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

Dr. M. J. Gitay

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: Utilize modern computational tools, software tools & hardware required with the proper understanding of all basic technical skills, soft skills in industry

PSO3: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths. Creating innovative career paths.

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 a certain 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:** Personality Development teaches us how to communicate and display ourselves as having caring skills. 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.

Events

NIRBHAYA PATHAK ABHIYAN

The Nirbhaya Pathak Abhiyan, organized by the students of the Mechanical Engineering department, was a significant event aimed at promoting awareness about women's safety and empowering women in society. By encouraging open conversations around women's rights and safety, the event aimed to inspire women to take charge of their well-being and engage in activities that foster their mental and physical strength.

The Nirbhaya Pathak Abhiyan proved to be a successful initiative, with active participation from students, faculty. The event helped foster an atmosphere of responsibility and solidarity, encouraging everyone to take part in creating a safer environment for women. The mechanical engineering students demonstrated their leadership and organizational capabilities, making a lasting impact on all those who attended. The Nirbhaya Pathak Abhiyan highlighted the importance of women's safety and the collective effort required from society to ensure their protection and empowerment. The event was a commendable effort by the mechanical students to bring about a positive change in society

INTERNATIONAL YOGA DAY

The International Yoga Day celebration, organized by the Mechanical Engineering Student Association, was a momentous event held on 21 June 2024 with the goal of promoting physical fitness, mental well-being, and the ancient practice of yoga among students and faculty members. The event, which coincided with the global observance of International Yoga Day, was designed to encourage participants to incorporate yoga into their daily lives for improved health and stress management.

A professional yoga instructor conducted a guided session, where participants practiced various Aasan (poses), pranayama (breathing exercises), and meditation techniques. The session catered to participants of all levels, from beginners to those with prior yoga experience.

The International Yoga Day celebration organized by the Mechanical Engineering Student Association was a successful and impactful event. It not only promoted physical and mental health but also helped students understand the importance of maintaining balance in their busy academic lives. The event set the tone for future initiatives aimed at fostering a healthy and supportive environment within the academic community.

MINI PROJECT EXHIBITION

The Mini Project Exhibition, organized by the MESA Activity Department, was held on 15th September 2024 on occasion of Engineer's Day. The event aimed to provide a platform for students from Second Year (SE) to Third Year (TE) to showcase their innovative ideas and engineering skills through their mini projects. The competition was voluntary, and students were encouraged to present their projects that were designed as a part of their curriculum or personal initiatives. The exhibition witnessed active participation and showcased a variety of creative projects in different fields of engineering.

The Mini Project Exhibition was a successful event that provided a platform for students to apply their theoretical knowledge in practical scenarios. It encouraged creativity, technical learning, and teamwork among participants. The event was a great success, with the students receiving constructive feedback and gaining exposure to the real-world applications of engineering concepts.

Such events are essential in the academic journey, as they help students bridge the gap between theory and practice, preparing them for the challenges of the professional world. The MESA Activity Department looks forward to organizing more such events in the future to foster innovation and creativity among the students.

Articles

ADDITIVE MANUFACTURING (3D PRINTING)

Three-dimension (3D) printing, also called additive manufacturing is the construction of a three-dimensional object from a CAD model or a digital 3D model. 3D printing or additive manufacturing, is a process where a physical object is created by layering materials based on digital design. The design is sliced into layers, and then each layers is printed by depositing materials (like plastics or metal) one layer at a time.

It's a bit like building with Lego bricks, but instead of stacking them, the layers are fused together. 3D printing has many applications, from medicine, to fashion to aerospace. There are variety of 3D printing materials, like thermoplastics such as acrylonitrile butadiene styrene (ABS), metals, resins and ceramics.

3D printing was the earliest manufacturing equipment developed by Hideo Kodama of the Nagoya Municipal Industrial Research Institute, when he invented two additive methods of fabricating 3D models. Hideo Kodama's invention was on laser cured resin rapid prototyping, which was completed in 1981. His invention spread across three decades, with the introduction of sterolithography in 1984. In 1987, the first 3D printer was invented by Chuk Hull, which used the sterolithography process. Other development followed like, selective laser melting, selective laser sintering among others. In 1990-2000s, lots of 3D printers where developed, though very expensive. In 2009, the cost of these dropped drastically opening of more users of technology.

- **Autade Archana Shriram**

Green Manufacturing

Eco-friendly manufacturing processes are essential for minimizing negative environmental impacts and promoting sustainability. This article explores the importance of adopting these processes in today's world. Sustainability: The ability to meet present needs without compromising the ability of future generations to meet their own needs. In eco-friendly manufacturing, sustainability involves practices that balance environmental, social, and economic factors.

