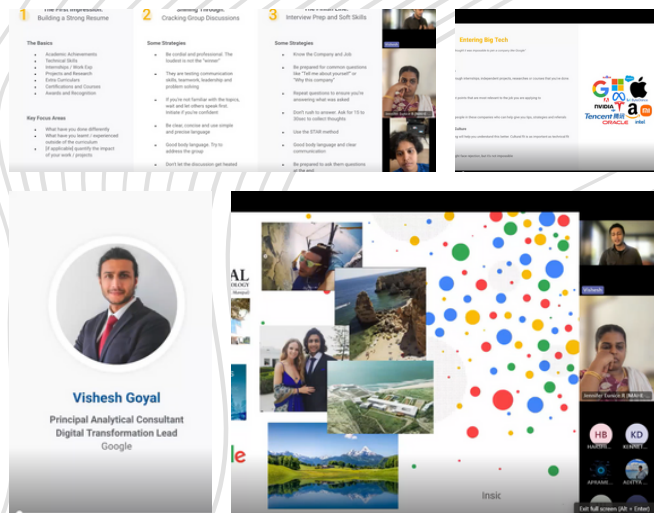


Mr. K Amruthesh

Attending the 'Elemental Robotic Programming with Service and Maintenance' workshop was a highly enriching experience. As a postgraduate student from Dr. T. M. A. Pai Polytechnic, I found the sessions on robotic programming and maintenance particularly useful. I am enthusiastic about the possibility of future workshops and further opportunities to enhance my knowledge in robotics and maintenance."

Alumni's Corner

Alumni Talks :Connect the Dots: Empowering Mechatronics Engineers for Diverse Growth



The Department of Mechatronics Engineering at MIT organized an insightful session on April 12, 2024, featuring alumnus Vishesh Goyal, a Principal Analytical Consultant at Google, Switzerland. The talk titled "Navigating the Transition from Academia to a Successful Career in the Tech Industry" provided attendees with actionable strategies for building a career in tech. Vishesh discussed key topics, including resume building, interview preparation, and the latest tech industry trends such as AI, cloud computing, and cybersecurity. The session also explored international opportunities and introduced a mentorship program aimed at guiding Indian students in their career journeys.

A Moment of Pride: NerdNerdy's Founder Meets the President of India

On January 18th, 2024, NerdNerdy, a startup founded by one of our esteemed alumni, had the honor of being invited to the Rashtrapati Bhavan for an interaction with the Hon'ble President of India, Smt. Droupadi Murmu. This prestigious event recognized 25 women-led initiatives from across the nation, bringing together select founders, including Unicorn leaders like Ghazal Alagh of MamaEarth.

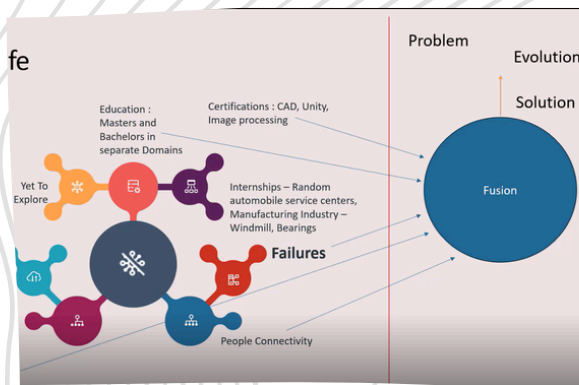
During this memorable interaction, the founder of NerdNerdy had the opportunity to share insights about their work and received valuable thoughts from the President. This recognition from the highest office in the country marks a significant milestone for NerdNerdy and highlights the growing impact of women-led ventures in India.

The journey from the classroom to the Rashtrapati Bhavan is a testament to the power of innovation, perseverance, and the unwavering support from the Institute.

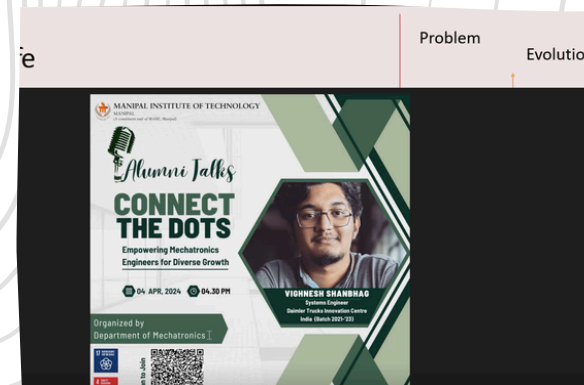


Alumni's Corner

Heading: Connecting the Dots: Empowering Mechatronics Engineers for Diverse Growth



On April 4, 2024, the Department of Mechatronics at MIT hosted an insightful talk titled "Connect the Dots: Empowering Mechatronics Engineers for Diverse Growth." The session, led by Mr. Vighnesh Shanbhag, emphasized the importance of continuous learning and interdisciplinary collaboration in engineering. Shanbhag discussed the significance of mathematical models and how both linear and nonlinear parameters impact system performance. He encouraged engineers from diverse backgrounds to contribute to the big picture, highlighting that seemingly small tasks are valuable stepping stones for future growth.



By trusting the process and reflecting on past experiences, engineers can effectively "connect the dots" in their professional journeys. The interactive session concluded with positive feedback from attendees