

TECHMECH



**The Next Generation of
Mechanical Engineering**

JANUARY 2024

IN THIS ISSUE

- 1 Editorial Board
- 2 About Ambalika Institute Of Management & Technology
- 3 Harnessing the Sun's Power
A Hyperbolic Path to Solar Energy Harvesting
- 4 Invisible Powerhouse
Windows that Generate While You Gaze
- 5 Tubular Triumph
Efficient Biodiesel from Waste Oil using Ultrasound
- 6 Beyond 3D: Shaping the Future with 4D Printing
- 7 Goodbye Fix-It-Later, Hello PDM
The Rise of Proactive Maintenance
- 8 From Magic to Reality
Unveiling the Materials of Tomorrow
- 9 About Department of Mechanical Engineering
- 10 Department Vision & Mission
- 11 Programme Educational Objectives (PEOs)
- 12 Programme Objectives (POs)
- 13 Executive Director's Message
- 14 Director's Message
- 15 HOD 's Message & Chief Editor's Message



Editorial Board

Editor-in-Chief

Mr.Madhur Prakash srivastava
(Assistant Professor)

Operation Head

Mr.Priyatam KuumarSrivastava (Asst.Prof)
Hariom Chaurasiya,B.Tech 4th year
Aniket Prajapati,B.Tech 4th year

Editor

Mrs.Vandana Pathak (Asst.Prof)
Aditya Chaudahary B. Tech, 4thyear
Kaushlendra Kumar Sharma B. Tech, 3rd year

Magazine Name

Mr.Madhur Prakash Srivastava (Asst. Prof.)

Photographers

Sagar Sharma, B. Tech 4th year
Adarsh Singh,B. Tech, 3rd year

Design and Layout

Mr.Chandra Kumar Dubey (Asst. Prof.)
Gopi Kumar Sharma,B. Tech, 3rd year

Departmental Magazine Logo

Mr. Prashant Kumar Srivastava (Asst. Prof.)
Abhishek Srivastava B. Tech, 4th year

About Our Writers

Ankit Kumar
Shubham Kumar
(B.tech ME IVth year)

Prince Kumar Soni
Mohit Shrivastov
(B.tech ME IVth year)

Kaushal Saini
Vineet Kumar
(B.tech ME IIIrd year)

Anand Singh
Saurav Kumar
(B.tech ME IIIrd year)

Vaibhav Kumar
Prince Kumar Yadav
(B.tech ME IIrd year)

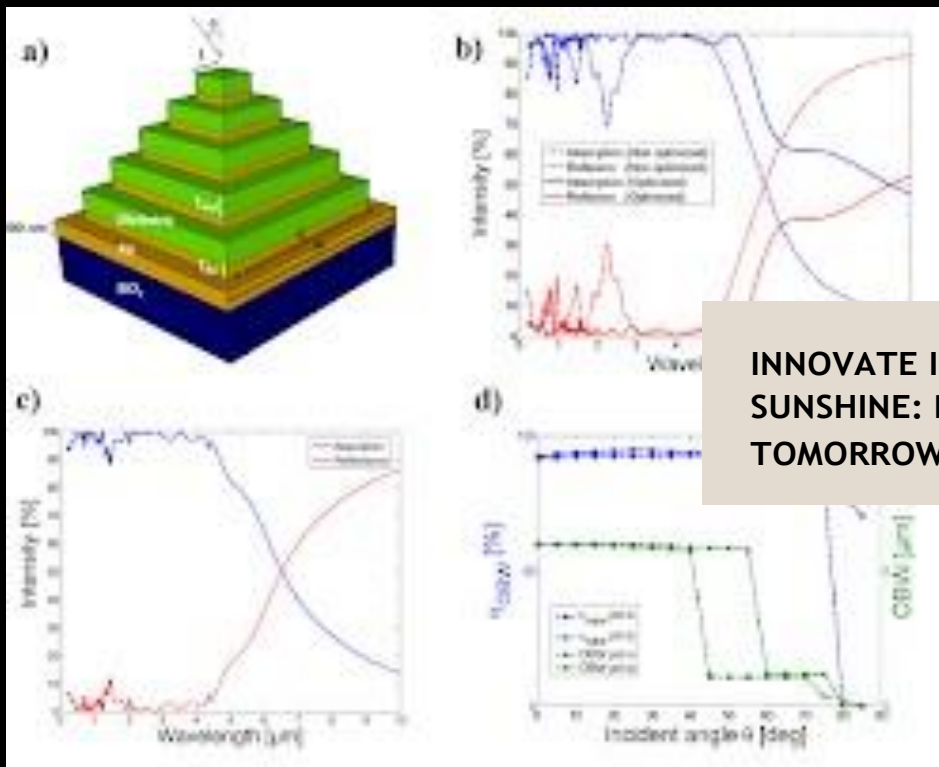
Karan Kumar
Alok Singh
(B.tech ME IIrd year)



