

MECH TECH

THE FUTURE IS SUSTAINABLE ENGINEERING

JULY 2026



**DEPARTMENT OF
MECHANICAL
ENGINEERING**

**AMBALIKA INSTITUTE OF
MANAGEMENT AND TECHNOLOGY**
Maurawan Road, Mohanlalganj, Lucknow



Table of Contents

01 AboutAmbalika InstituteofManagement and Technology	03	02
Magazine Credits	02	
03 Chairman's Message	04	
04 Director's Message	05	
05 Additional Director's Message	06	
06 HOD's Message	07	
07 Chief Editor's Message	08	08
Engineering a Greener Tomorrow: Sustainable Practices in Mechanical Engineering	09-10	
09 About Department of Mechanical Engineering	11	10
Department Vision & Mission	12	
11 Programme Educational Objectives (PEOs)	13	
12 Programme Objectives (POs)	14	

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2

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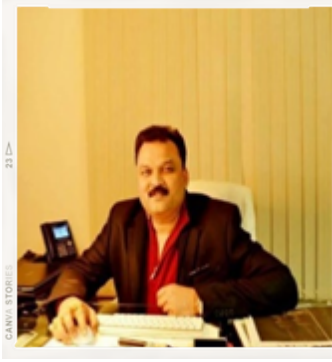


About Ambalika Institute of Management and Technology

Ambalika Institute of Management and Technology (AIMT) was established in 2008 as a private engineering and management college in Mohanlal Ganj, Lucknow, Uttar Pradesh, India, and is affiliated to AKTU and approved by AICTE. The Lucknow campus is spread over 200 acres and is located near NH-56B, surrounded by lush green fields and enhanced by a beautiful lake, which makes it one of the best private engineering institutes in Lucknow.

The institute is 24 km from Lucknow Railway Station and 20 km from Amausi Airport, Lucknow, and is very well connected to the district headquarters. Ambalika's Centre of Excellence³ has been the most dominant centre in providing high-end technical skills to our engineers to make them highly employable. AIMT, Lucknow is carrying out training programmes and joint certification program in innovative technologies with the support of industry giants like Microsoft, KUKA Robotics Siemens, Ace Micromatics, MTab, MasterCAM, etc.

Chairman's Message



It gives me immense pleasure to introduce our Technical Magazine “MechTech” from the Dept. of Mechanical Engg., which will be published bi-annually. Our students are very innovative and ever eager to learn new concepts. Apart from teaching, our faculty members are deeply engaged in research work. Our faculty and students regularly present their research findings at various academic conferences. It will help build the documentation culture of the institute.

One of our greatest strengths is our highly qualified and dedicated faculty members and staff. I congratulate the editorial team, faculty, staff members, and students for their contribution to this issue of “MechTech.” It is an attempt by the Technical Magazine to acquaint its readers with technological updates in the field of Mechanical Engineering.

Mr. Ambika Mishra
Chairman
Ambalika Group of
Institutions

Director's Message



I am very happy and grateful to present the latest issue of our Technical Magazine “MechTech” of the Department of Mechanical Engineering. This magazine will be a way to strengthen and enhance awareness in the field of Mechanical Engineering and to improve interaction among all of us. It will serve not only the purpose of building responsiveness but will also provide an avenue for new ideas, progress and creativity.

II do hope that it will motivate the faculty, students and others to contribute regularly making our newsletter a success and it will attain greater heights in the years to come.

Dr. Ashutosh Dwivedi
Director
Ambalika Institute Of Management & Technology

Additional Director's Message



I am privileged to introduce the latest edition of our esteemed Technical Magazine, “MechTech,” from the Department of Mechanical Engineering. This publication stands as a testament to our collective dedication to advancing knowledge and fostering innovation within our field. It aims not only to enhance our understanding of Mechanical Engineering but also to strengthen the bonds among us as a community.

Through this platform, we aspire to inspire creativity, share pioneering ideas, and showcase progress. I am confident that this magazine will continue to serve as a beacon of excellence, encouraging regular contributions from our faculty, students, and colleagues. Let us work together to ensure its continued success and propel it to even greater heights in the years ahead.

