Yantro

AMRITA VISHWA VIDYAPEETHAM

श्रद्धावान् लभते ज्ञानम्

DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF THE UGC ACT, 1956

Department of Mechanical Engineering

Amrita School of Engineering, Bengaluru

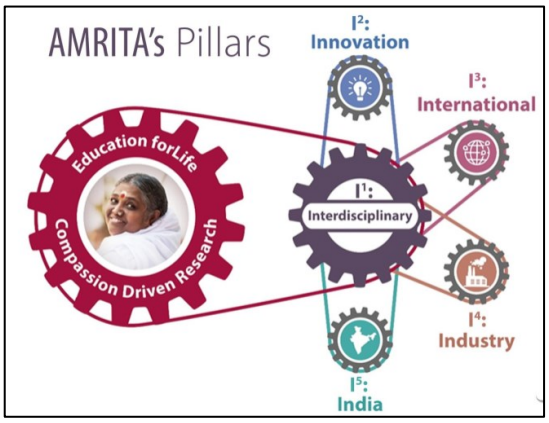
2024-25 Even Semester

Amrita Vishwa Vidyapeetham

Amrita Vishwa Vidyapeetham (AVV) is a multi-campus, multi-disciplinary research academia that is accredited 'A++' by NAAC and is ranked as one of the best research institutions in India.

Founded by the world-renowned humanitarian, Sri Mata Amritanandamayi Devi, the multi-campus University was established to provide rigorous academic instruction in an ambience rooted from Indian cultural heritage.

The vision and mission of AVV focus on "Education for Life" and "Compassion Driven Research" while aligning with the concept of five I Pillars for holistic development of the organization.



AVV Bengaluru Campus

Amrita School of Engineering started its operation at Bengaluru in 2002. With the advancements in the fields, School of Computing and School of AI have been carved out of it. Together, the three technical schools in Bengaluru Campus offer B.Tech. programs in nine disciplines and M.Tech. programs in seven disciplines. They seek to prepare graduates with a solution-mindset and highest ethical standards, with an emphasis on value-based Education.

The Bengaluru campus has carved itself as a destination for technological advancements due to its advantage of being in the Silicon Valley of India. The students and faculty are exposed to a variety of opportunities which have resulted in industry-academia collaborations.

Mechanical Engineering Department

The Department of Mechanical Engineering started the first batch of B.Tech in Mechanical Engineering in the year 2007. In the due course, B.Tech program in Robotics and AI, and M.Tech program in Robotics and Automation have been introduced to cater to needs of the demands in the emerging and frontier fields.

It has been producing qualified engineers to face the challenges of the real world with sustainable solutions. Excellent laboratory facilities, modern computer clusters, systematically designed curriculum, and dedicated faculty members make this department a dynamic place to study.

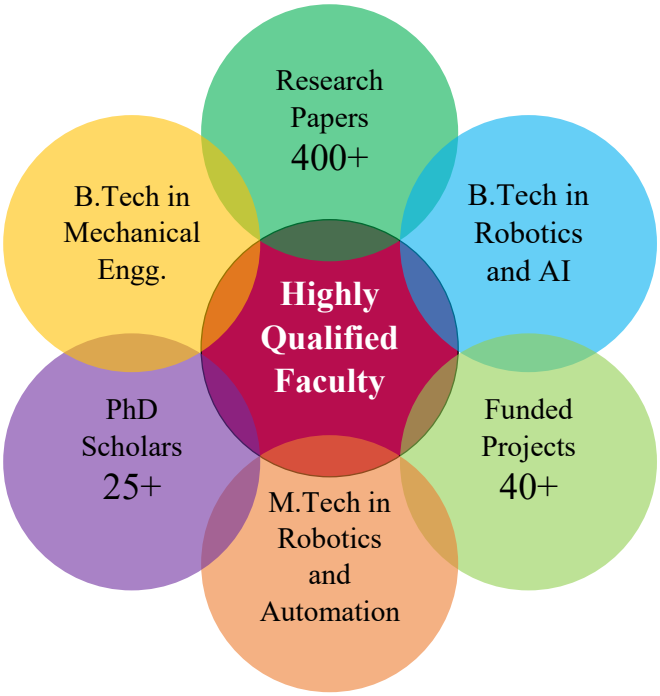
Vision:

To transform our students into outstanding mechanical engineers with **strong domain knowledge and skills, society-centric research intent, and exemplary ethical values**, making them the most desired professionals by research institutions, industry, and society.

Mission:

- To develop in each student, a profound understanding of fundamentals, motivation for continuous learning, and practical problem-solving skills for building a successful career.
- To create and share technical knowledge and collaborate with Industry and Institutions for the betterment of Society.
- To imbibe ethical values, leadership skills and entrepreneurial skills in students.
- To sustain a conducive environment to involve students and faculty in research and development.

Overview of the Department



Editorial

The Even Semester of 2024-25 witnessed a vibrant set of student activities over the semester, ranging from industrial visits to participating in student competitions, from inauguration of The Robotics Society (TRS) Student Chapter to volunteering in several outreach programs. We also had a few nice beginnings in the form of Grant of AICTE IDEA Lab to Amrita Bengaluru and a budding start to an international collaboration with University of Maryland Baltimore County (USA).

Through this edition of "Yantro" magazine, we bring out to you:

We look forward to your comments and suggestions.

- Editorial Team

(Dr. Shashi Kumar M. E. and Dr. Rajeevlochana G. C.)

Department Events and Updates

Briefing session for ME/RAE Students

[Jan 6, 2025]

A briefing session for the students of ME Dept. (MEE first to final years, RAE first and second years) was conducted on the first working day of the semester. Dr. Rajeevlochana G. Chittawadigi (Vice-chair) covered the following topics:

- POs (Program Objectives)
- PSOs (Program Specific Objectives)
- PEOs (Program Educational Objectives)
- Mission and Vision of the Department
- Do's and Don'ts for Academic Performance Improvements
- Placement and Internship Related Information

The students also gave their feedback on a few aspects such as participation in co-curricular and extra-curricular activities, department level events, etc.

Amrita Nurture Hands-On Workshop on Robotics and Drones

[January 23- 25, 2025]

The Amrita Nurture "Hands-On Workshop on Robotics and drones to kindle interest on students." Session was organized from 23rd January 2025 to 25th January 2025 supported by the I-Hub Foundation for Cobotics (IHFC), IIT Delhi, as a part of "Skill training in the field of robotics, AI/ML, coding and other emerging technologies". This program was held for school students of Classes 9th and 10th and provided hands-on sessions and activities. The workshop inspired school children to explore robotics through hands-on training and learning sessions. Participants learned the basics of robotics and how to apply them in everyday life, nurturing innovation and creativity.