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 (Mohanlalganj) Lucknow, Uttar Pradesh India and is affiliated to AKTU and BTE and Approved by AICTE. The Lucknow campus is spread over 200 acres and is located near NH-56B, surrounded by lush green field and enhanced by a beautiful lake which makes it Best Private Engineering Institute in Lucknow. The institute is 24 kilometers from Lucknow Railway Station and 20 kilometers from Amausi Airport, Lucknow. It is very well connected to the district headquarters.

Ambalika center of excellence has become the most dominating center delivering high-end technical skills to our engineers to make them highly employable. AIMT, Lucknow is imparting training and joint certification programs of innovative technologies in collaboration with the Industry giants such as Microsoft, KUKA Robotics, Siemens, Ace Micromatics, MTab, Master CAM etc.



INNOVATE IN THE
SUNSHINE: POWERING
TOMORROW, TODAY.

Harnessing the Sun's Power: A Hyperbolic Path to Solar Energy Harvesting

The sun, a radiant orb of immense energy, has long tantalized humankind with its potential to address our ever-growing power needs. While solar energy technologies have come a long way, capturing and converting its full spectrum into usable energy remains a challenge. Enter the realm of hyperbolic materials, offering a groundbreaking approach to solar energy harvesting with their unique light-trapping abilities.

What are Hyperbolic Materials?

Imagine a material that bends light not just towards, but also away from itself, defying the usual rules of optics. This is the essence of hyperbolic materials, characterized by a negative refractive index for one light polarization. This exotic property arises from their anisotropic nature, where the material behaves differently for different light waves. The result? Light gets trapped and concentrated within the material, leading to exceptional absorption.

Nature's Gift: Harnessing Natural Hyperbolic Materials

While engineered metamaterials can exhibit hyperbolic behavior, their complex fabrication presents challenges. Fortunately, Mother Nature has provided us with naturally occurring hyperbolic materials like hexagonal boron nitride (h-BN) and transition metal dichalcogenides (TMDCs). These materials offer inherent hyperbolic properties, simplifying fabrication and potentially paving the way for cost-effective solar energy solutions.

The Absorber Design: Pyramids to the Sun

Researchers propose an ingenious absorber design utilizing periodic arrays of pyramidal nanostructures made from natural hyperbolic materials. These pyramids act like tiny light traps, guiding and confining sunlight within the material. The hyperbolic nature further enhances absorption, maximizing the conversion of solar energy into heat or electricity.

Advantages of the Hyperbolic Approach:

- **Broadband absorption:** The design efficiently captures a wide range of solar wavelengths, maximizing energy harvesting.
- **Thin-film technology:** The nanoscale structures enable lightweight and flexible absorbers, ideal for diverse applications.
- **Enhanced thermal stability:** Natural hyperbolic materials like h-BN exhibit excellent thermal stability, crucial for long-term operation under harsh sunlight conditions.

Unlocking the Potential: Challenges and Future Prospects

While the potential of hyperbolic absorbers is undeniable, challenges remain. Scalability and cost-effective fabrication of large-area devices require further research and development. Additionally, integrating these absorbers into existing solar cell technologies needs careful consideration.

Despite these hurdles, the future of hyperbolic solar energy harvesting appears bright. Continued research and advancements in nanofabrication hold the key to unlocking the full potential of this revolutionary technology. Imagine solar panels with enhanced efficiency, powering homes and cities with the sun's boundless energy. The hyperbolic path to a sustainable future beckons, and with each step forward, we harness the power of nature to illuminate our world.

This article is just a glimpse into the captivating world of hyperbolic materials and their potential to revolutionize solar energy harvesting. As research progresses and technological hurdles are overcome, we can expect to see these extraordinary materials illuminating our path towards a brighter, more sustainable future.

Ankit Kumar (2003630400011)
Shubham Kumar (2003630400046)
B.Tech ME IVth Year

Invisible Powerhouse

Windows that Generate While You Gaze

Imagine a world where every window harnesses the sun's power, quietly generating clean energy for your home or office. This futuristic vision is no longer science fiction, but a rapidly evolving reality thanks to fully transparent solar-power-generating windows.

Gone are the clunky, opaque solar panels that dominate rooftops. These innovative windows seamlessly integrate into existing architecture, providing stunning views while discreetly capturing sunlight and converting it into electricity.