Dr. Shweta Mishra
Additional Director
Ambalika Institute Of Management & Technology

HOD's Message



It gives me immense pleasure to present this latest edition of MechTech, the technical magazine of the Department of Mechanical Engineering at Ambalika Institute of Management & Technology. This publication reflects our department's commitment to fostering innovation, technical excellence, and a spirit of collaboration among our students and faculty.

Mechanical engineering is a discipline that continues to evolve with advancements in technology, sustainability, and industry needs. Through MechTech, we aim to showcase not only the latest trends and emerging domains in our field, but also the creativity, problem-solving ability, and forward-thinking approach of our students. Each article, whether on green engineering, robotics, or future skills, is a testament to the dedication and passion within our department.

I sincerely appreciate the efforts of our editorial team, faculty members, and students in making this issue possible. I am confident that MechTech will continue to inspire, inform, and connect readers with the exciting possibilities that mechanical engineering holds for the future.

Mrs. Vandana Pathak

***HEAD, Department of Mechanical Engineering
Ambalika Institute Of Management & Technology***

Chief Editor's Message



We are pleased to bring you the latest issue of the Mechanical Engineering Technical Magazine. This issue presents new ideas and progress in the field, with a particular emphasis on how our discipline is contributing to a more sustainable future.

We hope that this magazine will keep you up-to-date with the latest trends and developments in mechanical engineering. We thank our dedicated staff of writers and editors who worked hard to make this magazine possible, and we are thankful for the generous support of our sponsors. We hope you enjoy this issue and find it a useful resource in your professional journey.

Mr. Madhur Prakash Srivastava
Assistant Professor, Department of Mechanical Engineering
Ambalika Institute Of Management & Technology

Engineering a Greener Tomorrow

Sustainable Practices Redefining Mechanical Engineering

Sustainability has moved from a buzzword to a design requirement. As industries race to cut emissions, conserve resources, and build a circular economy, mechanical engineering finds itself at the very center of this transformation. From the machines that manufacture our products to the systems that heat, cool, and power our world, mechanical engineers are being asked to rethink every stage of the design and production cycle with the planet in mind.

If artificial intelligence was the story of the last decade, sustainable and green engineering is fast becoming the defining trend of this one — and mechanical engineers are the ones turning that ambition into working hardware.

Why Sustainability Is Now a Core Engineering Discipline

Sustainable engineering is the practice of designing systems that meet present needs without compromising resources or environmental health for future generations. What used to be treated as an add-on — an afterthought once a product was designed — is now built into the process from day one. Regulatory pressure, rising energy costs, and consumer demand have all pushed sustainability into the core curriculum of mechanical design, alongside strength, cost, and manufacturability.

Mechanical engineers today are expected to ask new questions at every stage: How much energy does this system consume over its lifetime? Can these materials be recycled or reused? Can we reduce weight, waste, or emissions without sacrificing performance?

Key Trends Shaping Green Mechanical Engineering

- **Renewable Energy Systems:** Design and optimization of wind turbines, solar thermal systems, and small-scale hydro units, including improved blade aerodynamics, drivetrains, and structural materials.
- **Energy-Efficient HVAC & Thermal Systems:** Smarter heat exchangers, heat pumps, and refrigeration cycles that cut building energy consumption while maintaining comfort and reliability.
- **Lightweighting & Advanced Materials:** Use of composites, high-strength alloys, and bio-based materials to reduce vehicle and machine weight, directly lowering fuel and energy use.
- **Circular Manufacturing:** Design-for-disassembly, remanufacturing, and closed-loop production systems that keep materials in use longer and reduce landfill waste.
- **Electric & Hybrid Powertrains:** Mechanical design of battery enclosures, thermal management systems, and drivetrains that support the shift away from fossil fuels.
- **Water and Resource Efficiency:** Mechanical systems for water treatment, reuse, and conservation in industrial and municipal applications.

From the Factory Floor to the Field

Green engineering is not confined to the design office. On the shop floor, mechanical engineers are optimizing manufacturing processes to cut energy use through better machine scheduling, predictive maintenance, and reduced material waste in machining and additive manufacturing. In the field, engineers are designing more efficient irrigation pumps, low-emission engines, and durable equipment that lowers the total environmental footprint of everyday operations.

Even traditional strengths of mechanical engineering — thermodynamics, fluid mechanics, and materials science — are being applied with a new lens: not just how well a system performs, but how much of the planet's resources it consumes to do so.