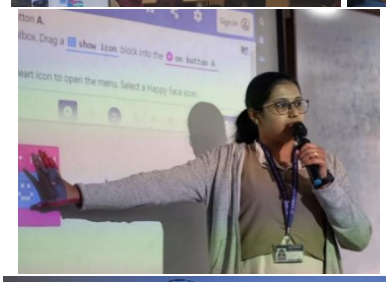
The event witnessed the enthusiastic participation of 142 students representing five schools:

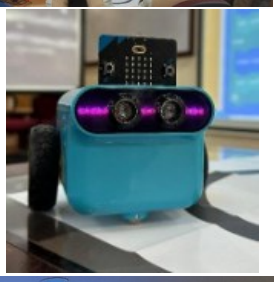
- Nityananda Swamy High School (Jigani, Anekal, Bengaluru Rural): 71 Students
- Renuka High School (Kaikondarahalli, Carmelaram, Bengaluru): 35 Students
- Kaveri Vidya Kshetram (Singasandra, Bengaluru): 14 Students
- Blue Bell Public School (Parappana Agrahara, Bengaluru): 6 Students
- Bangalore English High School (Parappana Agrahara, Bengaluru): 16 Students

The sessions organized were:

1. **Micro:bit and TPbot**

The micro:bit controller is an award-winning programmable device that allows students to get hands-on coding and digital making. TPBot is a smart coding car. It can be regarded as a toy for its preset functions that do not need a micro:bit, it can also be used as a teaching aid at the same time, you can code it via the micro:bit or make extensions for the other modules and the Lego bricks to develop children's imagination and creativity. Throughout the session, students had the opportunity to explore fundamental concepts of programming and robotics in an interactive environment.





2. Drone Assembly & Flying

The event began with an engaging presentation introducing students to drones, their components, and their real-world applications. The PPT covered: Basics of drone technology, Types of drones and their uses, Working principles and aerodynamics.

After the introduction, students were provided with drone kits to assemble. A live demonstration was conducted by the organizing team to guide them through the process. Volunteers actively assisted students in:

- Identifying and assembling drone parts
- Connecting motors, propellers, and electronic components
- Understanding battery connections and safety measures

Once assembled, students tested their drones under supervision.

3. RC car mania

The event was started with explaining the students about the working mechanism of a remote-control car. The usage of sensors was also explained. The PPT covered ,Basic working of a remote control car ,Different types of sensors used in a remote control car ,Hands on experience of controlling a remote control car.

After the introduction and explanation , students were given with a remote control car and were asked to go around the race track by following the rules and instructions given by the event coordinators.

The program successfully provided an engaging and enriching learning experience for school students, introducing them to the exciting world of robotics and drones. By hosting the event at our college, we aimed to bridge the gap between theoretical knowledge and hands-on application, fostering curiosity and innovation among young minds.

The Robotics Society – Student Chapter Inauguration

[March 12, 2025]

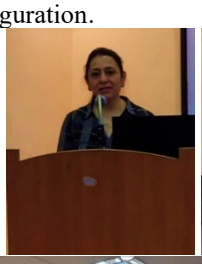
The Robotics Society (TRS) Student Chapter at Amrita Vishwa Vidyapeetham, Bengaluru was successfully inaugurated on March 12, 2025. The inauguration ceremony was graced by distinguished guest, Dr. Ekta Singla (IIT Ropar), Secretary, The Robotics Society.

Dr. Ekta Singla delivered an inaugural talk on "Overview of TRS and Robotics Activities at IIT Ropar" from 4:00 PM to 5:30 PM, highlighting the importance of robotics education and research in today's technological landscape. She also emphasised on how this student chapter brings exposure and connections to the students and the faculty.

Dr. Sriram Devanathan (Principal, Amrita School of Engineering) emphasized on the importance of fundamental knowledge in the individual domains of Mechanical Engineering, Electrical and Electronics Engineering, Computing and AI, to develop a robotic system.

Dr. Rajeevlochana G. Chittawadigi (TRS Student Activity Coordinator) gave a brief overview of all avenues which the student community can utilize to improve their employability, pursue higher education and also to become an entrepreneur.

Dr. Prashanth B. N. (Faculty Coordinator of TRS Student Chapter, Amrita Bengaluru) thanked all the dignitaries and students and gave an overview of the Hackathon that followed after the Inauguration.



The Robotics Society – Student Chapter Overnight Hackathon

[March 12, 2025]

The inauguration ceremony was followed by "RoboHack", an overnight hackathon event, providing students with a platform to showcase their innovation and problem-solving skills in robotics. Hackathon commenced at 6:00 PM, where registered participants formed teams to develop innovative robotics solutions.

This hackathon was open to all branches, attracting a diverse group of participants. In total,14 teams were formed comprising 49 participants. The registration fee for the hackathon was Rs.300 for TRS members and Rs.500 for non-TRS members.

Additionally, the event was supported by 7 dedicated volunteers and 4 student organizers who helped coordinate and provide guidance throughout the competition.

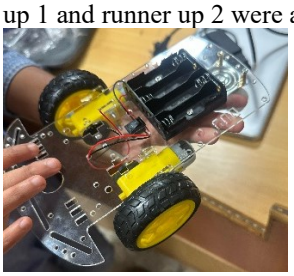
The following sessions were conducted:

- Python turtle programming by Dr. Rajeevlochana
- TPBot demo and hands-on session by Bahula M[RAE, 2nd year], Nihaarika H[RAE, 2nd year] and Haiagreva P[ELC, 2nd year].
- Arduino programming and motor drive session by Dr. Vishnu Raj K and Ms. Arya R.

Different stages of the hackathon:

- Stage 1: Assembly of the bot
- Stage 2: Obstacle avoidance bot
- Stage 3: Line follower bot

The winners were awarded cash prize of Rs.1000 and runner up 1 and runner up 2 were awarded cash prize of Rs.750.





Drone Assembly & Flying – AAROHAN'25

[January 17-18, 2025]

We believe in nurturing curiosity and encouraging children to dream big, which is why we organized a drone workshop at Amrita Vishwa Vidyapeetham CAD/CAE Lab. With this initiative, we aim to introduce students to the exciting world of drone technology and spark their interest in innovation, hands-on learning and practical applications.

The event began with a warm introduction by our Club OBS, who highlighted the club's annual activities and its focus on innovation, particularly in the field of drones. They provided an insightful overview of automation and how drone technology is impacting various sectors. This was followed by an engaging session that explored the diverse applications and potential of drones in various industries. The session sparked the students' interest in drone technology.

The Drone Workshop at the CAD/CAE Lab, Amrita Vishwa Vidyapeetham, was designed to provide students with an immersive learning experience in drone technology. The event was structured into three key phases:

1. **Introduction to Drones** – We began with an interactive session explaining the fundamentals of drones, including their working principles, components, applications, and significance in various industries.

2**. Drone Assembly** – To enhance practical understanding, students were provided with drone kits and guided through the assembly process, helping them grasp the mechanics and engineering behind drone construction.



3. **Hands-on Flying Experience** – The final phase took students to a designated flying area, where they had the opportunity to pilot the assembled drones under executives and OB'S supervision, gaining real-time experience in drone operation and control. The workshop successfully sparked curiosity and enthusiasm among participants, giving them valuable insights into drone technology and its real-world applications.

The Drone Workshop during Aarohan at Amrita Vishwa Vidyapeetham, hosted by JIDO - the Industrial Automation Club, saw over 180 students participate. It offered hands-on experience in drone assembly, and flight, guided by the club's executives and volunteers, fostering collaboration and skill development in Drone technology.

ADIOS MAYORES: Farewell 2025

[April 17, 2025]

The farewell event **"ADIOS MAYORES"**, organized by the Department of Mechanical Engineering, was an unforgettable celebration held in honor of the graduating batch of 2021–2025. The occasion was a perfect blend of emotions, capturing the joy of achievements, the sadness of goodbyes, and the warmth of shared memories. As the seniors prepared to step into a new chapter of life, this event stood as a tribute to their remarkable journey over the past four years. It was a time to look back at the laughter in the labs, the challenges in the classrooms, the endless cups of chai during project work, and the strong friendships that were built amidst assignments, workshops, and exams. The atmosphere was filled with bittersweet emotions as juniors, faculty, and seniors gathered not just to say goodbye, but to celebrate every moment that made their time in college memorable.

