VIVEKANAND EDUCATION SOCIETY'S POLYTECHNIC CHEMBUR,400071

MECHANZIA 2024 - 25

DEPARTMENT OF MECHANICAL ENGINEERING

VOLUME - 2

NEWSLETTER

VOLUME 2 DEPARTMENT OF MECHANICAL ENGG

CONTENT

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DEPARTMENT OF MECHANICAL ENGG

About Department

- **Established: Department of Mechanical Engineering started in 2018 with an intake of 60 students.**
- **Core Focus: Applies principles of physics, mathematics, and materials science to design, analyze, manufacture, and maintain mechanical systems.**
- **Field Overview: One of the oldest and broadest engineering disciplines, covering mechanics, thermodynamics, materials science, and structural analysis.**
- **Tools Used: CAD, CAM, and life cycle management for designing and analyzing systems like machinery, transport, robotics, and medical devices.**
- **Infrastructure: Advanced facilities and labs beyond the curriculum to provide a conducive learning environment.**
- **Continuous Learning: Engineers must stay updated with emerging trends and technologies in the industry. Learning is a lifelong process.**

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Vision

- To produce mechanical engineers with technical competency driven by ethical values.

Mission

- To impart value based quality education thus enabling students to meet up with the demands of industry as well as society
- To create technically expertise engineers with the desire for lifelong learning
- To provide platform for overall personality development of students

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Program Outcomes

- **PO1-Basic And Discipline Specific Knowledge: Apply Knowledge Of Basic Mathematics, Science And Engineering Fundamentals And Engineering Specialization To Solve The Engineering Problems.**
- **PO2-Problem Analysis: Identify And Analyse Well-Defined Engineering Problems Using Codified Standard Methods.**
- **PO3-Design/ Development Of Solutions: Design Solutions For Well-Defined Technical Problems And Assist With The Design Of Systems Components Of Processes To Meet Specified Needs.**
- **PO4-Engineering Tools, Experimentation And Testing: Apply Modern Engineering Tools And Appropriate Technique To Conduct Standard Tests And Measurements.**
- **PO5-Engineering Practices For Society, Sustainability And Environment: Apply Appropriate Technology In Context Of Society, Sustainability, Environment And Ethical Practices.**
- **PO6-Project Management: Use Engineering Managament Principles Individually, As A Team Member Or A Leader To Manage Projects And Effectively Communicate About Well-Defined Engineering Activities. "**
- **PO7-Life Long Learning: Ability To Analyse Individual Needs And Engage In Updating In The Context Of Technological Changes.**

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PROGRAM EDUCATION OUTCOME

- **PEO1:- Provide socially responsible, environment friendly solutions to Mechanical Engineering related broad based problems adapting professional ethics.**
- **PEO2:- Adapt state-of-art Mechanical Engineering broad based technologies to work in multi disciplinary work environment.**
- **PEO3:- Solve broad based problems individually and as a team member communicating effectively in the world of work**

PROGRAM SPECIFIC OUTCOME

- **PSO1:-Modern Software Usage: Use latest Mechanical Engineering related software for simple design, drafting, manufacturing, maintenance and documentation of mechanical engineering components and processes.**
- **PSO2:-Equipment and Instruments: Maintain equipment and instruments related to Mechanical Engineering.**
- **PSO3:-Mechanical Engineering Processes: Manage Mechanical engineering processes by selecting and scheduling relevant Equipment, subtracts, quality control techniques and operational parameters.**

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Highlights of Departmental activities.

- The Department conducted a two-day FDP on “Innovative Practices for Engineering Excellence” from 14th to 15th January 2025.

- Mr. Sandip Pawar successfully completed an 8-week faculty training program on Soft Skill Development conducted by the Indian Institute of Technology, Kharagpur.

- Mr. Mahesh Zope completed a 4-week faculty training course on Inspection and Quality Control in Manufacturing offered by the Indian Institute of Technology, Roorkee through the NPTEL platform.

- Mr. Shevale Nikhil P. completed a 12-week faculty training course on Industrial Hydraulic and Pneumatic conducted by NPTEL, IIT Kharagpur.

- Mr. Pranit Nigade attended an online faculty training on “Additive Manufacturing: Potential & Challenges” at A.G. Patil Polytechnic Institute, Solapur.

- Mr. Pranit Nigade, Mr. Nikhil Pandurang Shevale, and Mrs. Geetanjali Abhishek Thakur completed an online faculty training on “Recent Trends in Electric Vehicles and Artificial Intelligence” at Marathwada Institute of Technology (Polytechnic), Chhatrapati Sambhajinagar.

