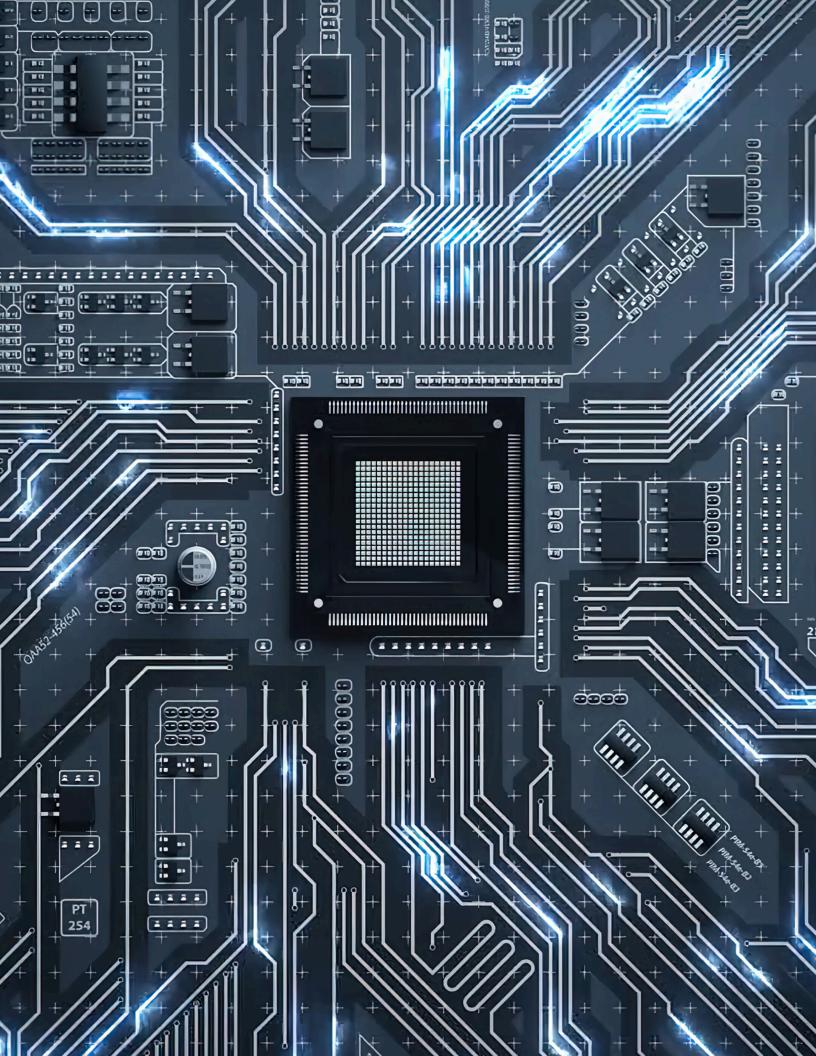


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Preface

Welcome to the first edition in the new academic year of the Department of Mechatronics. As we embark on this exciting journey, we invite you to delve into the vibrant world of mechatronics, where innovation converges with creativity, and technology blends seamlessly with craftsmanship.

On the further pages, you will witness various articles that narrates our department's activities followed by multiple events organized by our department and the Association of Mechatronics Engineers. Furthermore, you will be introduced to our department and its Association, Head of the Department, and the Convenor of the Association of Mechatronics Engineers.

Here we will also explore breakthroughs in the Robotics Community and the Research taking place in the form of "Tech Cover Stories", to inspire you for your next project!

Our magazine also sheds light on the dedicated faculties who guide, inspire, and nurture our students' aspirations. Get to know the individuals who form the bedrock of our learning environment, fostering an atmosphere of collaboration, curiosity, and growth.

I invite you to be part of this journey as you read this magazine further. Welcome to the Department of Mechatronics, SRMIST.

Sincerely, EDITORIAL TEAM Association of Mechatronics Engineers.

About SRM



SRM Institute of Science and Technology is one of the top ranking universities in India with over 52,000 full time students and more than 3200 faculty across all 6 campuses – offering a wide range of undergraduate, postgraduate and doctoral programs in Six Faculties - Engineering & Technology, Management, Medicine & Health sciences, Science & Humanities, Law and Agricultural Sciences.