How It Works:

The magic behind these solar windows lies in thin-film photovoltaic (PV) technology. Instead of using silicon wafers, like traditional solar panels, these windows employ ultra-thin layers of organic or inorganic materials embedded within the glass itself.

These layers efficiently capture specific wavelengths of light while allowing visible light to pass through, maintaining transparency. The captured light then generates electricity that can be used to power the building's lights, appliances, or even be fed back into the grid.

Benefits of Transparent Solar Windows:

- **Aesthetically pleasing:** Unlike traditional solar panels, transparent windows blend seamlessly into any building design, preserving existing architecture and eliminating the need for dedicated solar installations.
- **Increased energy efficiency:** By generating their own electricity, these windows can significantly reduce reliance on conventional energy sources, lowering energy bills and carbon footprint.
- **Versatility:** These windows can be applied to buildings of all shapes and sizes, from homes and offices to skyscrapers and greenhouses.
- **Enhanced building functionality:** Integrating photovoltaic technology into windows can offer additional benefits like solar shading and self-cleaning capabilities.



Challenges and Future Prospects

While the technology is promising, challenges remain. Current transparent solar panels still lag behind traditional panels in terms of conversion efficiency. Additionally, cost and scalability are factors that need further development for widespread adoption.

However, with continuous research and development, these hurdles are steadily being overcome. Experts predict that advancements in materials science and manufacturing will significantly improve efficiency and lower the cost of transparent solar windows in the coming years.

The future of windows is bright, literally! Imagine cities bathed in sunlight, not just with natural light, but also with the invisible hum of renewable energy generation.

Transparent solar windows offer a sustainable and aesthetically pleasing solution to our energy needs, blurring the lines between architecture and energy production. As the technology matures and becomes more accessible, we can expect to see these windows gracing not just skyscrapers, but every home and building, paving the way for a brighter, more energy-independent future.

So, the next time you gaze out your window, let your imagination dance with the possibilities. Perhaps, one day, that very window will be quietly whispering in the language of light, powering your world and contributing to a brighter tomorrow.

Prince Kumar Soni (2003630400033)
Mohit Shrivastov (2003630400029)
(B.tech ME IVth year)

TUBULAR TRIUMPH

Efficient Biodiesel from Waste Oil using Ultrasound



By Kaushal Saini (210363040008), Vineet kumar (2103630400020), B.Tech ME IIIrd Year

In the global quest for sustainable energy, biodiesel stands out as a promising alternative to fossil fuels. Its production from waste cooking oil (WCO) offers a double-edged sword: reducing waste and combating climate change. Enter the ultrasonic tubular reactor (UTR), a technology poised to revolutionize this process with its speed, efficiency, and eco-friendly advantages.

The WCO Challenge:

The global consumption of cooking oil generates colossal amounts of WCO, posing a significant environmental and health hazard if improperly disposed of. While incineration and land filling remain prevalent, their ecological consequences are alarming. Biodiesel production from WCO presents a sustainable solution, transforming waste into a valuable fuel.

Traditional Transesterification:

Biodiesel production from WCO involves transesterification, a chemical reaction where triglycerides in the oil react with an alcohol (typically methanol) to form fatty acid methyl esters (FAME) – the main component of biodiesel. However, conventional methods often suffer from:

- Slow reaction rates: The process can take several hours, requiring large reactors and higher energy consumption.
- High catalyst usage: Traditional catalysts like sodium hydroxide pose risks and require complex separation procedures.
- Interesterification side reactions: Unwanted byproducts like soap can reduce biodiesel yield and complicate purification.

UTR Unveiling Efficiency:

The UTR emerges as a game-changer, addressing these limitations by harnessing the power of ultrasound. High-frequency sound waves propagate through the reaction mixture, causing intense cavitation, the formation and violent collapse of microscopic bubbles. This phenomenon generates:

- Enhanced mass transfer: Cavitation disrupts the reaction mixture, bringing reactant molecules into closer contact, significantly accelerating the transesterification process.
- Increased catalyst activity: Ultrasound promotes interaction between catalysts and reactants, allowing for lower catalyst usage and reduced environmental impact.
- Suppressed side reactions: Cavitation selectively targets triglyceride molecules, minimizing interesterification and maximizing biodiesel yield.

UTR Advantages:

UTR-based biodiesel production boasts several benefits:

- Reduced reaction time: UTRs can slash reaction times down to minutes, significantly increasing production capacity and reducing energy consumption.
- Improved FAME yield: Higher conversion rates of WCO to FAME are achievable compared to traditional methods.
- Lower catalyst needs: UTRs enable significant reductions in catalyst usage, minimizing environmental impact and operational costs.
- Easy catalyst recovery: Cavitation facilitates simple catalyst separation and recycling, further enhancing sustainability.
- Scalability: UTRs can be tailored to various production capacities, making them suitable for both small-scale and large-scale biodiesel production.

