ROBOSTAG

e-The News Bulletin

Sakeshwar Gramin Vikas Seva Sanstha's

Adsul's Technical Campus,

Ahmednagar

Department of Mechanical Engineering

Shri Aniruddha Adsul

Chairman

Dr. P.M. Patil

Principal

Mr. Jaware A. R.

Head of Department

Vision of Institute

To be a most preferred Rural Technical Campus in the region by creating competent multifaceted Engineers and Professionals ready to serve the industry and society at large.

Mission of Institute

To establish state-of-the-art facilities and create a conducive environment for transforming the rural minds into competent, skilled, professional, researchers, technically sound, innovative aptitude, and ethics through value-based education to develop the nation for global competitiveness.

Objectives of Institute

- To provide quality education with futuristic trends in engineering and technology
- To ensure continual improvement in quality management system
- To impart innovative teaching and learning

Vision of Department

To be a premier department in Mechanical engineering to serve the need of industry and society

Mission of Department

M1: To provide state-of-the-art facilities to impart quality education.

M2: To undertake various value-added and add-on courses to make students technically sound and thorough professionals.

M3: To collaborate with the industries and strive to instil the research and problem-solving attitude amongst students and faculty.

M4: To inculcate high moral, ethical values, and spirit of national pride amongst students and faculty.

Program Educational Objectives (PEOs)

PEO1: To prepare Mechanical engineering graduate with standing knowledge of Mathematics, Science, Engineering, Technology, Management, Humanities and various other interdisciplinary subjects for successful career.

PEO2: To equip students with modern tools, technology and advance soft wares for deliberating Engineering solutions.

PEO3: To equip students with broad based knowledge to support the service industry, economic development and to address social and engineering challenges of nation.

PEO4: To inculcate student with leadership skill with high level of integrity and ethical value for team building and team work.

Program Outcomes (POs)

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

PO-2: 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.

PO-3: 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.

PO-4: 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.

PO-5: 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.

PO-6: 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.

PO-7: 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.

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

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

PO-10: 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.

PO-11: 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.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO1: An ability to design solution for thermal, hydraulic systems, design components and production processes that meet the specified needs with team work and management skill for safety, societal and environmental aspects through lifelong learning..

PSO2: An ability to use modeling and analysis software such as NX, Creo, CATIA, Ansys etc. technologies forobtaining quick, economical ad accurate solution of engineering problems.

PSO3: An ability to design electromechanical and automation systems in multidisciplinary environments through better communication.

Silent features of Department:

- **Supportive learning for placement:** Placement learning is immersive and iterative. Support in the form of formative tasks and activities are crucial for student success, whilst being mindful of the need to ensureparity of student workload between modules of the same credit weighting. Placement assistance can offer students professional guidance and support to help them build successful careers. Students who might feel overburdened by the job search process might greatly benefit from placement assistance services.
- **Value added courses:** Value Added courses are career and market oriented, skill-enhancing courses that empower the students beyond their domain of study. The certificate programmers enable them to enrich their capability and enhance their employability. Value added courses are conducted for one week during the semester breaks by department faculty and external trainers.
- **Career oriented Add-On Courses:** Job-oriented courses are training and academic courses that prepare professionals for a particular career field or role. A traditional academic course may provide an overview of acertain topic or area, but a job-oriented course focuses on the knowledge and skills required for a particular job.
- **Teacher as Mentor:** The role of the Mentor Teacher is a complex blend of modeling, coaching, instructing, collaborating, and encouraging as candidates build competency in program standards. Mentor Teachers are expected to support candidates in developing the skills and knowledge to meet these standards.
- **Report writing and Paper Presentation:** A report is a specific form of writing, written concisely and clearly and typically organized around identifying and examining issues, events, or findings from a research investigation. Reports often involve investigating and analyzing a problem and coming up with a solution.
- **Professional Development for Industrial Engagement:** There are three types of employee engagement: **cognitive**, **emotional**, and **physical**. When employees are cognitively engaged, they're committed to their job, when they're physically engaged, they're invested in their work, and when they're emotionally engaged, they have an emotional connection to their work.
- **Personality Development and Soft Skill Training:** It also emphasizes personal management, grooming, health, and nutrition, as well as soft skills. This course educates students on the numerous aspects of self-development. Soft skills comprise pleasant and appealing personality traits as self-confidence, positive attitude, emotional intelligence, social grace, flexibility, friendliness and effective communication skills.