Benefits of Green Manufacturing

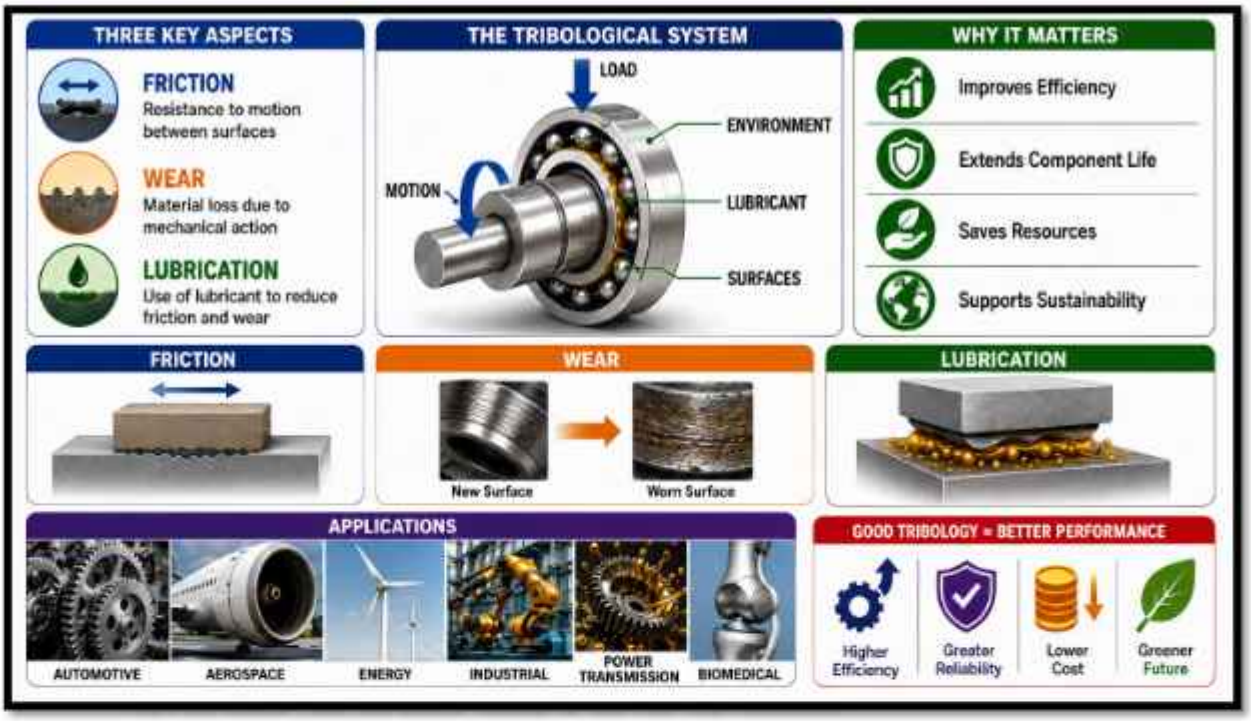
- Reduced greenhouse gas emissions.
- Lower water and air pollution.
- Conservation of natural resources. Cost savings through energy efficiency and waste reduction.
- Enhanced brand reputation and customer loyalty.

Challenges in Green Manufacturing

- Transitioning to sustainable technologies and processes often requires significant upfront investment.
- Limited availability of advanced eco-friendly technologies in certain regions.
- Navigating varying environmental regulations across different countries.
- Convincing stakeholders and customers to prioritize sustainability over traditional cost factors.

- Mhais Sandhya N

Tribology: Controlling Friction, Wear and Lubrication



Tribology is the study of friction, wear and lubrication between interacting surfaces. Although these effects occur at small contact regions, they can strongly influence the efficiency, reliability and service life of machines. When two surfaces move relative to each other, friction converts part of the mechanical energy into heat. Wear gradually removes material or changes surface geometry. In bearings, gears, seals and sliding mechanisms, poor tribological performance can lead to energy loss and premature failure. Lubrication reduces direct surface contact and controls temperature. Depending on the operating condition, a contact may operate under boundary, mixed or hydrodynamic lubrication. The correct lubricant viscosity, additive package and supply method depend on speed, load, temperature and material combination. Surface engineering is another important approach. Coatings, heat treatment, polishing and texturing can improve wear resistance. Hard coatings may reduce material loss, while engineered surface textures can influence lubricant behaviour. Tribological design requires attention to both materials and operating conditions. A material with high hardness is not automatically the best choice because toughness, compatibility and thermal behaviour also matter. Condition monitoring can provide information about tribological health. Lubricant analysis can identify wear particles, while temperature and vibration measurements can reveal changes in friction or contact conditions. Reducing friction has an important energy benefit. Small efficiency improvements across large numbers of machines can produce significant energy savings. Tribology therefore contributes directly to sustainability as well as reliability.

The key lesson is that machine performance depends not only on the bulk properties of materials but also on what happens at their surfaces. Tribology connects machine design, materials engineering, fluid mechanics and maintenance.

- Beg Naved

Picture Gallery

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

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