From Lab to Industry:

While UTR technology has demonstrated success at the lab scale, its transition to large-scale industrial applications is ongoing. Challenges like optimizing reactor design, improving efficiency with higher WCO concentrations, and addressing cost considerations require further research and development.

A Sustainable Horizon:

UTRs have the potential to produce green biodiesel from WCO, contributing to a cleaner, more sustainable future. With continued research and technological advancements, they can power vehicles and industries with homegrown fuel.

This article is just a starting point for your technical magazine piece. You can further expand on it by:

- Providing specific details about UTR design and operating principles.
- Including experimental data and comparisons with traditional methods.
- Discussing the economic feasibility and market potential of UTR technology.
- Highlighting the environmental benefits and life cycle assessment of UTR-based biodiesel production.
- Featuring interviews with researchers and industry experts in the field.

By delving deeper into these aspects, you can craft a comprehensive and informative article that will captivate your technical audience and spark further discussions about sustainable energy production.

BEYOND 3D: SHAPING THE FUTURE WITH 4D PRINTING

By Anand Singh(210363040002), Saurav Kumar (2103630400018) B.Tech ME IIIrd Year

Move over, static sculptures and rigid prototypes. The future of printing is not just three-dimensional; it's alive, dynamic, and ready to dance – with the arrival of 4D printing. This revolutionary technology transcends mere shapes and delves into the realm of time, imbuing objects with the ability to transform and respond to their environment.

Imagine a self-adjusting wing morphing to optimize airflow during flight, a medical cast adapting to a healing bone, or a self-deploying shelter springing up in disaster zones. These are no longer sci-fi fantasies; they are the tangible promises of 4D printing.

From Static to Kinetic:

Unlike its 3D counterpart, 4D printing doesn't just build layers of material; it weaves in intelligence. At its core are smart materials – materials imbued with the ability to change form upon exposure to stimuli like heat, light, or pressure. These materials are the actors in the 4D play, programmed to move and adapt according to pre-determined designs.

The magic lies in the intricate programming of these materials, much like writing a script for a responsive performance. This script dictates how the material will react to environmental cues, resulting in the desired transformation.

Unlocking a Universe of Possibilities:

The implications of this dynamic sculpting power are vast, stretching across diverse industries:

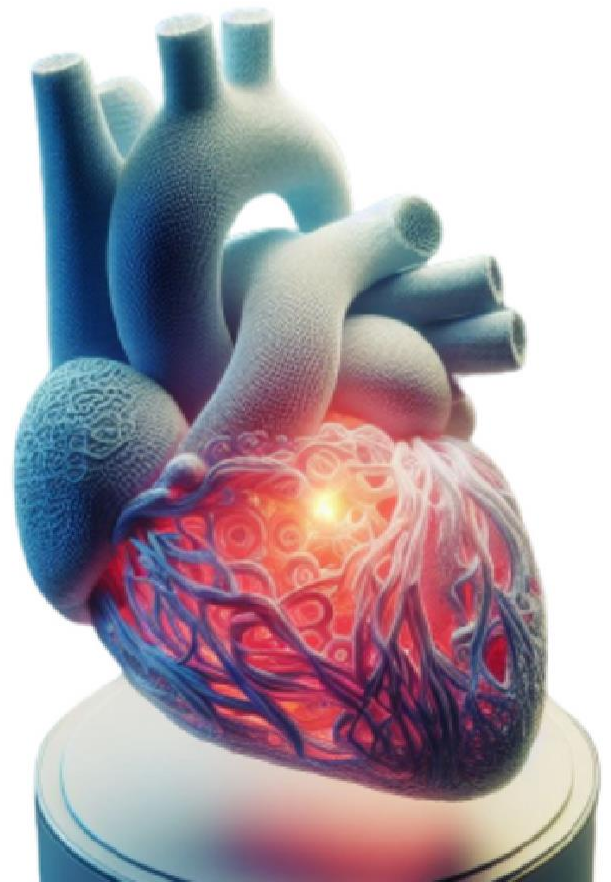
- Aerospace: Imagine wings adjusting in real-time for optimal lift and drag, or deployable heat shields protecting spacecraft from re-entry temperatures.
- Medicine: Custom-printed braces that realign bones with controlled pressure, or drug-delivery implants releasing medication based on body temperature changes.
- Construction: Self-assembling shelters for disaster relief, or adaptive buildings that adjust to weather conditions for increased energy efficiency.
- Robotics: Soft robots with built-in actuators for enhanced dexterity and adaptability, or self-repairing robots capable of mending their own damaged parts.