About the Department

The Department of Mechatronics Engineering at SRM Institute of Science and Technology, established in 2005 as the first private university program in India, focuses on delivering multidisciplinary skills in response to the growing demand for mechatronics driven by advancements engineers in robotics, automation, and Industry 4.0. The department offers various programs emphasizing experiential learning and is recognized for its state-of-the-art facilities and diverse faculty. Equipped modern laboratories featuring collaborative robots, autonomous mobile robots. advanced control systems, the department supports design, analysis, and simulation of mechatronic systems. The diverse expertise of its faculty and a strong alumni network working globally in reputable organizations further contribute to the department's success.





Message from HOD

Dear Readers,

It is my pleasure to welcome you to the first Issue of Mechaverse in this new academic year, a platform that highlights the impressive accomplishments of our Department of Mechatronics. As Head of Department, I am proud to oversee a community that is advancing engineering innovation through interdisciplinary collaboration.

In this issue, discover how our students and faculty are redefining the field through pioneering work across a wide range of mechatronics applications.

Furthermore you can explore the technical articles which throw light on some new and emerging fields in Mechatronics and Robotics, a sure inspiration for your future endeavors.



Dr. Murali G

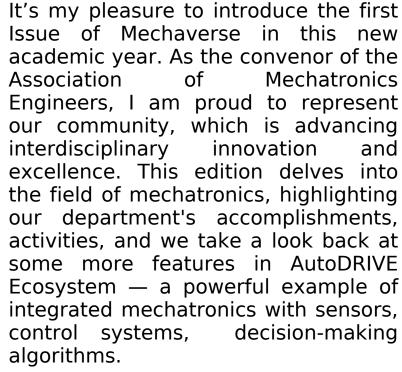
HOD

Department of Mechatronics Engineering



Message from convenor

Dear Readers,



My gratitude goes to the editorial team and contributors for bringing this issue to life. Enjoy exploring the remarkable work within our department!

Regards,

Dr. K Sivanathan

Assistant Professor, SrG

Department of Mechatronics Engineering



A Stellar Contribution to the World of Measurement

Belsam Jeba Ananth M has been recognized for his exceptional contributions to the field of measurement. The renowned publishing house, Elsevier, recently awarded him a Certificate of Reviewing for his outstanding work.

A Remarkable Achievement

The contributions made by Ananth are phenomenal. Through his dedicated effort, knowledge, and experience, the science and application of measurement principles have seen advancement. Of these, his 54 reviews published between September 2023 and April 2024 significantly affected the quality and rigor of research appearing in Measurement.



In Honour of Excellence

The editors of Measurement warmly thank Ananth for his precious contributions. He is meticulous, perceptive in his analysis, and always constructive with his feedbacks, which has played a great role in bringing out the highest standards of scientific excellence.

Tech Snippet #01- Al-Driven Predictive Maintenance in Robotics:

Predictive maintenance powered by AI is revolutionizing industrial robotics. By continuously monitoring robotic systems, AI algorithms can predict failures and schedule maintenance before breakdowns occur, reducing downtime and maintenance costs in factories.

(ICRABS2023) - 14th and 15th September 2023

First International Conference on Robotics in Agriculture, Bio-Waste Management and Surgery

sponsored by Department of Bio-Technology, Ministry of Science and Technology organized by Department of Mechatronics Engineering, SRMIST, Kattankulathur. Conference Report: International Conference on Robotics and Automation in Bio Waste Management, Agriculture, and Healthcare

The International Conference on Robotics and Automation in Bio Waste Management, Agriculture, and Healthcare was successfully conducted by the Departments of Mechanical and Mechatronics Engineering at SRM Institute of Science and Technology, Kattankulathur. The conference featured distinguished speakers, insightful sessions, and engaging discussions on the pivotal role of robotics in various sectors, particularly in agriculture and healthcare

Inaugural Session:

The conference commenced with the aims and objectives delivered by Dr. A. Vimala Starbino, followed by a felicitation address from Dr. G. Murali, Professor and Head of the Department. The Presidential address was presented by Dr. Kingsly Jeba Singh, Dean of the School of Mechanical Engineering. He emphasized the significance of the conference title, particularly in today's context where robotics has a substantial impact on the manufacturing industry and its potential applications in agriculture. Dr. Singh highlighted the importance of second-generation farmers who can leverage technology for sustainable practices, stressing the need for forums to discuss advancements in agricultural robotics, bio waste management, and surgical applications.