- Prathamesh Kasar completed advanced online courses at Skill Lync in electric vehicle technology, battery thermal system design, and Python fundamentals for mechanical engineers.

- Mahesh Zope and Mangesh Bidkar completed a faculty training program on Change Management at L & T Skill Training Academy.

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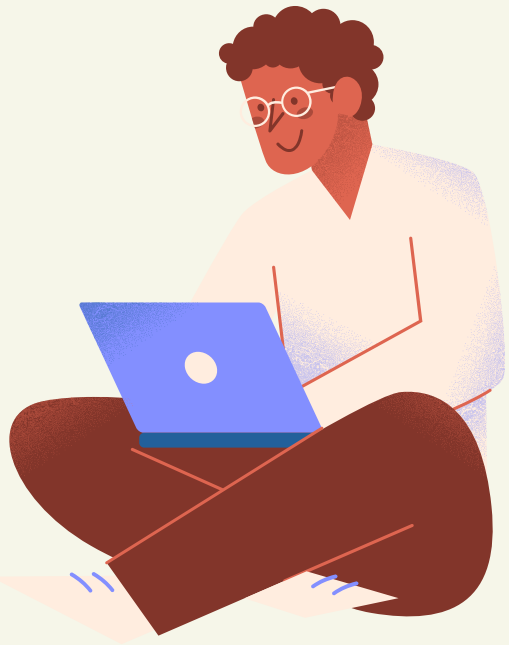
Student Articles

A platform for students to share their ideas, technical insights, and creative expressions. It highlights their thoughts and writing skills on various topics.



- **The Heart of Electric Vehicles: Understanding EV Powertrains**
- **AI IN HVAC**
- **Biomechatronics and Bionic Limbs**
- **The Role of Autonomous Drones in Modern Agriculture.**
- **Energy Harvesting Device Generating 200V.**
- **The Role of Autonomous Drones in industry.**

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The Heart of Electric Vehicles: Understanding EV Powertrains

Suyash Gadkari

Electric vehicles (EVs) are changing the car industry by giving a cleaner and more efficient option than petrol or diesel cars. The main part of an EV is its powertrain, which moves energy from the battery to the wheels. EV powertrains are simpler than traditional engines. They usually have an electric motor, power electronics, a single-speed gearbox, and a lithium-ion battery. Because of fewer parts, EVs need less maintenance and have fewer problems.

Today's EV powertrains are designed to give better performance, longer driving range, and higher efficiency. Features like strong batteries, regenerative braking (which saves energy while slowing down), and smart cooling systems help in this. The type of motor also affects how fast and smooth the car runs.

Engineers also use lightweight materials and sleek body designs to save energy. Smart software controls the system for better energy use. These improvements make EVs more useful, eco-friendly, and ready for the future.

AYAN KHAN

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AI IN HVAC

AI in HVAC systems is transforming how buildings manage heating, cooling, and ventilation. By integrating machine learning algorithms and real-time sensor data, AI optimizes energy efficiency, enhances comfort, and reduces costs. These systems adjust temperature and airflow based on occupancy, weather, and energy demand, leading to significant energy savings. AI also enables predictive maintenance, identifying potential issues before they cause system failures, and

Ayan Khan

improving the lifespan of HVAC equipment. Moreover, it ensures personalized comfort by learning user preferences and adjusting settings automatically.

However, challenges exist, including high initial costs, complex implementation, data dependency, privacy concerns, and overreliance on automation. Despite these, AI's potential to create more sustainable, efficient, and user-friendly HVAC systems is clear. As technology advances, AI will play an even larger role in developing smart buildings, integrating HVAC with other systems like lighting, security, and energy management. This integration will lead to fully automated, intelligent, and eco-friendly building environments.

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Biomechatronics and Bionic Limbs

Mohammed Qureshi

Biomechatronics is a field that mixes biology, mechanics, and electronics to help people move better, especially those who have lost a limb or have difficulty walking. It is used to create smart devices like artificial arms, legs, and support suits (exoskeletons) that work like real body parts.

Bionic limbs are artificial hands or legs that copy the way natural ones work. They have sensors, motors, and tiny computers. These parts help the limb move by reading signals from the person's muscles or nerves. Some bionic limbs also give feedback, like vibrations, to help the person feel and control their movements more easily.

The materials used in bionic limbs are light and strong, such as carbon fiber and titanium. This makes them comfortable to wear and easy to move. 3D printing is often used to make custom-fitted limbs at lower cost.

