PANIMALAR ENGINEERING COLLEGE

Accredited by NBA and Affiliated to Anna University
Approved by All India Council For Technical Education, New Delhi
POONAMALLEE, CHENNAI- 600 123.

DEPARTMENT OF MECHANICAL ENGINEERING

NEWSLETTER–THE TORQUE

.... Ready to be driven

Vol. 17 | Issue #2
September 2022

VISION

The Department of Mechanical Engineering will be globally recognized as a pioneer in Under Graduate Engineering Programs through its excellence in teaching and research, catering to the significant and evolving societal needs.

MISSION

Mission 1: To serve the society by developing competent engineers with outstanding leadership qualities and ethical values.

Mission 2: To address the progressive needs of the society and industry using modern engineering tools and cutting edge technologies.

Mission 3: To inculcate the importance of professional development within budding engineers through sustained learning.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: Graduates will contribute to the industrial and societal needs as per the recent developments using knowledge acquired through basic engineering education and training.

PEO 2: Graduates will be able to demonstrate technical knowledge and skills in their career with systems perspective, analyze, design, develop, optimize, and implement complex mechanical systems.

PEO 3: Graduates will be able to work in multidisciplinary environment developing complex mechanical systems.

PEO 4: Graduates will work as a team or as an individual with utmost commitment towards the completion of assigned task using apt communication, technical and management skills.

PEO 5: Graduate will recognize the importance of professional development by pursuing higher studies in various specializations.

PROGRAMME OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
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.
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.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
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.
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: Fundamental Domain Knowledge: Design mechanical systems in various fields of machine elements, thermal, manufacturing, industrial and inter disciplinary fields using engineering/technological tools.

PSO2: Usage of software programs: Resolve new challenges in Mechanical Engineering using modern computer tools and software programs.

PSO3: Continual learning and Research: Develop intellectual and technical solution to complex mechanical problems through continual learning and research.

3D Printing - Open Up New Design Possibilities

3D printing, also called additive manufacturing, is an incredible technology that builds objects layer by layer from digital models.

It lets engineers quickly create complex geometries without any special tools or dies. Parts can be printed on demand from CAD models without costly machining steps.

For mechanical engineers, 3D printing unlocks all sorts of new possibilities for rapid prototyping and distributed manufacturing.

It makes iterating on designs far faster and cheaper. 3D printing can also construct intricate shapes with internal voids and lattices that would be impossible with conventional methods.

Aerospace, automotive, and medical firms now use 3D printing for end-use components. As costs fall, localized on-site manufacturing and mass customization could become common!

SURESH A
III YEAR / MECH

Adopting Digital Twin Technology

Engineers often find themselves drowning in prototypes and physical models while making small changes to the design. Digital twinning is gaining popularity as a tool to reduce the number of physical prototypes necessary to complete a project. A digital twin is a virtual model that accurately represents an item in the physical world.

The digital twin can be equipped with virtual sensors, allowing mechanical engineers to put their products through stress and performance tests without creating a new prototype for each test. All the information collected in the digital space can be used to perfect the twin in the physical world.

AKASH S
II YEAR / MECH

Sustainable Design – Tackles Climate Change

Sustainability has become a pressing concern for society, with climate change threatening massive disruption. Mechanical engineers will play a key role in developing cleaner technologies to reduce environmental impacts.

Replacing fossil fuel power with renewable energy will require mechanical engineering expertise. Improving solar panels, advancing wind turbine designs, building utility-scale batteries and transitioning to electric vehicles are all critical focus areas today.

Looking ahead, progress in renewables will continue to accelerate.

An ingenious no-electricity cooler made with plastic bottles:

Do you have a few plastic bottles lying around? Then you can make an air conditioner - really.
Eco-Cooler is a low-cost cooling system designed for developing regions. It's constructed from halved plastic bottles inserted into a grid-like board, which is then installed in a hut like a window pane.
Each bottle's neck collects and compresses air from hot breezes, cooling it down dramatically. The innovation can drop temperatures inside a hut as much as 40 degrees Fahrenheit.
Several rural communities in Bangladesh have already implemented the system, which is an eco-friendly solution for communities lacking electrical access.

U. YUGESH
III YEAR / MECH

Advances in Aerospace Engineering

Electric Propulsion Systems for Aircrafts: The aerospace industry is shifting towards electric propulsion systems to reduce emissions and enhance fuel efficiency. Electric aircraft are becoming a reality with advancements in battery technology and power management.

Lightweight Materials for Aerospace Applications: Lightweight materials such as carbon fiber composites, titanium alloys, and aluminum-lithium alloys are being used in aerospace applications to reduce weight and improve performance. These materials are essential for achieving fuel savings and increasing payload capacity.

Enhanced Aircraft Design for Efficiency and Performance: Aircraft design is evolving with a focus on aerodynamics, structural optimization, and flight control systems. Engineers are developing more efficient and agile aircraft designs to meet the demands of the modern aviation industry.

M. VISHAL
III YEAR / MECH

"Engineering is the closest thing to magic that exists in the world"