Beti Bachao Beti Padhao Abhiyan

Beti Bachao Beti Padhao (BBBP) is a flagship initiative of the Government of India launched to address the declining child sex ratio and to promote the education, empowerment, and welfare of the girl child. The campaign emphasizes the importance of saving the girl child and ensuring equal opportunities for her education and overall development.

The Abhiyan focuses on creating awareness about gender equality, improving access to education for girls, and encouraging positive societal attitudes toward women. It aims to eliminate gender-based discrimination and promote the active participation of girls in education, skill development, and nation-building.

Educational institutions play a vital role in supporting the objectives of Beti Bachao Beti Padhao by organizing awareness programs, seminars, poster presentations, and discussions. Such initiatives help sensitize students about the importance of women's education, legal rights, and social responsibilities. Through participation in these activities, students develop a strong sense of ethics, social commitment, and respect for equality. The campaign also highlights the need for collective responsibility in ensuring the safety, dignity, and empowerment of girls. By educating society and promoting equal opportunities, *Beti Bachao Beti Padhao* contributes to building a progressive, inclusive, and empowered nation. The Abhiyan serves as a reminder that educating and empowering girls is essential for sustainable development and a

Poster Presentation Competition

The Mechanical Engineering Students' Association (MESA) organized a Poster Presentation on 15th April 2025 as part of its academic and co-curricular activities for the March–May period. The event was conducted with the objective of enhancing technical knowledge, creativity, and presentation skills among students. Students actively participated by presenting posters on various topics related to mechanical engineering, including renewable energy systems, automation and robotics, advanced manufacturing processes, CAD/CAM applications, industrial safety, and sustainable engineering.

The posters reflected innovative thinking, conceptual clarity, and practical relevance. Faculty members evaluated the presentations based on technical content, originality, visual appeal, and communication skills. The judges appreciated the efforts of the participants and provided constructive feedback, motivating students to engage in research-oriented and innovative activities.

The event witnessed enthusiastic participation from students across different semesters along with active involvement of MESA members and faculty coordinators. The poster presentation served as an effective platform for knowledge sharing, peer learning, and academic interaction. The program concluded with a vote of thanks, acknowledging the support of faculty members and the organizing team. Overall, the Poster Presentation was a successful academic activity that contributed positively to students' professional and technical development.

Ram Navami Jayanti

Ram Navami, the auspicious festival celebrating the birth of Lord Shri Rama, was observed with devotion and reverence in the college during the month of April 2025. The occasion marks the ideals of truth, righteousness, discipline, and moral values as embodied by Lord Rama. The celebration aimed to create awareness among students about the cultural and ethical significance of Ram Navami. Lord Rama is regarded as *Maryada Purushottam*, symbolizing ideal conduct, leadership, and social responsibility.

His life and teachings continue to inspire generations to follow the path of duty, honesty, and compassion. On this occasion, students and faculty members reflected on the relevance of Lord Rama's values in today's society. The program encouraged students to imbibe qualities such as integrity, respect, self-discipline, and commitment to ethical living in their academic and professional life.

The observance of Ram Navami contributed to the promotion of Indian culture and heritage within the campus and helped strengthen moral and social values among students. The event concluded with a message emphasizing harmony, unity, and righteous conduct.

Dr. B. R. Ambedkar Jayanti

Dr. B.R. Ambedkar Jayanti, celebrated on April 14th 2025, marks the birth anniversary of Dr. Bhimrao Ambedkar, one of India's greatest social reformers, jurists, and the principal architect of the Indian Constitution. Dr. Ambedkar's contributions to social justice, equality, and his relentless fight for the rights of marginalized communities continue to inspire millions.

The Mechanical Engineering Students' Association (MESA) organized a special event to honor his legacy and teachings, emphasizing his role in shaping modern India through his advocacy for equality, education, and social reform. A panel discussion was held featuring students and faculty members who shared their thoughts on Dr. Ambedkar's vision for an equal society.

Topics like the importance of education for social empowerment, the role of youth in fostering equality, and the ongoing struggle for social justice were discussed. The panelists highlighted how Dr. Ambedkar's ideas are essential in addressing today's challenges around caste, gender, and socio-economic disparities.