Installation of Tungsten Inert Gas (TIG) and Metal Inert Gas (MIG) Welding machines

[March 26, 2025]

Tungsten Inert Gas (TIG) and Metal Inert Gas (MIG) welding machines have been procured and installed by the department to enable the students get hands-on experience to industrial welding practices and enhance their knowledge in welding.

National Board for Accreditation (NBA)

The Department of Mechanical Engineering is pleased to share the good news of successful completion of the NBA Compliance Review, as a result of which the department has received an extension of NBA Accreditation for an additional three years for B.Tech. MEE till June 2028.

Industrial Visit - IMTEX

[January 27, 2025]

At JIDO, we believe in providing hands-on exposure to the latest advancements in technology and automation. As part of our initiative to bridge the gap between academia and industry, we organized a visit to IMTEX 2025—India's premier metal cutting and manufacturing technology exhibition. The objective of the visit was to explore cutting-edge industrial automation technologies, understand industry trends, and observe innovations from leading companies.

Our visit to IMTEX 2025 was aimed at broadening our knowledge of the latest advancements in industrial automation, CNC machinery, and smart manufacturing solutions. The exhibition provided an excellent platform for students to witness real-world applications of automation and gain insights into the future of manufacturing.

During the visit, we explored exhibits from leading companies, gaining valuable insights into their innovative solutions:

1. **Makino India:**

Makino is a leading CNC machine tool manufacturer known for high-precision machining solutions. At IMTEX, they showcased:

• Advanced 5-axis CNC milling machines
• High-speed machining centres for aerospace and automotive applications
• Smart automation solutions integrating robotics for enhanced efficiency.

2. **Electronica Mechatronic Systems**

Electronica Mechatronics specializes in metrology and precision measurement systems. Their exhibition included:

• Digital readouts (DRO) for precision measurement
• Laser-based calibration systems for industrial machinery
• Smart encoders enhancing accuracy in CNC operations

3. **Hexagon Manufacturing Intelligence Hexagon** is a global leader in digital reality solutions, combining sensor, software, and autonomous technologies. At IMTEX, they presented:

• Coordinate Measuring Machines (CMM) for precise industrial measurements
• Smart factory solutions with real-time data analytics and AI-driven insights
• Advanced simulation software for optimizing manufacturing processes

4. **Exploring Automation and Smart Manufacturing**: Apart from company-specific exhibits, we observed various industrial advancements, including:

• Artificial Intelligence in Manufacturing: AI-driven quality control and predictive maintenance solutions.
• Additive Manufacturing: Latest developments in 3D printing for industrial applications.
• Robotic Automation: Integration of collaborative robots (cobots) in factory automation.

The visit provided an invaluable opportunity to witness the latest industrial innovations firsthand. Observing real-world automation applications deepened our understanding of theoretical concepts and sparked curiosity about careers in manufacturing and automation technology.

IMTEX 2025 was an enriching experience, offering a glimpse into the future of industrial automation. We extend our gratitude to the organizers and participating companies for providing insights into the evolving landscape of manufacturing technology. This visit reinforced our club's mission of fostering technological curiosity and innovation among students. We look forward to more such industrial visits in the future.

Faculty Corner

Amrita Innovation & Research Awards (AIRA) @Amritapuri and Bengaluru 2025

[April 2025]

The following faculty received the Chancellor's Publication Excellence Award at the Amrita Innovation & Research Awards (AIRA) 2025, in recognition of their publication and project achievements for the years 2023/2024.

- Dr. Sriram Devanathan
- Dr. Rajeevlochana G. Chittawadigi
- Dr. Pramod R.
- Dr. Shashi Kumar M. E.
- Dr. Dileep B. P.
- Dr. Mohan Kumar S.
- Dr. Pradeep S. Jakkareddy
- Dr. Y. P. Deepthi
- Mr. S. Bhanu Prakash

Grant of AICTE IDEA Lab to Amrita Bengaluru

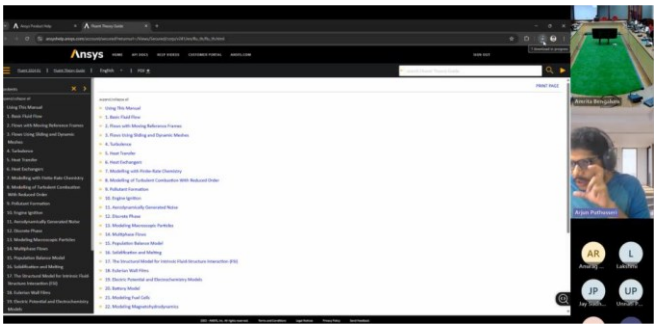
Dr. Rajeevlochana G. Chittawadigi was nominated as the Coordinator for the newly granted AICTE IDEA Lab for Amrita Bengaluru. Dr. Rajeevlochana and Dr. Vivek Venugopal (ECE Dept.) attended a kick-off event at AICTE Head Quarters on March 7, 2025, as a part of AICTE IDEA Lab Tech Fest 2025.

Two more campuses of Amrita (Coimbatore and Chennai) also have been granted and its coordinators also participated. A photograph with Dr. Siddalinga Swamy of AICTE can be seen.

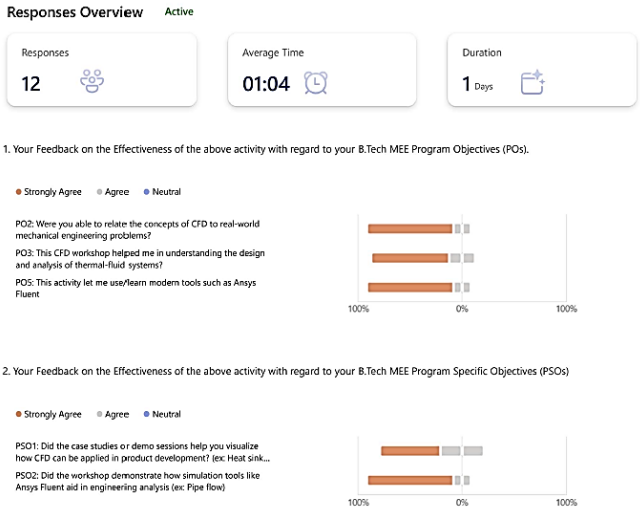
One-Day Online Workshop on Computational Fluid Dynamics in Energy Systems: Fundamentals and Applications

[April 5, 2025]

The Department of Mechanical Engineering, in collaboration with the Defence Institute of Advanced Technology (DIAT), DRDO, Pune organised a workshop to S6 ME students to provide a foundational understanding of CFD, ANSYS Fluent and practical applications in thermal engineering. The event included interactive sessions led by experts from academia and industry. Dr. Prashant S. Kulkarni, Director, SEES (DIAT), Dr. Sriram D., Chairman and Dr. Rajeevlochana C. Vice Chair, Dept of Mech Engg. ASE-B provided support in organizing the program, Dr. Pradeep S. Jakkareddy, Assistant Professor, ASE-B and Dr. Rahul Yadav DIAT, DRDO was the convenor of the event, and Dr. Mohan Kumar S., Faculty Mentor-Ingenium, facilitated the workshop.