Challenges and Opportunities:

While the potential is dazzling, 4D printing still faces hurdles. Controlling the precise movements of these time-varying materials demands sophisticated design tools and advanced materials science. Scalability and cost also remain challenges, but with rapid advancements, these barriers are poised to crumble.

The future of 4D printing is undeniably bright. It promises to rewrite the rules of how we design, manufacture, and interact with objects. Imagine a world where objects are not just inert tools, but active partners, responding to our needs and the environment with intelligent grace. With each step into the realm of 4D, we shape not just objects, but the very future of possibilities.

This article is just a starting point. To delve deeper, you can explore specific applications in different industries, discuss the ethical considerations of this powerful technology, or interview researchers and pioneers pushing the boundaries of 4D printing. Remember, the future is dynamic, and so should your exploration of this transformative technology. Let's embrace the dance of 4D, and together, shape a world where objects come alive with the vibrant pulse of innovation.





GOODBYE FIX-IT-LATER, HELLO PDM: THE RISE OF PROACTIVE MAINTENANCE

Imagine a world where machines whisper their secrets before they break down, allowing us to intervene and prevent costly repairs and disruptions. This futuristic scenario is no longer science fiction; it's the reality ushered in by predictive maintenance (PdM), a game-changer transforming how we maintain equipment across industries.

Farewell, Fix-It-Later Mentality:

For decades, reactive maintenance reigned supreme. We waited for machines to cough, sputter, and finally fail before fixing them, often incurring downtime, production losses, and hefty repair costs. But PdM flips the script, embracing a proactive approach. By leveraging data and advanced analytics, it predicts potential equipment failures before they occur, enabling timely interventions and preventing headaches down the line.

By -Vaibhav Kumar (2203630400010)
Prince Kumar Yadav
B.Tech ME IInd Year

The Power of Data and Analytics:

The magic of PdM lies in its ability to listen to the whispers of machines. Sensors attached to equipment continuously collect data on various parameters like vibrations, temperature, and power consumption. This data is then fed into intelligent algorithms that analyze it for patterns and anomalies. By identifying subtle changes that might indicate impending failure, PdM delivers a heads-up before the breakdown ever happens.

Benefits Beyond Measure:

- Reduced downtime: Catching problems early minimizes equipment downtime, boosting productivity and efficiency.
- Lower repair costs: Proactive maintenance prevents catastrophic failures, saving on expensive repairs and replacements.
- Extended equipment lifespan: By addressing issues before they worsen, PdM helps equipment last longer, maximizing its value.

- Enhanced safety: Identifying potential safety hazards through PdM minimizes risks for workers and the environment.
- Optimized resource allocation: PdM allows for targeted maintenance efforts, focusing resources on equipment needing immediate attention.

From Factories to Farm Fields:

- PdM isn't just for factory floors. Its applications extend across diverse industries:
- Aviation: Airlines use PdM to monitor aircraft engines, ensuring safe and efficient flights.
- Energy: Power plants leverage PdM to predict equipment failures and prevent disruptions in energy supply.
- Healthcare: Hospitals employ PdM to monitor medical equipment, ensuring its reliability for critical patient care.
- Agriculture: Smart farms use sensors and PdM to optimize irrigation, fertilization, and equipment maintenance.

Challenges and the Future of PdM:

While the potential of PdM is immense, some challenges remain. Implementing advanced sensors and analytics can be costly, and integrating PdM systems into existing infrastructure requires strategic planning. Yet, with advancements in technology and data analytics, these hurdles are steadily being overcome. The future of PdM is bright. As AI and machine learning capabilities evolve, PdM will become even more sophisticated, predicting not just failures but also optimal maintenance schedules and resource allocation. Imagine a world where machines not only work for us but actively partner with us in their own care, maximizing their lifespan and ensuring smooth operations.

PdM is more than just a technology; it's a mindset shift, a move towards a future where we listen to the whispers of our machines and build a more reliable, efficient, and sustainable world. So, the next time you hear the hum of a machine, remember, it might be whispering its secrets, waiting for you to listen and unlock the power of predictive maintenance.



"PDM: THE ULTIMATE INSURANCE POLICY AGAINST THE SURPRISE PARTY OF A BREAKDOWN."