Keynote Addresses and Paper Presentations:

The inaugural address was delivered by Mr. L. Mayakrishnan, Deputy Director of Agriculture, who underscored the necessity for robotic innovations in agriculture to enhance productivity. He urged participants to engage in extensive research to facilitate the integration of robotics into the agriculture sector.

Tech Snippet #02- Haptic Feedback in VR Robotics:

Virtual reality (VR) integrated with robotics is creating immersive training environments for complex tasks like surgery or industrial operations. Haptic feedback systems allow users to feel and manipulate virtual objects through robotic interfaces, enhancing realism and learning efficiency.

The first keynote speech on "Robotics in Surgery" was delivered by Dr. Jey Subbaroyan, Vice President of Medical Affairs & Clinical Research at Nyxoah, Inc. His presentation emphasized the precision and accuracy of robotic surgery, particularly in the United States. Following this, an interactive Q&A session allowed students to clarify their doubts.

The conference received 20 papers on agriculture, 9 on bio waste management, and 5 on healthcare, with a total of 68 registrations. The second keynote speech was given by Dr. Durgaprasad Bhandari from Nepal Engineering College, focusing on "Robotics in Agriculture and Bio Waste Management." He reiterated the urgency of developing more agricultural robots and expressed interest in potential collaborative projects.

Paper Presentation Sessions:

The paper presentation sessions commenced in the afternoon, with a total of 10 papers presented in the agriculture domain. The session was chaired by Mr. V. Manoj Kumar and Dr. M. Santhosh Rani. Subsequently, several sessions featured presentations on bio waste management and healthcare, with distinguished review panels honoring the best papers in each category.

The keynote speech on "Al-based Defect Detection in Infrastructure for Safety and Sustainability" was presented by Dr. Ali Sophian, which was followed by sessions focusing on automation in aquaculture by Mr. Arun Ganapathy.

Valedictory Function:

The conference concluded with a valedictory function on Day 2, where awards for the best papers were presented by Chief Guest Dr. Ali Sophian. Participation certificates were distributed by Mr. Arun Ganapathy, and the contributions of 20 student volunteers were acknowledged by Dr. G. Murali.

Tech Snippet #03- Hyper-Redundant Robots for Constrained Spaces:

Hyper-redundant robots with flexible, snake-like designs are being developed for tasks in constrained environments, such as pipeline inspections or disaster zones. These robots can maneuver through tight spaces and perform operations that are difficult for traditional robots.

Acknowledgments:

Dr. A. Vimala Starbino delivered the vote of thanks, expressing gratitude to the organizing team, participants, DBT, and the Ministry of Science and Technology, Government of India, for their support in making the conference a resounding success. The organizing committee extends its appreciation to all external and internal participants, student volunteers, technical assistants, and domestic staff for their invaluable contributions, ensuring the conference was both impactful and memorable.





ICRABS2023 - INAUGRAL CEREMONY

GLIIMPSE OF ICRABS 2023















































ICRABS2023

SRMIST to Host FDP on Machine Learning for Electric Vehicles

Kattankulathur, Tamil Nadu – SRM Institute of Science and Technology (SRMIST) will host a seven-day Faculty Development Program (FDP) focused on the application of machine learning and data analytics in the electric vehicle (EV) industry. The program, running from August 14th to 20th, 2023, will be offered in a hybrid format, combining online and offline sessions, culminating in an industrial visit.

Dr K. Sivanathan, of the Department of Mechatronics is one of the Principal Investigators, overseeing the Development of this Program.

