

JAN 2024 | VOLUME 5 | ISSUE 2

MECHATRON



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

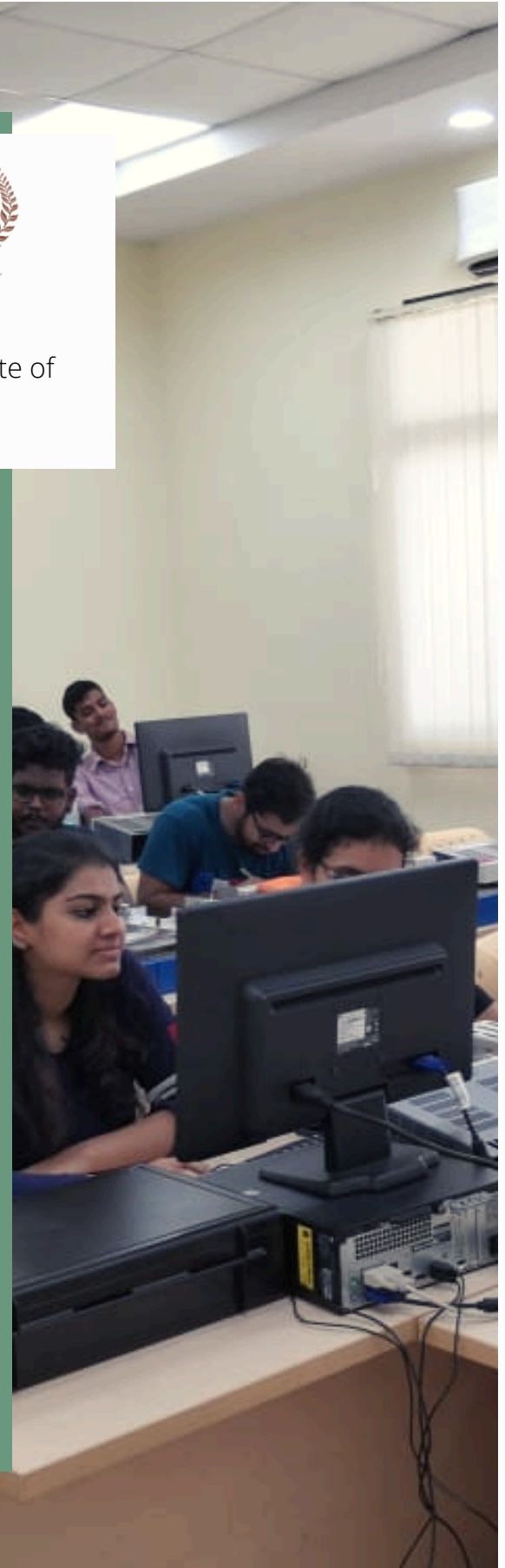
HOD's Message

I hope this message finds each of you well and in good spirits. As we embark on another exciting journey with our college magazine, I extend my heartfelt gratitude to all contributors and supporters. Your unique perspectives and talents play a vital role in shaping the vibrant tapestry of our academic community. Let us continue to celebrate our collective achievements and aspirations through the pages of our magazine. I encourage each of you to participate and share your stories, experiences, and insights as we strive to showcase the essence of our college life.

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

Guest Talk on Advanced Visualization: Augmented and Virtual Reality

Manipal 10-02-2023, Friday

Department of Mechatronics hosted a guest talk on "Advanced Visualization: Augmented and Virtual Reality for Engineers". Mr. Raja Dheepan, Group Manager- Vehicle Architecture, Volvo, Bangalore was the guest speaker. The event was attended by many students and faculty members.

The talk started with the presentation by providing a brief overview of the history of AR, VR in gaming, and other sectors and its evolution in the engineering areas. He explained how AR has evolved from a simple technique to current devices used in the VR industry. He then discussed the various applications of VR in different domains, including healthcare, transportation, and more. He explained how VR is transforming research in Volvo trucks for safety purposes. He also discussed various skill sets required for a VR engineer. The talk ended with a Q&A session, where the audience were given an opportunity to ask questions and engage in a lively discussion with the speaker.