Impact Analysis of the CFD workshop



AICTE IDEA Lab FDP

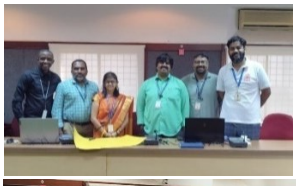
[March 17-21, 2025]

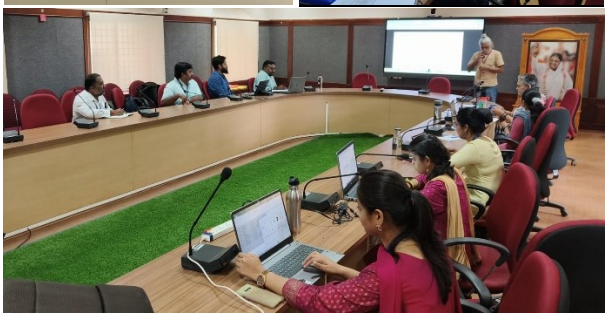
Dr. Rajeevlochana G. Chittawadigi participated in the Faculty Development Program (FDP) organized by AICTE for the Coordinators of the newly granted AICTE IDEA Labs. It was held over five days at VTU Research Center in Muddenahalli (Chikkaballapur) where technical sessions and hands-on training on Laser Cutting, 3D Printing, IOT systems, etc. was provided. The FDP also provided inputs on initial planning for the setup of IDEA Lab in Amrita Bengaluru.

Two-day faculty workshop on Live-in-Labs

[April 10-11, 2025]

The Live-in-Labs team from Amritapuri conducted a two-day workshop for faculty members from the Bengaluru campus who had opted for the Live-in-Labs course. The workshop aimed to train faculty to effectively facilitate the Live-in-Labs-1 course. Key modules included orientation, experiential learning, Participatory Rural Appraisal (PRA) tools, synthesis methods, and Human-Centered Design (HCD) tools. Dr. Pramod R. and Ms. Divya Sharma S. G. represented the department of ME.





Publications

The department faculty has immersed themselves into research work apart from their teaching capabilities. They publish articles in reputed journals and conferences that are indexed in Scopus/WoS. A total of 09 Journal articles and 10 Conference papers are published between Jan and June 2025 and the same shall be updated in the list of publications for Academic Year 2025 (in the next edition of the magazine).

Staff Corner

The non-teaching staff of the department contributed in several ways in addition to their conventional lab related load. Some of them are listed below:

- Helping student teams working on GKDC (Go-Kart)
- Assisting faculty in the conduct of sponsored research projects
- Mr. Lakshmi Narayana contributed in Honeywell project (PI: Dr. Pradeep S. Jakkareddy)
- Mr. Dharmendra T. S. and Mr. Lakshmi Narayana helped in the conduct of IHFC (IIT Delhi) Nurture Training Program on Robotics and Drone for School Children.

Students' Corner

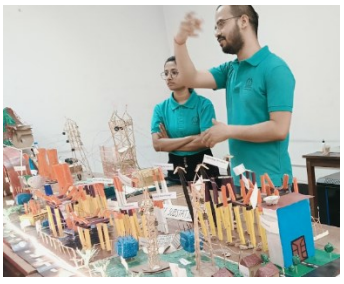
Open Day Visit to Indian Institute of Science (IISc), Bengaluru

[March 1, 2025]

The visit to IISc provided students with hands-on exposure to advanced scientific research and cutting-edge technologies across various departments. They explored fields like supercomputing, aerospace engineering, mechanical systems, and renewable energy through live demonstrations and expert interactions. The experience deepened their understanding of real-world scientific applications and inspired curiosity in interdisciplinary research. Students gained valuable insights into practical uses of science and technology, motivating them to pursue innovative academic and professional paths. The IISc Open Day served as a unique platform for learning, discovery, and inspiration.





Tech Talk on applications of Additive Manufacturing

[March 20, 2025]

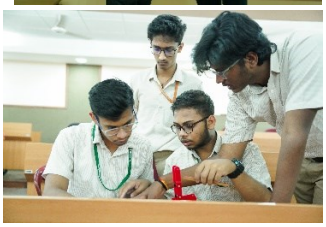
JIDO – The Industrial Automation Club and The Robotics Society at Amrita Vishwa Vidyapeetham, Bengaluru, organized an industrial talk on "Applications of Additive

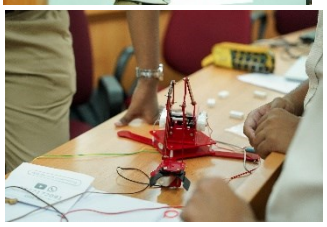
Manufacturing" by Mr. Mariappan from Honeywell. The session highlighted cutting-edge uses of 3D printing in the aerospace industry, covering trends, types, challenges, and sustainability. Mr. Mariappan shared real-world insights from his 20+ years of experience. The talk helped students understand rapid prototyping, industrial applications, and required skills. It also provided networking and career exploration opportunities in advanced manufacturing.

Automaze – A journey into the Future of Automation

[April 15, 2025]

Automaze, the flagship event of JIDO – The Industrial Automation Club, brought together 27 teams for a thrilling, futuristic automation challenge. The day began with a traditional lamp-lighting ceremony and featured core events like an Arduino Hackathon, robotic arm assembly, gesture and remote-controlled car races, and a drone navigation challenge. A highlight was the Tech Talk by Mr. Muralidharan of RP3D, offering insights into cutting-edge 3D printing technologies. His inspiring journey and industry knowledge captivated the audience. With a prize pool of ₹9500, Automaze blended innovation, competition, and teamwork, making it one of the club's most dynamic events.





RC Car Mania

[January 17-18, 2025]

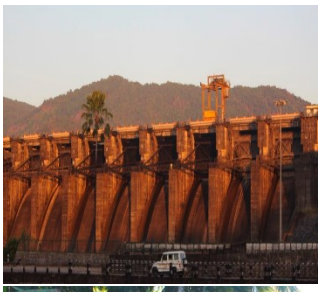
The SAE Club successfully organized RC Car Mania to introduce secondary school students to remote-controlled car racing, blending excitement with technical learning. The event featured timed lap races, where student's maneuvered RC cars, showcasing precision driving.

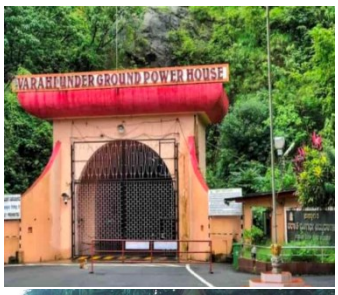
SAE Club managed registration, briefings, and practice runs. They organized races and awarded winners, fostering confidence and educating participants on the technical aspects of RC cars, including the advantages and disadvantages, aiming to provide engaging, educational experiences for young enthusiasts.

Industrial Visit to Varahi Hydro Electric Power Plant and Kaiga Nuclear Power Plant

[January 23-26 ,2025]

The students of S4 and S6 ME and S4 RAE visited Varahi Hydroelectric and Kaiga Nuclear Power Plants to gain practical insights into power generation. The trip blended technical exposure with fun-filled activities in Murudeshwar and Dandeli, enhancing engineering understanding, teamwork, and providing a memorable, well-rounded learning experience for all participants.