Biomechatronics is helping many people live better lives. In the future, there may be brain-controlled limbs, touch feeling, and even smarter systems that work closely with the body.

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The Role of Autonomous Drones in Modern Agriculture

Autonomous drones are playing an important role in modern farming by helping farmers work more efficiently and smartly. These drones can fly on their own using GPS, cameras, and sensors to collect useful information about the condition of soil, crop health, water levels, and pest activity.
One of their biggest advantages is in precision farming. Drones allow farmers to apply water, fertilizer, and pesticides only where they are needed, instead of spraying the whole field. This reduces waste, saves money, and protects the environment. They help improve crop health by quickly spotting problem areas and allowing early action.
In addition to this, drones are also used for planting seeds, checking crop growth, and knowing when crops are ready to harvest. Their ability to work continuously and adjust to weather or field conditions makes them very useful for large-scale farms. They also reduce the need for manual labor in repetitive tasks.
As climate change and rising population increase pressure on food production, autonomous drones offer a smart and sustainable solution. By using technology in farming, we can grow more food while taking better care of the land and resources.

-Nathan Luke

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Energy Harvesting Device Generating 200V

Aman Yadav

Energy harvesting devices capture ambient energy and convert it into electricity, especially in places where traditional power sources are hard to access. Devices generating up to 200 volts are often used in remote or industrial areas.

They harness energy from sources like vibrations, heat, sunlight, or radio waves. For example, piezoelectric materials turn mechanical vibrations into high-voltage electricity, while thermoelectric generators (TEGs) use temperature differences—like waste heat—to generate similar voltages.

Though voltage is high, the current is usually low, making these devices suitable for low-power systems. The energy is stored in supercapacitors or rechargeable batteries, and regulated using voltage control circuits to maintain stable output.

Efficient circuit design is key to using the harvested energy safely and effectively. With advances in technology, these devices are becoming smaller, more reliable, and ideal for applications in smart grids, sensor networks, and aerospace or defense systems

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The Role of Autonomous Drones in industry.

In the heart of modern industry, a quiet revolution is taking flight—literally. Automated drones, once the stuff of science fiction, are now soaring above factories, power lines, and oil rigs, transforming the way we inspect critical infrastructure.

Traditionally, industrial inspection safety operations involve scaling dangerous heights, braving toxic environments, and shutting down operations for safety. Today, drones equipped with AI, thermal imaging, and LiDAR can scan vast areas in minutes, detecting cracks, leaks, or wear invisible to the naked eye. Companies report up to 80% cost savings and significant risk reduction—proof that efficiency and safety can fly hand in hand.

From remote solar farms in Rajasthan to offshore wind turbines in the North Sea, these unmanned aerial systems offer a bird’s-eye view of problems before they escalate. The data they gather not only ensures maintenance is proactive but also contributes to sustainability by minimizing waste and downtime.

As industries worldwide grapple with rising demands and shrinking margins, drone inspections represent more than just a technological upgrade—they're a paradigm shift. The skies are no longer the limit, but the solutions

-Durgesh Kasodekar

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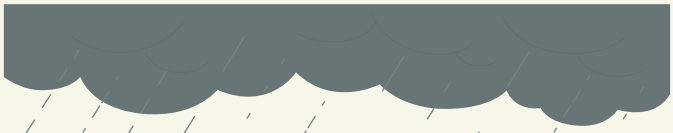
Departmental Spotlights in Art



आले आले ढग आभाळी
काळोखातून वारा वाही
आसव पावसा उरी राही
चातक वाट सरींची पाही

आला पाऊस हा असा
समरी कुणी क्षत्रियसा जसा
घामेजून उन्हाने त्रस्त
भिजाया मन मोकळे मस्त

-सौमिल थरवल

उन् मावळले रानात,
दृश्य भासे अजूनही माझ्या मनात.
आयुष्याला सार काही,
मनावर भोळे वार काही.
मन मंदिरासारखे घडवले,
चूक झाल्यास मनस्ताप ही झेलीले.
मन अडविती वाट ,
मन भरविती सुखाचा भात.
मन कोरडा सुवास,
मन चिंब भिजलेली रात.
मन मायेचा सागर,
प्रेमाचा डोंगर ;
भक्तीची ओंजळ, हे मन.
मन जुळवि रेशमी धागे,
मन सोडवि गुंतलेले तागे.
मन भाबडे बाळ त्याला भरविती पार;
मन मोकळे रान त्याला घडवित सार.