About the FDP

The Faculty Development Program (FDP) aims to equip faculty members with the necessary knowledge and skills to understand and explore the application of machine learning and data analytics in the context of Electric Vehicle (EV) deployments. The program will focus on the latest trends, technologies, and best practices relevant to the integration of machine learning and data analytics in the EV industry. The FDP will consist of a mix of lectures, interactive sessions, hands-on workshops, and case study discussions. Participants will have the opportunity to collaborate, ask questions, and learn from experienced industry experts and academia.

The program is designed for faculty members, Research Scholars, and industry persons from engineering and technology disciplines who are interested in advancing their understanding of machine learning, data analytics, and their applications in the domain of Electric Vehicles

ABOUT THE CENTER FOR Electric Mobility (CEM)

SRM Institute of Science and Technology, Kattankulathur has been awarded the prestigious Department of Science and Technology (DST), Promotion of University Research and Scientific Excellence (PURSE) title "Establishment of Holistic Electric Mobility Infrastructure and Supporting Networks to Promote Research and Startups towards National Electric Mobility" grant of Rs. 13.63 Crores towards the establishment of a centralized state-of-the-art E- mobility Research facility for the Development, Testing, and Validation of Electric Vehicles which all institutions, Start-ups, and Indian OEMs could access.

This grant aims to establish a centralized state-of-the-art E-mobility Research facility for the Development, Testing, and Validation of Electric Vehicles which could be accessed by all institutions, Startups, and Indian OEMs. The PURSE grant has been awarded to enhance the research further enhance the research facility, create a regional test center, and act as a regional hub to develop and establish research and product development activities through collaborating arch institutes and start-ups.

Furthermore, It aims to build a complete state-of-the-art advanced electrical mobility center comprising the complete Electric Mobility Infrastructure and Supporting Networks research facilities for learning, research, and development towards inception and support of Indian start-ups.

Aligned with the Indian government's National Electric Mobility Mission Plan 2020 Phase II of Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, the E-Commercial Vehicle sector will be the primary beneficiary of this project. This project will create many entrepreneurs to initiate new start-ups towards building an Atmanirbhar Bharat, developing in-house technologies in the E-Mobility sector.

The facilities and infrastructure developed through this project will also be available for external research partners and institutions during the time when our students and faculties are not using it.

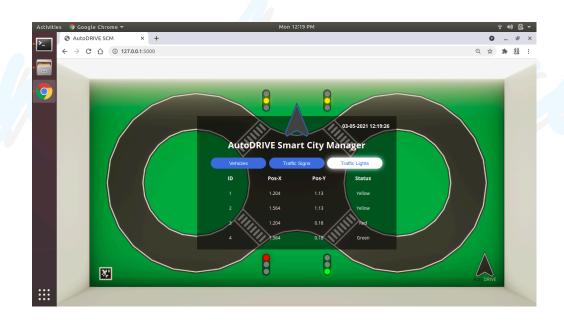
Training facilities and programs will inculcate job-oriented skills for local youth community for their empowerment and livelihood.

Through this DST grant and Additional contributions from SRM IST, we have created a Centre for Electrical Mobility (CEM) in a 25,000 Sq.ft Area, with onboarding of the following facilities developed through various DST PURSE projects. Focused on performing research and development to support a wide array of EV integration and technology services.

Advancing Autonomous Research with AutoDRIVE Devkit

Empowering Developers with AutoDRIVE Devkit

At the core of the AutoDRIVE Ecosystem is the Devkit, a suite of tools designed to accelerate the development of autonomy algorithms. The Devkit caters to both autonomous driving (via the ADSS Toolkit) and smart city management (through the SCSS Toolkit), supporting a wide range of research applications. By offering compatibility with ROS and direct scripting capabilities, the Devkit enables developers to tailor their projects with unmatched precision. It supports both decentralized and centralized computing setups, making it adaptable for a variety of research needs, from university projects to industry-led innovation.



Tech Snippet #04- Robotic Systems for Aging Populations:

Robotics is playing a critical role in assisting aging populations by providing caregiving robots. These robots can help with daily tasks such as mobility assistance, medication reminders, and companionship, promoting independent living for the elderly.

