CHANDIGARH ENGINEERING COLLEGE
CGC, LANDRAN, MOHALI

Building Careers. Transforming lives.

Mechnotimes

NEWSLETTER

Department of Mechanical Engineering

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July-September 2024

VISION OF CHANDIGARH ENGINEERING COLLEGE-CGC, LANDRAN

To become a leading institute of the country for providing quality technical education in a research-based environment for developing competent professionals and successful entrepreneurs.

MISSION OF CHANDIGARH ENGINEERING COLLEGE-CGC, LANDRAN

1. To provide state of the art infrastructure and engage proficient faculty for enhancing the teaching learning process to deliver quality education.
2. To give a conductive environment foe utilising the research abilities to attain new learning for solving industrial problems and societal issues.
3. To collaborate with prominent industries for establishing advanced labs and using their expertise to give contemporary industry exposure to the student and faculty.
4. To cater opportunities for global exposure through association with foreign universities.
5. To extend choice-based career options for students in campus placements, entrepreneurship and higher studies through career development program.

DEPARTMENT OF MECHANICAL ENGINEERING

Vision of the Department

To emerge as centre of quality education for creating competent mechanical engineers catering to the ever-changing needs of industry and society.

Mission of the Department

M1: To provide quality education by constantly updating departmental resources and using effective teaching learning methodology.

M2: To promote research practices in the field of mechanical engineering in pursuit of academic excellence and for the benefit of society.

M3: To establish industrial collaborations for imparting contemporary knowledge to keep pace with the technological challenges in the interdisciplinary and core areas of mechanical engineering.

M4: To provide opportunities to the students for global exposure through international collaborations.

M5: To nurture students through pre-placement training programs to succeed in campus placements and to provide guidance for entrepreneurship and higher studies.

EDITOR'S COLUMN

A newsletter stands as a testament to the vision and mission of a department, serving as a platform to highlight key events, innovative activities, and notable academic achievements. In the ever-evolving field of mechanical engineering, the pursuit of innovation and sustainability remains at the forefront, driving progress to shape a better world and leave a meaningful impact on society. While we honour our past accomplishments, our focus is firmly set on the future, brimming with opportunities and boundless possibilities. The discipline of mechanical engineering holds immense potential to redefine the boundaries of technology and human ingenuity. With unwavering commitment, we aim to prepare the next generation of engineers to tackle the challenges of tomorrow with competence and creativity. This newsletter not only celebrates the remarkable contributions of our students and faculty but also serves as a window into their inspiring journey of growth and discovery. As valued readers and contributors, you are integral to this transformative journey. Your engagement fuels the spirit of progress and innovation that defines our community. We take great pride in sharing these glimpses of our department's dynamic endeavours and trust that this culture of knowledge-sharing will endure, inspiring others to follow in our footsteps. Let this publication be a beacon of excellence and a testament to the unwavering commitment to advancing the field of mechanical engineering.