From Magic to Reality

UNVEILING THE MATERIALS OF TOMORROW

By Karan Kumar Pandey (2203630400001)
Alok Kumar (2203630400003)
B.Tech ME IInd Year

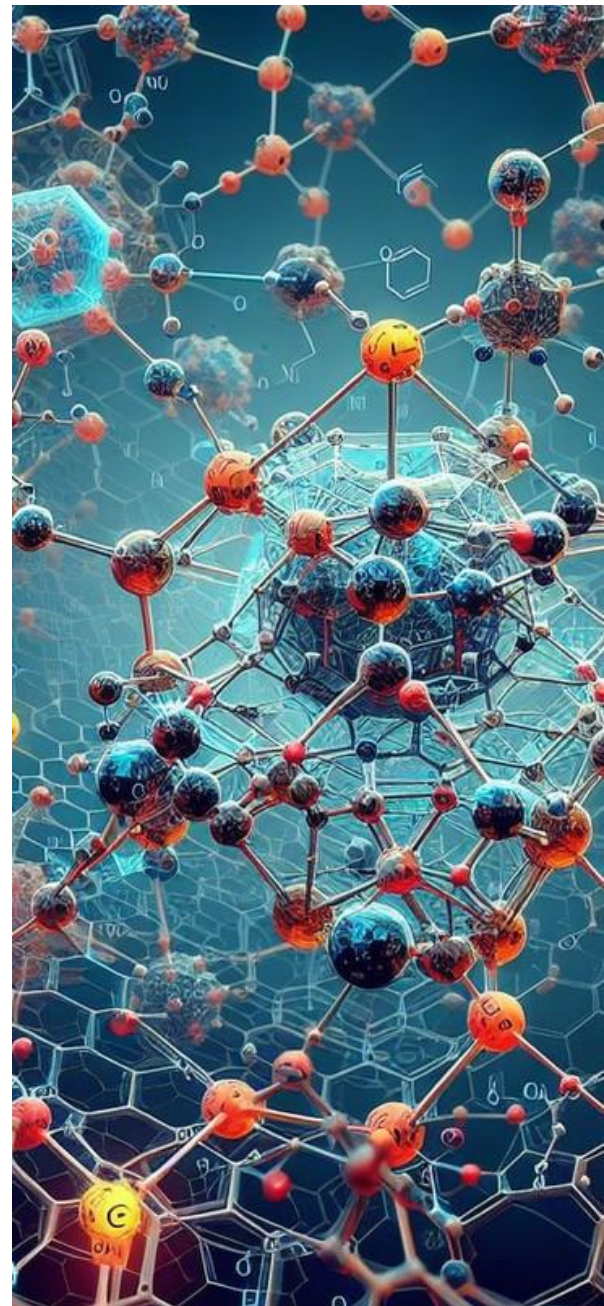
Prepare to be amazed, for the future of industry gleams with the promise of revolutionary materials. From self-healing polymers to programmable metamaterials, these 50 innovations are poised to reshape everything from construction to medicine, transportation to energy. Dive into this vibrant spectrum of possibilities:

1 Metamaterials

Bending the very fabric of space and time, these engineered materials manipulate light and sound in incredible ways, holding the key to cloaking devices, super-lenses, and ultra-efficient solar cells.

2 Graphene and its derivatives

Stronger than steel yet lighter than air, graphene's conductivity and versatility open doors to flexible electronics, transparent electrodes, and next-generation batteries.



3 MOFs (Metal-Organic Frameworks)

These porous giants with infinite design possibilities promise gas capture and storage solutions, efficient drug delivery systems, and even water purification miracles.

5 Bioplastics

Ditching fossil fuels for plant-based polymers, bioplastics break down naturally, reducing plastic waste and paving the way for sustainable packaging and biodegradable products.

7 Topological insulators

These electrical oddities conduct electricity on their surface while insulating the interior, promising revolutionary quantum computing applications and exotic electronics.

4 Liquid metals

Morphing like mercury but as soft as toothpaste, liquid metals offer heat sinks that adapt to shape, self-healing electronics, and even soft robots with a touch of the T-1000.

6 MXenes

Two-dimensional wonders layered from transition metals and carbon, MXenes offer a universe of possibilities, from super-strong, lightweight composites to energy storage solutions and even electrochromic windows.

8 Perovskites

These solar cell powerhouses boast stunning efficiency and affordability, pushing the boundaries of renewable energy and promising a solar-powered future.

9 Self-healing polymers

Imagine materials that mend themselves, extending product lifespans and reducing waste. Self-healing polymers, from scratch-resistant coatings to shape-shifting structures, are not science fiction anymore.

11 Nanocellulose

From super-strong building materials to flexible electronics, this abundant and sustainable resource derived from wood pulp redefines the possibilities of natural materials.