Recognition and Awards: A Testament to Excellence

The AutoDRIVE Ecosystem has not gone unnoticed. With accolades like the Best Paper Award at CCRIS 2021 and the finalist position in the ASME Student Mechanism and Robot Design Competition (SMRDC) 2023, the platform has earned its place among the best in the field. Its success is a reflection of the dedication of the developers and contributors behind it, as well as the mentors guiding its progress. These achievements underscore the platform's potential to shape the future of autonomous driving research, making it a standout in the world of innovation

Looking Ahead: The Next Phase of AutoDRIVE

As the AutoDRIVE team prepares for the release of Testbed 0.3.0 and Simulator 0.4.0, the platform continues to evolve, bringing new features and capabilities to researchers around the globe. With its focus on collaboration and cutting-edge technology, AutoDRIVE is set to remain a key player in the autonomous driving industry, offering a pathway for researchers to bring their visions to life—from digital simulations to real-world streets.

Tech Snippet #05- Edge Computing for Real-Time Robotic Control:

The integration of edge computing in robotics allows real-time data processing at the device level, reducing latency and enhancing decision-making. This is critical for applications like autonomous vehicles, where fast response times are essential for safety.



Forging International Research Connections: Dr. T. Muthuramalingam's Visit to King Saud University

From November 26 to December 1, 2023, Dr. T. Muthuramalingam, Associate Professor of Mechatronics at SRM Institute of Science and Technology (SRMIST), has been invited by the Centre for Advanced Manufacturing, King Saud University (KSU), Saudi Arabia. This prestigious visit, under the Ministry of Higher Education's IFKSUDR H133 scheme, underscores Dr. Muthuramalingam's expertise and commitment to advancing the field of mechatronics in manufacturing process control and advanced machining processes.

ey Contributions during the Visit:

1. Forum Talk on Research Areas in Mechatronics

Dr. Muthuramalingam delivered a comprehensive talk exploring cutting-edge research opportunities in mechatronics, with a special focus on its application in manufacturing process control and advanced machining processes. This forum provided a platform to discuss emerging trends and how these innovations can shape the future of advanced manufacturing.



2. Lecture on Mechatronics for Manufacturing Process Control

As part of his academic outreach, Dr. Muthuramalingam engaged with students at KSU, sharing insights on the applications of mechatronics in manufacturing process control. His lecture inspired the next generation of engineers, sparking interest in interdisciplinary approaches to modern manufacturing challenges.

3. Collaboration Discussions

During his visit, Dr. Muthuramalingam met with KSU officials to explore collaboration opportunities between SRMIST and King Saud University. These discussions focused on potential avenues for joint research projects, student and faculty exchange programs, and other initiatives that will benefit both institutions in the field of mechatronics and advanced manufacturing.



Have given lecture to students about application of mechatronics in manufacturing process control.

Building Global Academic Networks

This visit not only enhanced the research partnership between SRMIST and King Saud University but also for future paved the way collaborations in the rapidly evolving mechatronics. domain of Dr. Muthuramalingam's contributions during this visit will further solidify SRMIST's position on the global academic stage, while opening new doors for technological advancements and educational excellence.



Discussed with University officials for the possible collaboration with SRMIST and King Saud University

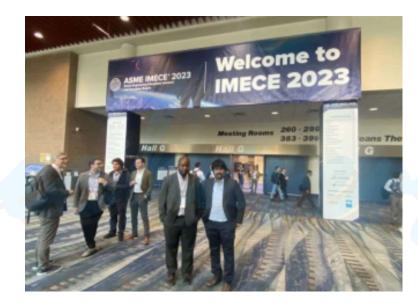
Tech Snippet #06- Shape-Memory Alloys in Robotics:

Shape-memory alloys, which can change shape in response to temperature, are being used in actuators for robotics. These materials are enabling the creation of lightweight, energy-efficient robotic components for use in aerospace, biomedical devices, and more.

Advancing Research at ASME IMECE 2023, New Orleans, USA

Soon after his visit to China, Dr. Muthuramalingam travelled to the United States to participate in the ASME International Mechanical Engineering Congress & Exposition (IMECE 2023), held from October 29 to November 2, 2023, at the New Orleans Ernest N. Morial Convention Center, Louisiana. Supported by DST SERB-ITS funding,

Dr. Muthuramalingam presented his research paper on October 30, contributing valuable insights into the field of mechanical engineering.