The event concluded with a vote of thanks, where the MESA president expressed gratitude to all the speakers, participants, and volunteers for making the event a success. A moment of silence was observed to honor Dr. B.R. Ambedkar and his contributions to building a just and equal society. The students were encouraged to live by Dr. Ambedkar's teachings and work towards creating an inclusive society that embraces diversity and equality.

Student Articles

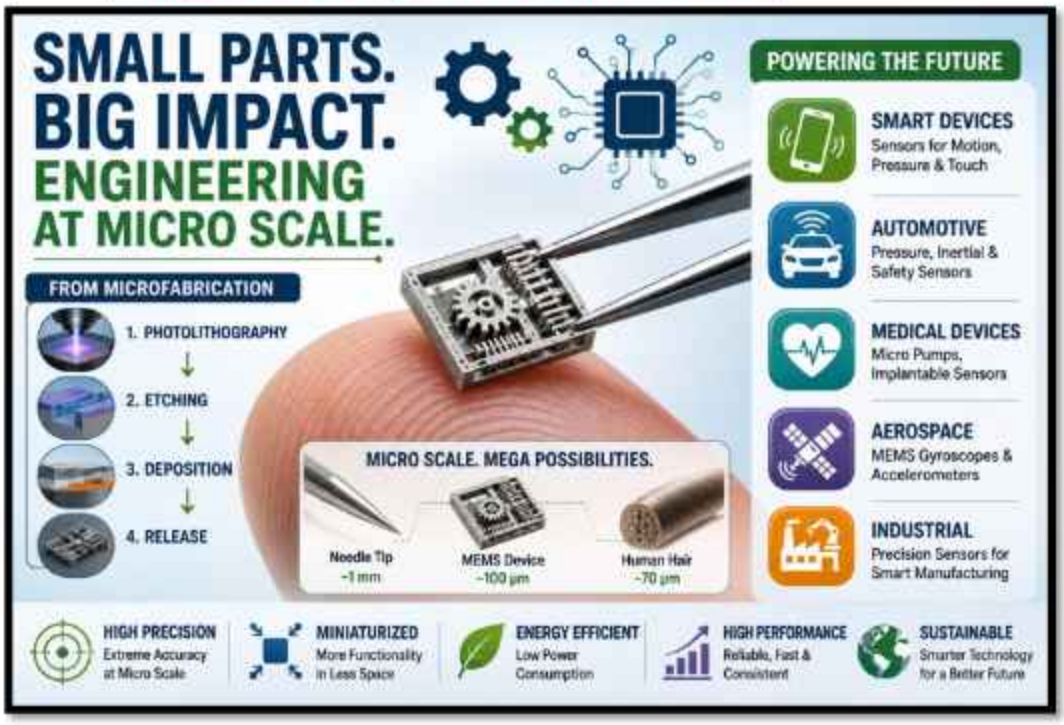
Industrial Safety and Maintenance – A key to Sustainable Operations

Industrial safety and maintenance are essential components of effective engineering practice. Proper safety measures and regular maintenance of machinery ensure smooth operations, reduce accidents, and enhance productivity in industrial environments. Mechanical engineers play a crucial role in implementing safety standards and maintenance strategies. Industrial safety involves identifying potential hazards, following standard operating procedures, and using personal protective equipment such as helmets, gloves, and safety shoes. Awareness of safety rules not only protects workers but also minimizes damage to machines and infrastructure. Regular training and safety audits help in maintaining a safe working environment.

Maintenance engineering focuses on inspection, servicing, and repair of equipment to prevent breakdowns and extend machine life. Preventive and predictive maintenance techniques reduce downtime and improve reliability. Mechanical engineers analyze machine performance, detect faults, and plan maintenance schedules to ensure continuous operation. For students, understanding industrial safety and maintenance is important for responsible professional practice. Through workshops, laboratory activities, and industrial visits, students gain practical exposure to real-world safety and maintenance challenges. Emphasizing safety and maintenance helps in building efficient, reliable, and sustainable industrial systems, making it a key aspect of modern mechanical engineering.