13 Engineered wood

Reimagining nature's building block, engineered wood offers stronger, lighter, and more fire-resistant alternatives to traditional lumber, transforming the construction industry for the better.

10 Hyperbolic metamaterials

Bending light in unprecedented ways, these materials hold the key to ultra-thin, ultra-efficient solar cells, optical cloaking, and even manipulating heat flow at will.

12 Quantum dots

These tiny particles that emit light on demand hold the key to revolutionary displays, ultra-sensitive bioimaging, and even solar cells that capture a wider spectrum of sunlight.

14 Biocompatible electronics:

Imagine seamlessly merging technology with human tissue. Biocompatible electronics, from soft circuits to implantable sensors, are blurring the lines between humans and machines.

15 DNA-based materials

Nature's ultimate blueprint is being repurposed! DNA-based materials offer self-assembly, programmable properties, and even potential applications in bioelectronics and regenerative medicine.

16 Hydrogels

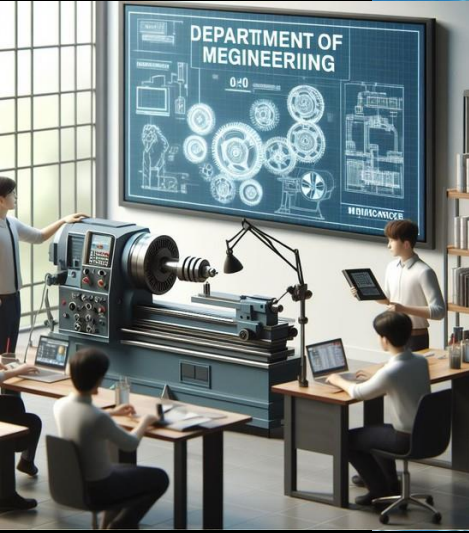
These water-loving gels mimic natural tissues, holding immense potential for wound healing, drug delivery, and even artificial organs.

17 Nanofibers

From ultra-strong textiles to air filters that capture even the tiniest particles, nanofibers offer a spectrum of possibilities, revolutionizing everything from clothing to environmental technologies

This is just the beginning! From smart coatings that clean themselves to magnetic levitation materials, the list of groundbreaking materials shaping the future is endless. So buckle up, because the industrial landscape is about to undergo a breathtaking transformation, driven by the magic of these innovative materials.

The innovations in the field of technology represent a paradigm shift, offering cleaner skies, safer roads, lighter airplanes, and healthier lives. These revolutionary materials are paving the way for a brighter, more sustainable, and technologically empowered future, paving the way for a wonderland filled with innovation.



About Department of Mechanical Engineering



CANVA STORIES



CANVA STORIES



CANVA STORIES

The Department of Mechanical Engineering at AIMT has been at the forefront of engineering education and training since its establishment. With a strong commitment to excellence, we have consistently contributed to the field of engineering and technology.

Over the years, we have witnessed remarkable growth and have made significant contributions to the transfer of technology and the advancement of innovation. Mechanical engineering, a subset of General engineering, is the backbone of technology. Our talented engineers leverage scientific principles and mathematical techniques to solve complex technical problems.

They possess the unique ability to create new products and solutions, driving innovation and pushing technology to its limits. At AIMT, we take pride in nurturing the next generation of inventors and problem solvers. Our comprehensive curriculum equips students with the knowledge and skills necessary to tackle real-world challenges. Through hands-on experiences, practical training, and theoretical understanding, we prepare our students to excel in their careers and make a positive impact on society. What sets us apart is our dedicated faculty, who are renowned experts in their respective fields.

They bring their wealth of knowledge and industry experience into the classroom, creating an engaging and dynamic learning environment. Our faculty members are committed to mentoring students, providing personalized guidance, and fostering a spirit of innovation and creativity. As a student in our department, you will have access to state-of-the-art facilities and cutting-edge research opportunities.

Our laboratories are equipped with the latest technology and equipment, allowing you to gain practical experience and conduct groundbreaking research. Additionally, we offer collaborative projects and internships with industry partners, giving you valuable industry exposure and preparing you for the professional world. Join us at the Department of Mechanical Engineering at AIMT and embark on a journey of discovery, innovation, and limitless possibilities.

Whether your passion lies in robotics, renewable energy, automotive engineering or any other field, we provide a supportive and stimulating environment to explore your interests and make your mark in the world of engineering.

Department Vision & Mission



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



- To motivate students to indulge in analytical and creative thinking by putting them in challenging environment by means of appropriate pedagogy.
- To develop department of mechanical engineering as a centre of excellence in the various advance fields.
- To develop the habit of continuous learning, team work and fulfill the societal needs.