-प्रणव शृंगारपुरे

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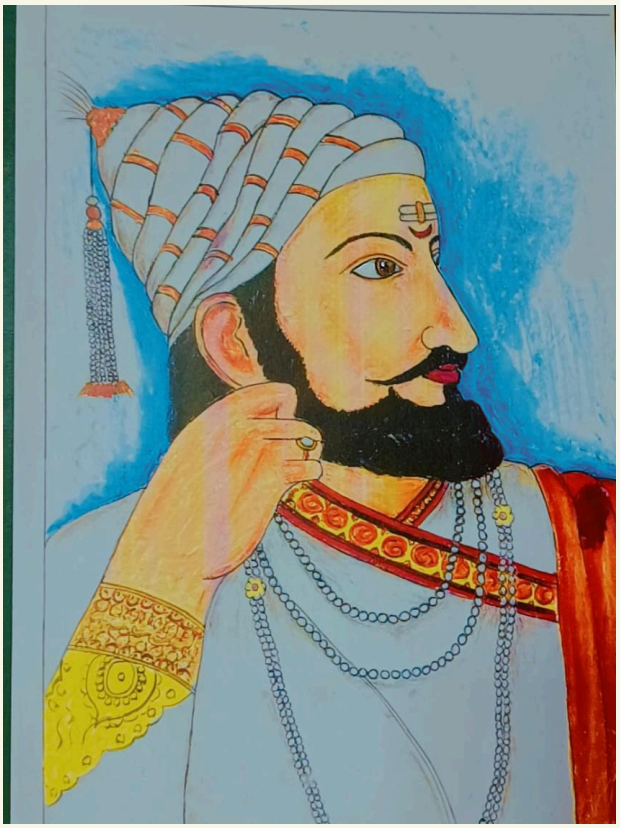

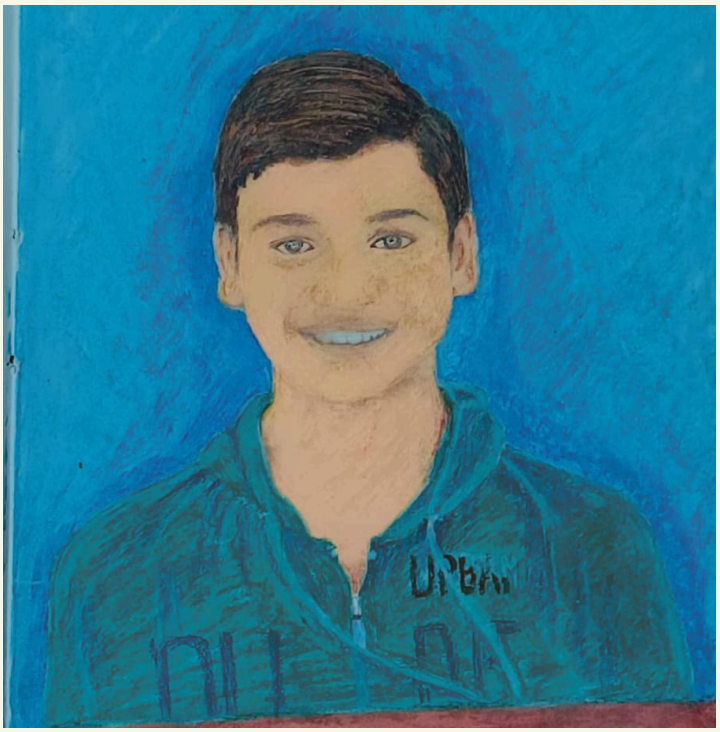

Paintings by Jayesh Khegde & Kartik Bhandare

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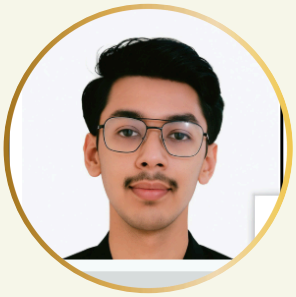
ACADEMIC TOPPERS

Odd Semester 2024-25

DEPARTMENT OF MECHANICAL ENGINEERING

FIRST YEAR

AYAN KHAN
87.03 %



KASODEKAR DURGESH PARAG
82.06%

SUYASH PRASHANT GADKARI
80.63%

SECOND YEAR

SOMVANSHI ROHIT NITIN
84.94%

SHRUNGARPURE PRANAV RAKESH
79.33%

THARWAL SAUMIL SACHIN
78%

THIRD YEAR

BHAVESH HEMANT BORADE
81.13%

PARTH VIJAY MANEPATIL
80.62%

SHREYASH RAMCHANDRA SAWANT
80.56%

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Editor Team

PARTH MANEPATIL

PRATHAMESH KASAR