- **Sanap Sarthak**

Micro-Manufacturing and MEMS: Mechanical Engineering at Small Scale



Micro-manufacturing involves the fabrication of components and devices with dimensions ranging from a few micrometres to several millimetres. It is an important area of modern engineering because many industries increasingly require smaller, lighter, faster, and more efficient components. At the micro-scale, the behaviour of materials and mechanical systems can differ significantly from that observed in conventional machine design. Phenomena such as surface forces, friction, adhesion, heat transfer, fluid flow, and material properties become increasingly significant as the dimensions of a component decrease. One of the most important technologies associated with micro-manufacturing is Micro-Electro-Mechanical Systems (MEMS). MEMS are miniature systems that integrate mechanical structures with electrical and sensing functions. They can perform functions such as sensing, actuation, measurement, and control within extremely small packages. Common examples include accelerometers, pressure sensors, gyroscopes, micro-mirrors, microphones, micro-pumps, and miniature actuators. Although electronic circuits are an important part of MEMS, many devices depend heavily on mechanical elements such as beams, diaphragms, springs, gears, proof masses, and resonators.

The manufacturing of micro-scale components requires highly precise and controlled processes. Common techniques include lithography, etching, thin-film deposition, surface and bulk micromachining, laser-based processing, and additive manufacturing techniques. These processes must provide accurate dimensions and surface characteristics because even a very small dimensional error can significantly influence the performance of a micro-device.

In addition, factors such as residual stresses, material uniformity, surface roughness, and temperature effects need to be carefully controlled during manufacturing. An important characteristic of micro-scale engineering is the increase in the surface-to-volume ratio. As the size of a component decreases, its surface area becomes large compared with its volume. Consequently, surface-related phenomena such as adhesion, friction, and heat transfer can become more important than gravitational or inertial effects. For example, two micro-components that appear to be separated may experience significant surface forces and may tend to adhere to each other.

Similarly, heat can be transferred differently at the micro-scale compared with conventional engineering systems. Therefore, a mechanism that performs effectively at the conventional scale may not necessarily function in exactly the same way when miniaturized. Mechanical engineering plays a major role in the development of micro-manufacturing and MEMS technologies. Mechanical engineers apply concepts from solid mechanics, machine design, dynamics, vibration, fluid mechanics, thermodynamics, heat transfer, manufacturing, and materials science to design and analyze micro-devices. Computer-aided engineering and simulation techniques are also used to predict the behaviour of micro-components before fabrication.

A MEMS accelerometer provides a simple example of how mechanical engineering principles are applied at the micro-scale. It may contain a tiny proof mass suspended by micro-scale springs. When the device experiences acceleration, the proof mass moves relative to its supporting structure. This small displacement can then be detected using an integrated sensing mechanism and converted into an electrical signal. Such devices are widely used in applications involving motion and acceleration sensing. Another important application is microfluidics, which deals with the manipulation and control of very small quantities of fluids through micro-scale channels. Microfluidic systems can be used for chemical analysis, biological testing, medical diagnostics, drug delivery, cooling systems, and laboratory-on-chip applications. At these small dimensions, fluid behaviour is strongly influenced by factors such as viscosity, surface tension, and channel geometry. Mechanical engineering knowledge of fluid mechanics and heat transfer is therefore essential for designing efficient microfluidic systems.

Micro-manufacturing is also finding applications in automotive systems, aerospace, healthcare, robotics, consumer electronics, environmental monitoring, and industrial automation. Miniature sensors can monitor pressure, temperature, acceleration, vibration, and other physical quantities while occupying very little space. The development of these devices has contributed to the growth of smart and intelligent systems used in modern engineering. The future of micro-manufacturing is moving towards multifunctional and highly integrated devices, in which mechanical, electrical, sensing, and control functions are combined within extremely small packages. Such systems can offer advantages such as reduced mass, lower power consumption, faster response, improved portability, and higher functionality. Advances in materials, precision manufacturing, nanotechnology, and additive manufacturing are expected to further expand the capabilities of micro-scale devices.

- **Darekar Priyanka**

Editorial Committee

We acknowledge the efforts of our editorial team, comprising faculty and students, for their valuable contributions in this publication:

Faculty Member : Dr. Ankur Vasava

Student Members : 1. Hasanpalli Sainath S

2. Beg Naved Babu

3. Darekar Priyanka Pramod

4. Karpe Sakshi Babasaheb

5. Sanap Sarthak Suryabhan