Programme Educational Objectives (PEOs)

- 1** To prepare students for successful career in Core Mechanical and Interdisciplinary Industries through strong foundation in mathematical, scientific and engineering fundamentals. (Pre-preparation)
- 2** To develop ability among the students for acquiring 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 the technical skills in classical software packages. (Core competence and professionalism)
- 3** To equip students with broad based knowledge to support the service industries, economic development and to address social and engineering challenges of the nation. (Breadth)
- 4** To promote the students for continuous learning, research and development with strong professional, moral and ethical values and zeal for life-long learning. (Learning environment)

Programme Objectives (POs)

- 1. 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.**
- 2. Problem analysis: Ability to effectively apply knowledge of computing and mathematics to computer science problems.**
- 3. Design/development of solutions: Ability and skills to effectively use state-of-the-art techniques and computing tools for analysis, design and implementation of computing systems which resolve real life problems.**
- 4. Conduct investigations of complex problems: Ability to utilize multi-disciplinary knowledge across domains to effectively apply computer technology in a global and social environment.**
- 5. Modern tool usage: Ability to efficiently make use of additional training provided throughout the course, satisfying industry requirements and thereby becoming globally employable.**
- 6. The engineer and society: Ability to successfully pursue professional development through lifelong learning.**
- 7. Environment and sustainability: Ability to communicate effectively with both technical and non-technical audiences.**
- 8. Ethics: Ability to become a versatile professional and function effectively as an individual and as a member.**
- 9. Individual and team work: Ability to understand professional, ethical, legal, security, and social issues and responsibilities.**
- 10. Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.**
- 11. Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects 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.**



Messages

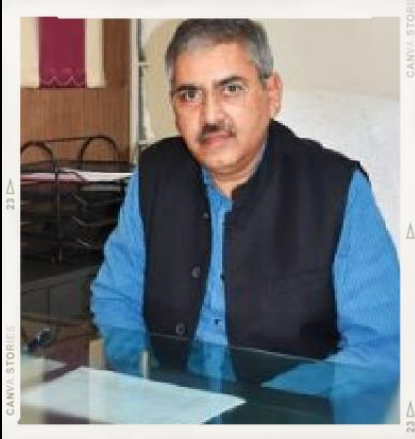
Executive Director's Message



It gives me immense pleasure to introduce our Technical Magazine "TechMech" from Dept. of Mechanical Engg. 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 in various academic conferences. It will help the documentation culture of the institute. One of our greatest strength is our highly qualified and dedicated faculty members and staff. I congratulate the editorial team, faculty, staff members and students for their contribution in the maiden issue of "TechMech". It is an attempt of the Technical Magazine to acquaint its readers with the Techological updation in the field of Mechanical Engineering.

Mr. Ambika. Mishra
Executive Director
Ambalika Group of Institutions

Director's Message



I feel honored and grateful to start the Next edition of our Technical Magazine "Tech Mech" from Dept. of Mechanical Engineering. This magazine will serve to reinforce and allow an increased awareness in the field of Mechanical Engineering and an improve interaction among all of us. It will not only serve the objective of creating responsiveness but will give a platform to new ideas, progress and creativity. I do hope that it will encourage faculty, students and others to contribute regularly in making our newsletter a success and may it acquire great heights in the years to come.

Dr. Ashutosh Dwivedi
Director

Ambalika Institute Of Management & Technology

Head's Message



We are delighted to introduce our department and share with you all the exciting things happening in Mechanical Engineering. Our department is committed to providing students with an excellent educational experience that prepares them for successful careers in engineering. Our faculty members are dedicated to excellence in teaching, research, and service. Our students are engaged in innovative projects that are making a difference in the world.

Our department offers a wide range of courses, including design and analysis of mechanical systems, robotics, materials science, and energy conversion.

We invite you to learn more about the Mechanical Engineering Department and the exciting opportunities available to our students.

Mrs. Vandana Pathak
HEAD

Department of Mechanical Engineering
Ambalika Institute Of Management & Technology

Chief Editor's Message



We are proud to present our latest issue of the Mechanical Engineering Technical Magazine. This issue is packed with cutting-edge research and development in the field. We hope that this magazine will help you stay up-to-date with the latest trends and advancements in mechanical engineering. We would like to thank our dedicated team of writers and editors who worked hard to make this magazine possible. We are also thankful for the generous support of our Management, who made this publication possible. We hope that you enjoy this issue of the Mechanical Engineering Technical Magazine and find it to be a valuable resource in your professional journey.

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