Student Delegates to IMTEX 2025

[January 27-28, 2025]

Poojitha and Kadiyala Bhargavaram of S6 ME, participated in IMTEX 2025 as part of the IMTMA's JAGRUTI program. Over two days, they explored the latest advancements in manufacturing technologies at BIEC, including CNC machining, robotics, automation, and additive manufacturing. Guided by the event team, they visited leading companies such as DMG MORI, Mazak, Zoller, and Hiwin, witnessing live demonstrations and gaining insights into Industry 4.0, smart manufacturing, and sustainable practices. The experience enriched their understanding of current trends and the future of the manufacturing sector.

Go-kart Design Challenge Season 12

[February 17-24, 2025]

The Go Kart Design Challenge (GKDC), organized by ISNEE Motorsports, allows engineering students to design, build, and test go-karts, fostering creativity and teamwork. It challenges participants to meet high standards for performance and durability.

Team ‘VEGAM” consisting of 31 student members from SAEINDIA Collegiate Club, Amrita School of Engineering, Bengaluru participated in 12th season of GKDC Go-Kart competition. This event was conducted by ISNEE Motorsports at Kari Motor Speedway Coimbatore from 19th February to 23rd February 2025. Team was mentored by Mr. Vinod Kotebavi.

Industrial Visit – Honeywell

[March 26, 2025]

The industrial visit to Honeywell's Additive Manufacturing Lab on March 26, 2025, provided B.Tech and M.Tech students with an in-depth look at advanced manufacturing technologies. The visit included demonstrations of laser-based processes using materials like Inconel and steel, highlighting design optimization, rapid prototyping, and automation in creating high-strength components. Students learned about material preparation, laser fusion technology, post-production processing, and quality inspection, reinforcing concepts from their Additive Manufacturing elective.

Industrial Visit – Venkateshwara Laser Cutting Facility

[April 4,2025]

As part of the academic curriculum for the subject Manufacturing Process II, students visited Sri Venkateshwara Laser Cutting, a facility specializing in precision laser cutting services in Sarjapura, Bangalore. During the visit, students were given a guided tour of the facility where they observed high-precision laser cutting machines in operation. The staff demonstrated how Computer-Aided Design (CAD) files are used to program the laser cutter, which then cuts mild steel sheets into various complex shapes with high accuracy. They also gained valuable insights into safety protocols followed in the workshop. This visit helped them to bridge the gap between theoretical knowledge and practical applications in the field of Advanced Manufacturing processes.

Industrial Visit – Toyota Kirsloskar Motors, Bidadi

[April 7, 2025]

Students of the mechanical department were taken to The Toyota Kirloskar industry in Bidadi Karnataka near Bengaluru. During the visit, the students were given a brief introductory session about the industry. The facility has 3 Manufacturing plants in which students visited one where models like the Fortuner, Innova and Hycross are manufactured. The students were explained about all the assembly stages and were given a tour of the plant. After visiting the students went to the Eco-zone which consists of 17 theme parks and few forests which they have grown to boost sustainable development in their industry. This visit helped them gain valuable insights into the manufacturing process of Automobiles and the importance of sustainable Industrial practices.

FKDC Workshop

April 12, 2025

Fraternity of Mechanical and Automotive Engineers (FMAE) in association with SAEINDIA collegiate club and Department of Mechanical Engineering, Amrita School of Engineering, Bangalore conducted one-day workshop on Go-Kart on 12th April-2025. Mr. Vinod Kotebavi and Dr.Dileep BP co-ordinated the workshop. The students gained deep insights into the design aspects of Go-karts through this workshop. A total of 157 students from southern India participated in this workshop.

Students' Achievements

Athletics: Lavanya Velusamy, S4 ME, was awarded the Women's Athletics Individual Championship 2025 for securing **first place** in the following events:

- 200 meters running race
- 400 meters running race
- High Jump

Marchpast: The ME and RAE students won the First place in the March Past during the 21st Annual Sports Meet on 15 Feb, 2025.

Inter-departmental Yoga Competition: The students of the ME and EEE departments bagged second place in Inter-departmental Yoga competition held on April 9, 2025

Parent's Point of View

Mr. Biju Chembil
Product Marketing Head
Altronix
(Parent of Ms. Anusree B. S4 RAE)

Article Title: Emerging Trends in Railway Engineering: A Call to Future Mechanical Engineers

The Indian railway industry is undergoing a significant transformation, driven by an emphasis on passenger safety, operational efficiency, and cutting-edge innovation. Thanks to the Indian government's forward-thinking policies and stringent railway standards, the industry is now evolving into a hub of technological excellence.

At the heart of this transformation is the **Research Designs and Standards Organisation (RDSO)** under the **Ministry of Railways**, which monitors and regulates the adoption of advanced technologies in locomotives and related systems. Public sector giants like **ICF, RCF, CLW, BEML** and private players such as **Medha Servo, ABB, Alstom, Siemens**, and **Crompton Greaves** are consistently upgrading their systems and manufacturing processes. From MEMU to EMU configurations, including the latest **Vande Bharat trains**, India's railway ecosystem is shifting toward high-performance, safer, and more reliable transport modes.

This evolution involves a symphony of mechanical and electronics engineering. Innovations are increasingly integrated into systems like:

- Traction and Propulsion Systems
- VCU & TCMS (Vehicle Control and Train Management Systems)
- TCAS (Train Collision Avoidance System)
- BCU (Brake Control Units)
- Fire Suppression and Door Control Units
- Communication and HVAC Systems
- Generator and Compactor Units
- PIS (Passenger Information Systems)

Each of these systems exemplifies the importance of interdisciplinary knowledge. For instance, many devices now comply with **SIL-2 (Safety Integrity Level)** and **HL1–HL3 (Hazard Level)** classifications to enhance safety standards and reduce risks during unforeseen incidents.

Mechanical engineering students must realize that the core industry is no longer limited to static machines or conventional roles. Today, robotics, automation, and system integration are integral to modern railway manufacturing. Robots are now being widely used for welding, assembling, and ensuring dimensional accuracy and consistency in large-scale production directly contributing to quality and defect minimization.

Moreover, the growth of the railway sector offers significant employment potential and an exciting landscape for young engineers to explore their skills in design, analysis, manufacturing, and systems integration. There is a rising demand for professionals who can bridge the gap between mechanical and electronic systems, proving the value of an interdisciplinary approach in engineering education.

A Message to Students

As parents and industry professionals, we urge our aspiring mechanical engineers to embrace the challenges and opportunities offered by the core sectors. The future of transportation is not only fast and smart it is *mechanically brilliant*. Rather than confining aspirations to routine software roles, students should consider the exciting possibilities in railway technology, automation, and system design. This is where the nation needs bright minds and where your passion for engineering can truly make a difference.

International Affairs

Visit by Dr. Ramana Vinjamuri (UMBC, USA)

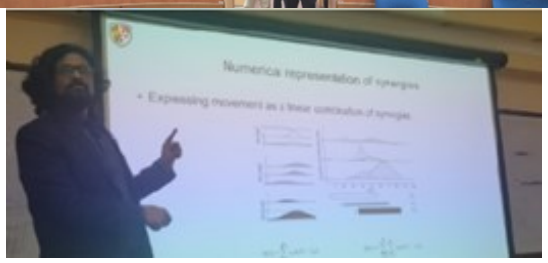
[Jan 24, 2025]

Dr. Ramama Vinjamuri is an Associate Professor of Computer Science and Electrical Engineering at University of Maryland, Baltimore County (UMBC), USA. He visited Amrita Bengaluru campus on Jan 24 (Fri), 2025, and the following is the summary of his visit:

1. Amrita-Nurture: Dr. Vinjamuri interacted with the school children (around 150) participating in Amrita-Nurture Workshop on Robotics and Drones, supported by IHFC (I-Hub Foundation for Cobotics), IIT Delhi. He addressed the students by introducing them to bio-robotics through videos and illustrations. He ended the session by giving tips on the importance of good qualities in students and youth.