Visiting Professor at Navajo Technical University, New Mexico, USA in the field of advanced machining

In addition to his participation at IMECE 2023, Dr. Muthuramalingam took on the role of Visiting Professor at Navajo Technical University, New Mexico, where he conducted specialised lectures and sessions in advanced machining. This collaboration opens the door for future knowledge exchanges and strengthens international ties in advanced manufacturing technologies.

Paving the Way for Global Collaborations

Dr. Muthuramalingam's visits to China and the USA underscore his dedication to global academic engagement. The recognition received at IULTCS 2023, combined with his involvement in ASME IMECE 2023 and his teaching contributions at Navajo Technical University, mark significant steps toward fostering international partnerships and advancing research in mechatronics and manufacturing.

With new collaborations on the horizon and research excellence at the forefront, Dr. Muthuramalingam continues to inspire and lead in the global academic arena

Recognised by Vice Chancellor Dr. Muthamizhchelvan on World IP Day 2024 for outstanding achievement in securing five patents granted from April 2023 to March 2024.

Tech Snippet #07- Al-Based Robotic Perception Systems:

Al-powered perception systems are improving how robots interpret their surroundings. These systems combine computer vision and deep learning to enhance object recognition, navigation, and interaction with humans in unstructured environments.

visit to Hanoi University of Industry, Vietnam, in April 2024:

Visit by Dr. T. Muthuramalingam: Fostering International Collaborations at HaUI, Vietnam

Dr. T. Muthuramalingam, Professor of Mechatronics at SRMIST, was invited as a Visiting Professor by the Faculty of Mechatronics Engineering at Hanoi University of Industry (HaUI), Vietnam, from April 25-27, 2024. Sponsored under the prestigious VINIF.2023.DA089 scheme by Vingroup Innovation Foundation (VINIF), this visit focused on knowledge exchange and academic collaboration.

During his time at Hall, Dr.
Muthuramalingam delivered technical
lectures to Mechatronics students and
discussed admission procedures for
the M.Tech (Mechatronics) program at
SRMIST, encouraging UG students
from HaUl to apply.



As visiting professor

A highlight of the visit was Dr.
Muthuramalingam's Keynote talk at the International Conference on Sustainability and Emerging Technologies for Smart Manufacturing (SETSM 2024) on April 26, 2024.
Additionally, a Memorandum of Understanding (MoU) was signed between Hanoi University of Industry and SRMIST, focusing on future collaborations, including joint international conferences.
This visit is expected to open new

This visit is expected to open new avenues for student exchange programs and further joint research initiatives between the two institutions.



During MOU ceremony

- **Dr. Madhavan Shanmugavel,** has successfully participated in the two-day workshop on "Introduction to Embedded Systems and Robotics" conducted on 22nd and 23rd September 2023 at Adhiparasakthi Engineering College, Melmaruvathur.
- **Mr. J. Arivarasan,** has participated in the Short Term Training Programme on "Challenges in Welding and Metallurgical Characterization" organized by the Department of Mechanical Engineering, SRM Institute of Science and Technology, Kattankulathur, from 25th to 30th September 2023.
- **Mr. G. Balakumaran,** Assistant Professor, has completed the "Counsellors Training on Train the Trainers" for the duration of 24 weeks organized by the Department Counseling Cell, College of Engineering and Technology, SRM Institute of Science and Technology, Kattankulathur.



A student team ROBOCON at SRM Institute of Science and Technology, funded by the Centre for Excellence in Teaching (CET), captivated audiences with their Enhanced Visitor Assistant (EVA) Robot at the Multidisciplinary Project Exhibition on May 3, 2024. The humanoid robot dazzled attendees with its advanced interaction capabilities, seamlessly responding to voice commands and performing gestures such as "Namaste," "Hello," and handshakes. EVA also demonstrated its tech-savvy skills by sharing building locations via WhatsApp and answering visitor queries with precision.