AISHNA MAHAJAN

EDITOR-IN-CHIEF

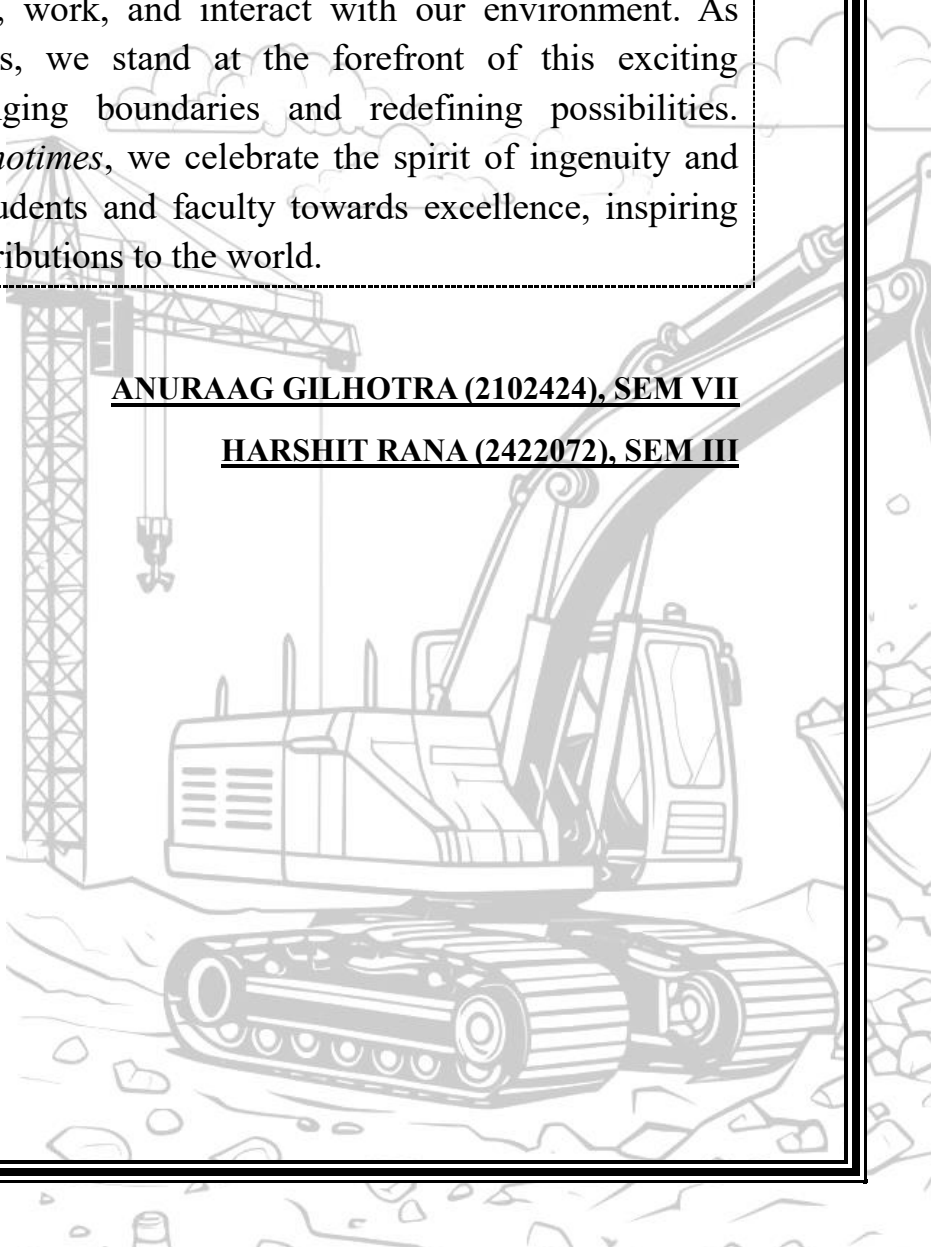
MECHNOTIMES

FROM EDITORIAL'S BOARD

Welcome to the latest edition of *Mechnotimes*, the official newsletter of the Mechanical Engineering Department at Chandigarh Engineering College - CGC, Landran, covering the period from July to September 2024. As we navigate the ever-expanding horizons of engineering and technology, we are reminded of the immense opportunities and responsibilities that come with this journey. This editorial highlights the critical importance of innovation and sustainability as the driving forces shaping the future of the mechanical engineering landscape. Innovation lies at the heart of engineering, acting as the catalyst for progress. From the revolutionary invention of the steam engine to the cutting-edge advancements in electric vehicles, innovation has continually transformed the way we live, work, and interact with our environment. As aspiring mechanical engineers, we stand at the forefront of this exciting evolution, constantly challenging boundaries and redefining possibilities. Through this edition of *Mechnotimes*, we celebrate the spirit of ingenuity and dedication that propels our students and faculty towards excellence, inspiring them to make meaningful contributions to the world.

ANURAAG GILHOTRA (2102424), SEM VII

HARSHIT RANA (2422072), SEM III



Expert talk on “From Concept to Creation: The Power of Computer-Aided Design”

The Mechnorobs Club of the Department of Mechanical Engineering, CEC-CGC, Landran, organized an expert talk titled “*From Concept to Creation: The Power of Computer-Aided Design*” on July 25, 2024. The session was conducted by Mr. Pritam Prakash from P2P Analysis and Solutions and saw participation from around 55 students. Mr. Prakash introduced the students to cutting-edge trends and innovations in engineering design and analysis. He also explored future advancements in CAD technology, highlighting the role of artificial intelligence, virtual reality, and collaborative design platforms. The informative and interactive session concluded with a feedback and Q&A session between the students and the speaker.

Expert talk on “Innovations in Additive Manufacturing: Shaping the Future of Production”

The Mechnorobs Club of the Department of Mechanical Engineering, CEC-CGC Landran organized another expert talk on "Innovations in Additive Manufacturing: Shaping the Future of Production" on August 1, 2024. Dr. Charanjit Singh Kalra from Modern Manufacturers, Ambala, delivered the session and demonstrated prototypes created using this cutting-edge technology. The event was highly successful, offering participants an in-depth understanding of the latest trends, technologies, and applications in additive manufacturing. Attendees gained valuable insights for their respective fields and practical knowledge on integrating these advanced technologies into modern manufacturing processes.

Students participating in the expert lecture on “Innovations in Additive Manufacturing: Shaping the Future of Production”

Industrial Visit to “Nahar Industrial Enterprises Limited”

The Department of Mechanical Engineering at CEC-CGC, Landran, organized an industrial visit to Nahar Industrial Enterprises Limited on August 9, 2024. This visit provided students with a unique opportunity to gain first-hand insight into the textile industry. Nahar Industrial Enterprises, a leading name in the sector, is renowned for its state-of-the-art manufacturing facilities and focus on quality. During the visit, students were introduced to the spinning process, where raw fibers are transformed into yarn using advanced machinery. The technical focus of the visit offered a detailed exploration of the technological and operational processes involved in textile manufacturing, bridging the gap between theoretical knowledge and practical application.