2. Interaction with Leadership of Amrita Bengaluru: Dr. Vinjamuri interacted with Dr. Manoj (Director, Amrita Bengaluru and Dean, School of Business) and Dr. E. A. Gopalakrishnan (Principal, Schools of Computing and AI). Dr. Manoj gave an overview of the vision and mission of the University and emphasized the collaborations that are already existing with several universities worldwide. Dr. Ramana expressed interest in such a partnership with UMBC and both sides agreed to explore MoU at the earliest possible.

3. IIC Event: Dr. Vinjamuri addressed the students of RAE 2nd Semester, AI-DS 4th Semester, and other interested students and faculty on the topic "Emerging Frontiers in Human-Robot Collaboration". He gave an overview of different aspects of Bio-robotics and how their team is trying to solve the problem of controlling robots by tapping signals from brain. The session was organized by IIC (Institution's Innovation Council) and the Department of Mechanical Engineering to enhance knowledge of Amrita Students.



Talk by Mr. Sai Shiva Jampala (Director in Logistics & Change in Management, Locus, Dallas, USA)

[Feb 17, 2025]

Mr. Sai Shiva Jampala, Director at Locus (USA), focused on building a dynamic career in logistics and change management. He shared his global professional journey, highlighting the importance of adaptability, continuous learning, and leadership in a rapidly evolving industry. His insights provided students with a broader understanding of international career opportunities and the skills required to thrive in a global work environment.

Industry-Academia Partnership

Industry Conclave

[April 26, 2025]

As a kick-start to the AICTE IDEA Lab setup and to streamline the industry-academia activities, Industry Conclave was conducted by Amrita Bengaluru campus on April 26, 2025. More than 50 participants from 30+ industries/organizations interacted with over 50 faculty and researchers from Amrita.

The daylong event consisted of an Overview of the AICTE IDEA Lab at Amrita, followed by cluster-level meetings where industry personnel and faculty deliberated on different problems they are facing and how they can be overcome, using the Four-Blocker Method. The application clusters were:

- Robotics and Automation
- Automotive Systems and E-Mobility
- Sustainable Energy
- Biomedical and Healthcare
- Advanced Materials and Manufacturing
- IoT and Wearables
- Advanced Communication and Navigation
- Edutech
- Cloud Computing

The faculty members of ME Dept. participated actively in the proceedings and established a few key collaborations with the industries.

Festo's Plant Inauguration

[June 6, 2025]

Festo, a world-renowned name in the automation industry inaugurated Festo India's Global Production Centre (GPC) near Hosur (Krishnagiri district) and the celebrated Festo's remarkable 100 years journey of innovation. Dr. Rajeevlochana G. Chittawadigi and Dr. Dileep B. P. (along with Dr. Nippun Kumaar A. A. of CSE) were invited to represent academic partners of Festo, as a follow up of Industry Conclave at Amrita Bengaluru.

Ongoing Projects in the Department

Project SVR-1: "Integration of AMoRA (Amrita Modular Robotic Arm) with RoboAnalyzer® for Effective Robotics Education"
Project Investigator: Dr. Rajeevlochana G. Chittawadigi
Funding: Rs. 8,43,700
Collaborator: SVR Infotech, Pune
Duration: May 2023 to April 2025.

Project alfaTKG-A1: "Motion Planning of an Industrial Robot to Perform Welding in a CAD Environment"
Project Investigator: Dr. Rajeevlochana G. Chittawadigi
Funding: Rs. 9,40,000
Collaborator: alfaTKG Technology India Services Pvt Ltd, Chennai
Duration: June 2023 to March 2025.

Project alfaTKG-B1: "Further Development of a Software Library to Convert Orthographic Views to a 3D Model for AutoPilot3D"
Project Investigator: Dr. Rajeevlochana G. Chittawadigi
Funding: Rs. 14,75,000
Collaborator: alfaTKG Technology India Services Pvt Ltd, Chennai / alfaTKG Co. Ltd., Tokyo, Japan
Duration: March 2024 to April 2025 (extended upto 3 years).

Project Orangewood-1: "Setting up of Amrita-Orangewood Collaborative Robotics Lab"
Project Investigator: Dr. Rajeevlochana G. Chittawadigi
Project Co-investigator: Dr. Nippun Kumaar A. A.
Funding: Rs. 16,00,000
Collaborator: Orangewood Labs, Noida
Duration: Feb 2024 to January 2029.

Project Honeywell-1: "Experimental investigations on characterization of pumps provided by Ms. Honeywell"
Project Investigator: Dr. Pradeep S. Jakkareddy
Project Co-investigator: Mr. Vinod M. Kotebavi
Funding: Rs. 3,41,680
Duration: November 2024 to March 2025.

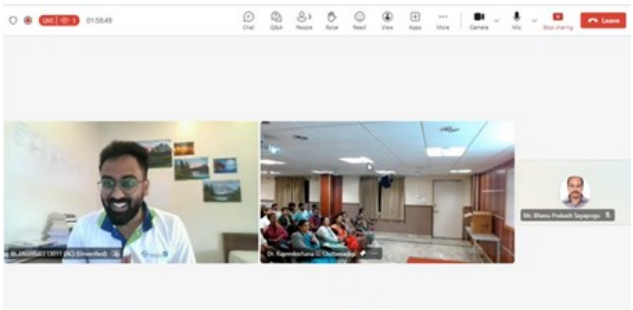
Project Honeywell-2: "Experimental investigations of filmwise and dropwise condensation on the material provided by Ms. Honeywell"
Project Investigator: Dr. Pradeep S. Jakkareddy
Funding: Rs. 73,100
Duration: November 2024 to February 2025

Alumni Corner

Annual Alumni Meet 2025

[January 18, 2025]

The Annual Alumni Meet 2025 (hybrid mode) was successfully hosted at Amrita Vishwa Vidyapeetham (AVV), Bengaluru campus. The event served as a platform for alumni to reconnect with the institution and their peers while contributing to the department's growth and development.



The alumni shared their experiences and insights, highlighting their willingness to assist the department and current students in various capacities.

A key highlight of the event was the "Innovation in Alumni Meet-2025," which connected alumni and current students to celebrate achievements and share knowledge. The department showcased recent innovations, including advancements in robotics. Notably, the Rover project stood out as a testament to the department's commitment to excellence. Moving forward, such events will continue to bridge the gap between alumni and the institution, creating a thriving ecosystem for mutual growth and innovation.

Alumni Talk(s)

Talk by Mr. Charles Antony, Co-founder (STEM Smart Labs Pvt. Ltd.)

[January 23, 2025]

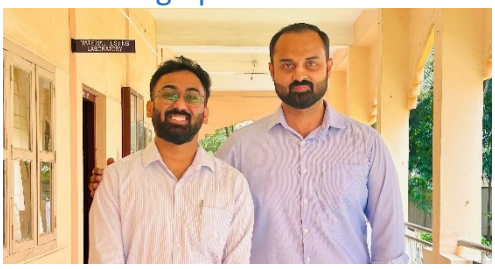
Mr. Charles Antony, Co-founder of STEM Smart Labs, delivered an engaging session on entrepreneurship. He spoke about his journey of starting his own venture, the challenges he faced, and the lessons he learned along the way. His talk encouraged students to explore innovative ideas and consider entrepreneurial paths in their careers.