Workshop Nuts and Bolts of Legged Robotics: Manipal 18th - 20th March 2023

To bring about latest and emerging trends in the field of Robotics to you all, the Department of Mechatronics, Manipal Institute of Technology (MIT), Manipal Academy of Higher Education (MAHE), and IEEE-Robotics & Automation Society Student Branch Manipal is Presenting a 3-day workshop on "Nuts and Bolts of Legged Robotics", scheduled (off-line mode) at M V Seminar Hall, AB-II, MIT, Manipal during 18th - 20th March 2023.

Notable resource personages from Stochastic Robotics Lab, Indian Institute of Science, Bangalore will deliver the workshop on Legged Robots and current developments. Dr. Ramya M, Dr. Umesh Sahu and Dr. Narendra Khatri were the coordinators of the workshops.

Speakers



Mr. Manan Tayal, PMRF
Robert Bosch Centre for Cyber Physical Systems (RBCCPS)
Indian Institute of Science (IISc)



Mr. Vamshi Kumar Kurva, PMRF
Robert Bosch Centre for Cyber Physical Systems (RBCCPS)
Indian Institute of Science (IISc)



Mr. Aman Singh, PMRF
Robert Bosch Centre for Cyber Physical Systems (RBCCPS)
Indian Institute of Science (IISc)



- Day 1:**
Session 1: Evolution and Design of Legged Robots
Session 2: Reinforcement learning II - Basics and Importance
Session 3: Reinforcement learning III - Mathematical Learning in lieu with Robotics
- Day 2:**
Session 1: Optimal Controls (Basics, LQR, iLQR, DDP)
Session 2: Modern Predictive Control for Legged Robots
Session 3: Introduction to Simulation Environments like MuJoCo and Python based Simulation
- Day 3:**
Session 1: Introduction of Current work in stochastic robotic lab
Session 2: Linear Policy Based Locomotion
Session 3: Safety Critical Control

MoU with Ingersoll Rand:

Manipal Tuesday, February 7, 2023

The Department of Mechatronics has established a significant Memorandum of Understanding (MoU) with Ingersoll Rand, marking a pivotal step towards fostering industrial collaborations. This strategic partnership holds the promise of unlocking substantial opportunities for mutual growth and innovation. By leveraging the expertise and resources of both entities, this MoU lays the foundation for potential collaborations that could pave the way for the establishment of Centers of Excellence.



These centers would serve as hubs of advanced research, development, and knowledge exchange, driving advancements in the field of mechatronics and contributing to the broader industrial landscape.

Faculty Corner

Solar Electric Vehicle Championship: Coimbatore 29th March to 2nd April 2023

Department of Mechatronics congrats Dr. Vijay Babu on winning Inspiring Faculty Award for guiding the SolarMobil team which participated and won Solar Endurance Award, Optimum Cost Award in SOLAR ELECTRIC VEHICLE CHAMPIONSHIP 2023 held at Coimbatore



Best Paper Award at International Conference on Computational Intelligence and Knowledge Economy - ICCIKE2023 and Patent Grant: Amity University Dubai, UAE 9-10 March 2023

Dr. Narendra Khatri has received the Best Paper Award (a certificate with AED 500 cash) at International Conference on Computational Intelligence and Knowledge Economy - ICCIKE2023 for an outstanding research paper presented during the Technical Session-I: Machine Learning & Data Science.

His extensive work has also got him two patent grants namely Design, entitled "IOT BASED ROBOT FOR SANITIZATION" and "IoT Based Agricultural Spray Machine".



Editorial Board Member and Patent Grant:

Dr. Abhimanyu K Patro has been nominated into Editorial Board Member (Academic Editor) of "Advances in Multimedia" Journal, Hindawi. He also got Patent Grant on "AI-assisted Image Recovery for Low-Dose CT Scans"



Alumni's Corner



Ms. Khushaboo Khatri an alumna of the Dept. of Mechatronics along with her team conquered the summit of Kala Patthar and reached the renowned Everest Base Camp. They achieved this feat despite facing challenges, including grueling altitudes and frigid temperatures dropping below minus 30 degrees, they triumphed over the 12-day trek showcasing amazing fitness levels and team spirit.