The project, guided by an expert team of mentors—Dr. R. Gangadevi (Mechatronics), Dr. Jayakanth J. J. (CINTEL), and Dr. Lavanya R. (CTECH)—won first place at the exhibition, earning the team a well-deserved cash award of ₹25,000. This remarkable achievement highlighted the innovative spirit and multidisciplinary expertise of the student team, setting a benchmark for future projects.



College of Engineering and Technology 18XXP109L-Multidisciplinary MAJOR PROJECT AY23-24 (EVEN)- MDP Exhibition- Best project Award						
Batch no	Department	Register Number	Name of the Candidate	Project Title	Project Mentors	BEST PROJECT AWARD POSITION
	M echat-					
	Robotics	RA2011038010014	Adheesh Mathur			
	Mechat-		Danush			
	Robotics	RA2011038010044	Ramakrishnan			
	Mechatronics	RA2011018010022	Roel Pais		Dr. R. Ganga Devi/M echatronics	
	CINTEL	RA2011047010068	Harikrishnan M		Dr. Jayakanth J J /CINTEL	
MDD40	O Task	DA 2014002044220	December Malakas	D/A Februard Visitor Assistant	D- L D/ OTFOLI	First Place with Case





Gullipalli Saketh, Chavhan Aayushi Rajesh third year students have successfully completed Hands-on Training on IoT Modules and their application in 14.0 organized by ZF-SRM Centre of Excellence for Smart Factory Initiatives and Department of Mechatronics Engineering, SRMIST, Kattankulathur on 16-17 October 2023.

Dharini S, Lalithesh K, Tejas M K, second year students have participated in the training course on IIoT Technology at SRM-BRIN Centre of Excellence in Automation Technologies, from 14.10.2023 to 04.11.2023 (5 days Program).

Lalithesh K, Manan Wadhwa, second year students have been awarded with a certificate in recognition of their outstanding participation in "AERO X 2024", a National Level Aeromodelling Competition held at NMAM Institute of Technology, Nitte.

Pratheek k, first year student has participated in the GIT101 workshop conducted by Alexa Developers SRM, held at TP Ganesan Auditorium - Mini Hall 2 on November 15, 2023. This certificate is awarded in appreciation of the participant's dedication, active engagement, and valuable contributions to the workshop

Lalithesh K, Ganesh, Tejas M K, second year students from SRM Institute of Science and Technology, as part of Team AgroSense have participated in Unplugged 1.0,ON 7-8 th january organized by DJSCE IETE-ISF with a certificate in recognition of their outstanding participation in 24 hr hardware hackathon and been as apart of the top 5 finalist teams.

Tech Snippet #08- Liquid Metal Robotics:

Advances in liquid metal technology are paving the way for self-reconfigurable robots. These robots can change their shape in response to external stimuli, potentially allowing them to squeeze through tight spaces or self-repair, with applications ranging from space exploration to search-and-rescue operations.

Akhil Anil, Aditya Rahul Pradhan, Nagesh Yenigalla, Aarush Bhandari, second year students have successfully organized and conducted the workshop "Solidworks Bootcamp 2.0" in collaboration with the Department of Electronics and Instrumentation Engineering, SRMIST from 26-28 February 2024.

Ashmit Mondal, A Ram Charan, second year students on behalf of SRM Team Robocon, recognizing their outstanding contribution and exceptional results displayed throughout the SolidWorks workshop, held from 26-28 February 2024.

Dharini S, C Santhosh, Dhiya Raj, Shrudeep S R, second year students have been selected as a semi-finalists for National level Hackathon "NEXUS 24", held from february to march 2024.

Aditya Rahul Pradhan, Ashmit Mondal, second year students have participated in the India Engineers Elite Challenge 2024 held at MIT campus, Anna University on 29th and 30th March 2024.

MG Vigneshwaran, B.C. Mohana Gokul, Kalluru Snehit, third year students with their incredible performance, have obtained the position of First Runner up at the India Engineers Elite Challenge 2024 held at Department of Instrumentation Engineering MIT Campus, Anna University on 29th & 30th March 2024.





Editorial Team



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Assistant Professor, SrG
Department of Mechatronics Engineering



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B.Tech Mechatronics with
specialization in Robotics



Nagesh Yenigalla Student B.Tech Mechatronics with specialization in Robotics



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