Talk by Mr. Thejas S. S. and Sai Vikas M.

[April 1, 2025]

Mr. Thejas (completed Masters in Robotics from Univ. of Twente, The Netherlands) and Mr. Sai Vikas Maram (working in alfaTKG Japan/India in Smart Manufacturing) , both alumni of 2016-20 batch of MEE program, interacted with the students of S4 RAE and gave inputs on how to pace their academic journey. They also shared what types of internships they had undergone during their time at Amrita and encouraged the students to engage in learning beyond the classrooms too.

Catching up with our Alumni



Ankur Choudhary (alumnus of class 2017)

Sai Shiva Jampala (alumnus of class 2015)

Laksheeth (alumnus of class 2021)

Innovation in Teaching and Learning

Industry Visit to Augment Course

The students of 4S MEE visited SVRS Laser Cutting and Roofing Industry as a supporting activity for the course 23MEE212 Manufacturing Process. The purpose of the visit was to provide an opportunity to witness manufacturing techniques first hand. Students could see the facility and interacted with the working professionals out there and got a deeper understanding about the processes such as laser cutting, bending, rolling and pressing machines.

Course Projects for Experiential Learning

Amrita University encourages its students to take up course projects so that they can "Learn-by-Doing", i.e., through Experiential Learning. A few courses have an end-semester project as evaluation instead of a pen-and-paper written exams. This allows the students to learn deep into the aspects of such courses and develop a functional prototype. A few such projects carried out this semester are reported below:

Project 1: G-Bot

Team: Anirudh A C, Ruthvik Sai Kumar L, K Uday Kiran, Prasanna R, Bahula M, Marumukham Prasad, Kshitish M
Class: S4 RAE

The G-Bot is a compact 3RRS parallel manipulator designed for ball balancing and gesture mimicking. It uses three identical arms, each with a motorized revolute joint, a passive revolute joint, and a passive spherical joint, to control a 3-DOF platform. Real-time feedback from IMUs or vision systems enables precise orientation adjustments. Its high stiffness and responsive motion make it ideal for dynamic, interactive tasks.

YouTube Video:
https://www.youtube.com/watch?v=746wwyVn6-0

Project 2: Robotic chess-playing system

Team: Nandhith Karthikeyan, Dinesh Challagolla, Pasupuleti Satvik
Class: S4 RAE

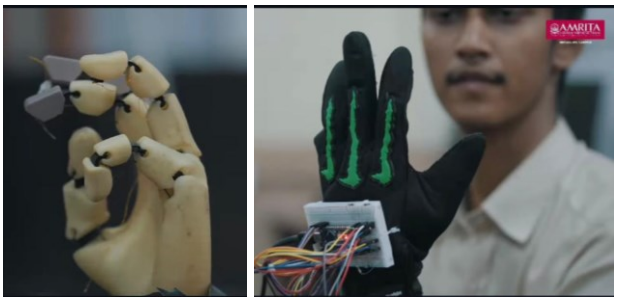
A low-cost, accessible robotic chess-playing system that provides an immersive physical playing experience. Unlike traditional bulky robotic arms or expensive sensor-embedded boards, it uses a planar five-bar mechanism with an electromagnet-based end-effector to grip and move pieces precisely. An Arduino microcontroller with a PCA motor

driver controls the robot, while a camera-based vision system detects human moves by monitoring board state changes. By using an existing chess AI framework like Stockfish, the player can play with an intelligent opponent, and the robot's adjustable difficulty allows players to progressively improve their skills.

YouTube Video:
https://www.youtube.com/watch?v=Bcdw6fR45XM

Project 3: 3D-printed Robotic Hand

Team: Sanskar Deopuje, Dhruva Korla, Anusree B
Class: S4 RAE

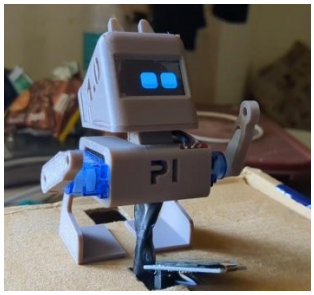


This smart assistive device operates through a transmitter-receiver setup. The transmitter glove, equipped with five flex sensors and an RF module, captures hand movements and wirelessly transmits them to a 3D-printed robotic hand.

YouTube Video:
https://www.youtube.com/watch?v=rb2T8uDMYCI

Project 4: Desk Companion Bot

Team: Anandan babu, Venkat rami Reddy, Vursha ramesh
Class: S4 RAE



The desk companion bot is an interactive robotic assistant designed to enhance user engagement and productivity. It features a circular display capable of showing expressive emojis to indicate status or responses. The bot supports voice interaction, basic task management, and customizable feedback. Its compact form factor and intuitive interface make it suitable for both personal and professional workspaces.

YouTube Video:
https://www.youtube.com/watch?v=YRVjmtBvb8g

Co-Teaching by Orangewood Labs

[Feb 1, 2025]

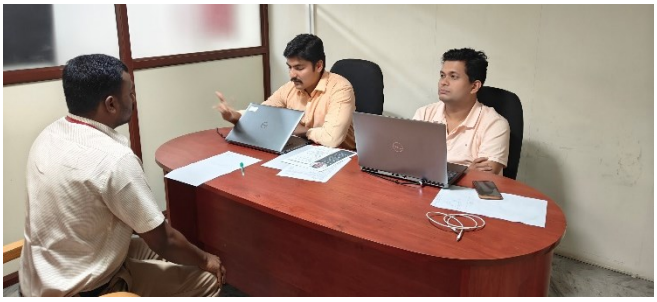
Amrita and Orangewood Labs have an MoU and an ongoing project on "Setting up of Collaborative Robotics Lab" and as a part of that, the Orangewood team lead by Mr. Sathish A. V. addressed S4 RAE students. This was done as a part of co-teaching of 23RAI211: Kinematics of Robotic Systems course (taught by Dr. Rajeevlochana G. Chittawadigi).

The Orangewood team gave an overview of their 6-axis robotic manipulator and also gave a demonstration of the robotic arm. The students got a first-hand experience of a robotics company from India.

Preparing Students for a Bright Future

Mock Interview Session by Alumni

[April 5, 2025]



Mr. Kavin Prasad and Mr. Dipayan Bannerjee, esteemed alumni from the 2016 batch of the Department of Mechanical Engineering, conducted a mock interview session for the S6 ME students. The session was aimed at helping students prepare for industry requirements and expectations.

Both alumni are currently working in the design domain, with Mr. Dipayan Bannerjee serving at Altair and Mr. Kavin Prasad at WSP. Their rich professional experience and domain expertise provided valuable guidance to the students. Through the mock interviews, students were able to evaluate their preparedness, identify areas for improvement, and gain critical insights into their technical knowledge and interview readiness.

The department expresses sincere gratitude to the alumni for their continued support and commitment to mentoring the next generation of engineers.

B.Tech Program Objectives (POs)

[As mandated by AICTE/NBA]

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 modeling to complex engineering activities with an understanding of the limitations.

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, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: 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 at large, 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 Educational Objectives (PEOs)

[Formulated by the ME Dept.]

PEO1: Apply their Knowledge in Science, Mathematics and Engineering to **address Industrial and Societal problems** with a strong emphasis on creativity, confidence, ethics, and responsibility.