Skills the Next Generation of Engineers Will Need

Skills the Next Generation of Engineers Will Need

- Life-cycle assessment (LCA) and environmental impact analysis
- Knowledge of renewable energy systems and grid integration
- Proficiency with sustainable materials and additive manufacturing
- Energy modeling and thermal system optimization
- Familiarity with emerging standards in green building and green manufacturing

Conclusion

The future of mechanical engineering will be measured not only in horsepower, efficiency, or precision, but in the environmental legacy each design leaves behind. As students and professionals in this field, embracing sustainable design principles today prepares us to build the resilient, resource-conscious machines and systems the world will need tomorrow.

Sustainability is not a constraint on good engineering — it is becoming the very definition of it.



About Department of Mechanical Engineering

Mechanical engineering is a subset of general engineering. Engineers use scientific and mathematical principles to solve technical problems. Since they often create new products to solve these problems, they are in high demand. Engineers are essentially inventors — by dreaming up ideas and turning them into reality, they push technology to its limits.

Mechanical engineers are specialized engineers who work with mechanical devices. These may include elevators, refrigeration and air-conditioning equipment, robots, and electric generators. Mechanical engineers design tools used across other engineering disciplines, making mechanical engineering one of the broadest engineering specialties.

Mechanical Engineering is a discipline that involves the application of principles of physics for the analysis, design, manufacturing, and maintenance of mechanical systems. It requires a solid understanding of key concepts including mechanics, kinematics, thermodynamics, and energy. Mechanical engineers use these principles in the design and analysis of automobiles, aircraft, heating and cooling systems, manufacturing plants, industrial equipment and machinery, medical devices, and more.

The department aims to develop itself as a centre of excellence in various advanced fields, and to instill the habit of continuous learning and teamwork to fulfill societal needs.



Department Vision & Mission

Vision

To nurture students in achieving excellence in mechanical engineering, to develop proficiency in research activities along with overall personality development, and to contribute to the nation and humanity.

Mission

- To motivate students to engage in analytical and creative thinking by placing them in a challenging environment through appropriate pedagogy.
- To develop the department of mechanical engineering as a centre of excellence in various advanced fields.
- To develop the habit of continuous learning and teamwork, and to fulfill societal needs.

Programme Educational Objectives (PEOs)

1. To prepare students for a successful career in core mechanical and interdisciplinary industries through a strong foundation in mathematical, scientific, and engineering fundamentals. (Pre-preparation)
2. To develop the ability among students to acquire technical knowledge in specialized areas of Mechanical Engineering such as Materials, Design, Manufacturing, and Thermal Engineering, with a focus on research and innovation, and gaining technical skills in classical software packages. (Core competence and professionalism)
3. To equip students with broad-based knowledge to support service industries, economic development, and to address social and engineering challenges of the nation. (Breadth)
4. To promote continuous learning, research, and development among students, along with strong professional, moral, and ethical values and a zeal for life-long learning. (Learning environment)

Programme Objectives (POs)

PO1: Engineering knowledge — Ability to perform academic activities and achieve the expected requirements by conforming to a pre-defined process as set by the institute and university.

PO 2: Problem analysis — Ability to effectively apply knowledge of computing and mathematics to engineering problems.

PO 3: Design/development of solutions — Ability and skills to effectively use state-of-the-art techniques and tools for analysis, design, and implementation of systems that resolve real-life problems.

PO 4: Conduct investigations of complex problems — Ability to utilize multi-disciplinary knowledge across domains to effectively apply technology in a global and social environment.

PO 5: Modern tool usage — Ability to efficiently make use of additional training provided throughout the course, satisfying industry requirements and becoming globally employable.

PO 6: The engineer and society — Ability to successfully pursue professional development through lifelong learning.

PO 7: Environment and sustainability — Ability to communicate effectively with both technical and non-technical audiences, and to design solutions mindful of environmental impact.

PO 8: Ethics — Ability to become a versatile professional and function effectively as an individual and as a team member.

PO 9: Individual and team work — Ability to understand professional, ethical, legal, security, and social issues and responsibilities.

PO 10: Communication — Communicate effectively with the engineering community and society at large; comprehend and write effective reports and documentation; make effective presentations.

PO 11: Project management and finance — Demonstrate knowledge of engineering and management principles and apply these as a member and leader in a team; manage projects in multidisciplinary environments.

14

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.