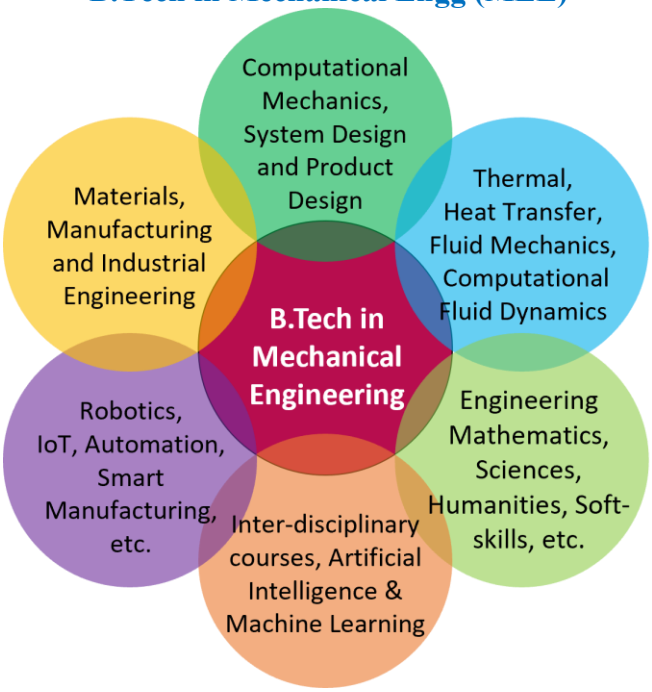
PEO2: Apply latest **computational, analytical, simulation tools** and techniques to develop and improve products and processes.

PEO3: Solve **multidisciplinary** problems by working in cross functional teams.

PEO4: Develop and upgrade technical, intellectual, and emotional **skills for life-long learning** to compete in a rapidly evolving world.

PEO5: Nurture **entrepreneurial** ventures and **foster research** activities that support **sustainable** economic development to enhance the quality of life.

B.Tech in Mechanical Engg (MEE)



Program Specific Objectives (PSOs - MEE)

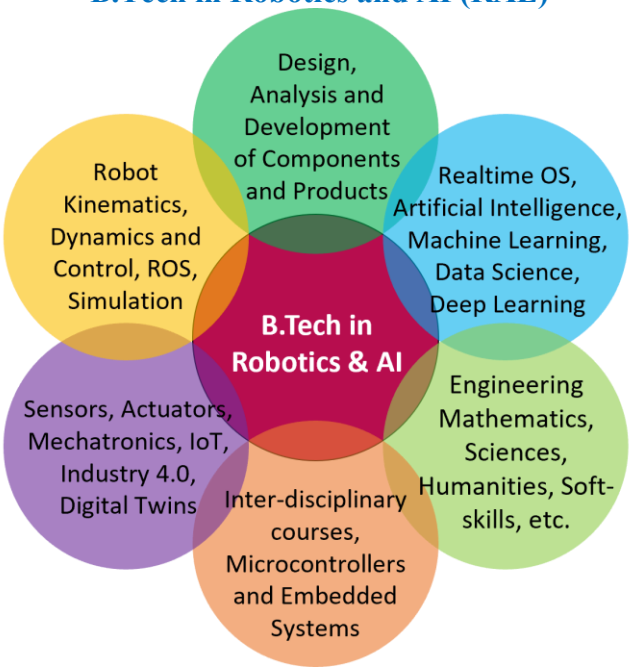
PSO1 (MEE): Apply knowledge acquired in the field of **Design, Manufacturing, Thermal, and Fluid sciences** to solve real-world engineering problems using emerging technologies.

PSO2 (MEE): Extend and implement **innovative** thinking on **product design and development** with the aid of modern tools.

PSO3 (MEE): Apply the Science and Engineering knowledge for advanced materials design and processing for development **of sustainable solutions** and improvement of products and processes.

PSO4 (MEE): Augment the acquired domain knowledge with **AI and Computational skills** in order be ready with the changing interdisciplinary demands of the industry.

B.Tech in Robotics and AI (RAE)



Program Specific Objectives (PSOs - RAE)

PSO1 (RAE): Design and develop cost-effective **robotic systems** catering to Industrial and Societal requirements.

PSO2 (RAE): Develop cost-effective, safe, and efficient **AI-based automation systems** for manufacturing applications, focusing on product development and process improvement.

PSO3 (RAE): Apply the acquired knowledge and skills in **AI to address real-life multidisciplinary** engineering problems.

Faculty Profiles

Mr. Bhanu Prakash S.
- Heat Transfer
- Fluid Mechanics
- Thermoelectric Modules

Dr. Y. P. Deepthi
- Polymer Composite Materials
- Industrial Engineering

Dr. Dileep B. P.
- Ferrous-based Metal Matrix Composites
- Powder Metallurgy
- Industrial Automation

Ms. Divya Sharma S. G.
- Supply Chain Engineering
- Total Quality Management
- Lean Manufacturing
- Optimization

Dr. E. A. Gopalakrishnan
- Nonlinear Dynamics
- Complex Systems
- Combustion Instabilities
- Stochastic Systems

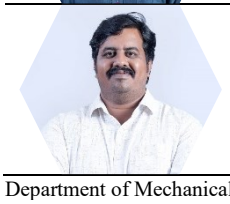
Dr. Mohan Kumar S.
- Composite Materials
- Fracture Mechanics
- Material Science
- Finite Element Method

Dr. Mrudula Prashanth
- Composite Materials
- Alloys
- Cryogenics
- Manufacturing

Dr. M. V. Phanibhushana
- Composite Materials
- Aluminium Metal Matrix Composites
- Severe Plastic Deformation

Dr. Pradeep S. Jakkareddy
- Inverse Heat Transfer
- Experimental Heat Transfer
- Cooling of Electronic Systems

Dr. Prakash Marimuthu
- CAD /CAM
- Manufacturing
- AI / ML in Mechanical Domain



Dr. Pramod R.
- Composite Materials
- Fracture Mechanics
- Finite Element Analysis
- Computational Mechanics

Dr. Prashanth B. N.
- Product Lifecycle Management
- CAD/CAM
- Robotics & Industrial Automation
- Wind & Solar Energy Systems

Mr. Raghavendra Ravi Kiran K.
- Composite Materials
- CAD / CAM
- Robotics & Industrial Automation

Dr. Rajeevlochana Chittawadigi
- Robotics
- Kinematics and Dynamics of Multi-body Systems
- CAD and Graphics

Dr. Ravi Kumar V.
- Nano Composites
- Mechatronics and Sensors
- Machine Design

Dr. Shali S.
- Aeroelasticity
- Vibration Analysis in Sub-sonic and Super-sonic flow

Dr. Shankara
- Waste Management
- Pollution Research
- Geo-environmental Engineering

Dr. Shashi Kumar M. E.
- Composite Materials
- Concurrent Engineering
- Complex Products Development

Dr. Smita Singh
- Geo-polymer Technology using Industrial Wastes
- Structural Engineering

Dr. Sriram Devanathan
- Data Reconciliation & Gross Error Detection
- Groundwater Transport
- Low-cost Materials

Dr. Ulhas K. Annigeri
- Composite Materials
- Metal Matrix Composites
- Tool Design

Mr. Vinod Kotebavi
- Shock Wave and Hypersonic flow
- Renewable Energy

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