Students were exposed to modern machinery, automation, and sustainability practices in the textile industry, enhancing their understanding of current trends and technological advancements. They also learned about eco-friendly technologies, including water recycling systems and energy-efficient machinery, which are employed to reduce environmental impact in the manufacturing process.

Group photo of students during their visit to Nahar Industrial Enterprises Limited

Faculty Development Program on "Advanced Research Methodologies: Tools, Techniques and Best Practices"

Felicitation of Chief Guest at Inauguration Ceremony of FDP

The Department of Mechanical Engineering at Chandigarh Engineering College-CGC Landran organized a Faculty Development Program (FDP) on "Advanced Research Methodologies: Tools, Techniques, and Best Practices" from July 1 to July 5, 2024. This event included expert-led sessions and interactive discussions, focusing on innovative research methodologies.

The diverse panel of distinguished speakers included Prof. Harmesh Kumar from UIET, Panjab University, Chandigarh; Dr. Rajan Swami, Associate Professor at Chitkara University; Dr. Balwinder Singh, Joint Director at CDAC Mohali; Prof. Sarbjit Singh from PEC, Chandigarh; and Prof. Sanjeev Kumar, Head of the Department of Mechanical Engineering at PEC, Chandigarh enriched the participants with their knowledge.

Group Photograph of the participants after the valediction of FDP

The FDP aimed to enhance the research capabilities of faculty members, fostering a culture of high-quality research and contributing to the academic excellence of the institution. Participants gained proficiency in using LaTeX for writing professional research papers and learned effective strategies for producing impactful research work. Additionally, the program provided practical tools and skills that attendees could directly apply to their current and future research projects, enriching their academic pursuits.

A Hands-On Workshop on "MATLAB Essentials"

The Department of Mechanical Engineering at CEC-CGC Landran organized a workshop on "MATLAB Essentials: A Hands-On Workshop for Beginners" on August 29, 2024. The workshop focused on building foundational MATLAB skills, enhancing participants' problem-solving abilities and confidence through practical exercises. Attendees gained a thorough understanding of MATLAB's interface, commands, and basic programming functions, enabling them to perform essential computational tasks. Through hands-on exercises, participants applied MATLAB to real-world scenarios, boosting their analytical and computational skills. The workshop encouraged and inspired participants to use MATLAB independently, equipping them for advanced studies or applications in their respective fields.

Dr. Ritula Thakur conducting the workshop and engaging the students with the hands on session

“Thrust2k24…. Celebrating Engineers’ Day”

The Mechnorobs Club organized “THRUST 2K24….celebrating Engineers' Day” on 16.09.2024. The event featured dynamic technical events, cultural performances, and inspiring insights that encouraged student innovation.

The Guest of Honour Dr. Vikas Chawla, Dean Academics, IKGPTU, Jalandhar and Dr. Labh Singh, Chairman, Institution of Engineers (India) inspired the students with their thoughts, highlighting the vital role of engineers in shaping the future.

Glimpses of THRUST 2K24…celebrating Engineers' Day

Faculty Achievements

Best Teacher Award

Mr. Gurkirat Singh Bhatia, Assistant Professor in the Department of Mechanical Engineering, received the Best Teacher Award during the Teachers' Day celebrations organized by CGC Landran on September 5, 2024.

Mr. Gurkirat Singh Bhatia receiving award from the Hon'ble Management of CGC Landran

Best Research Coordinator Award

Dr. Saurabh Chaitanya, Associate Professor, in the Department of Mechanical Engineering, received the Best Research Coordinator Award during the Teachers' Day celebrations.

Dr. Saurabh Chaitanya receiving award from the Hon'ble Management of CGC Landran

Best Club Coordinator & Best Mentor Award

Ms. Aishna Mahajan, Assistant Professor in the Department of Mechanical Engineering, was honoured with the Award for special recognition, Best Mentor Award and the Best Club Coordinator Award during the Teachers' Day celebrations.

Ms. Aishna Mahajan receiving award from the Hon'ble Management of CGC Landran

Student Achievements

The Mechanical Engineering students of Chandigarh Engineering College - CGC, Landran, Mohali, have once again showcased their exceptional talent. Team Rudraksh has secured the First Prize at Hackwars, organized by Chandigarh University, along with a cash prize of ₹40,000. This outstanding achievement is a true testament to their dedication, innovation, and hard work.

Team Rudraksh wins 1st prize at Hackwars 2024, Chandigarh University

Mechanical Engineering Role in Harnessing Floating Offshore Wind Turbines

The Floating Offshore Wind Turbines (FOWTs) are emerging as a revolutionary technology in the renewable energy sector, offering a sustainable solution to harness wind energy from deep waters. Unlike traditional offshore wind turbines that rely on fixed seabed foundations, FOWTs are installed on floating platforms anchored to the seabed with cables. This innovative design enables turbines to operate in deep-water locations where wind speeds are stronger and more consistent, maximizing energy generation potential. Mechanical engineering plays a pivotal role in the development and optimization of FOWTs, focusing on areas such as platform design, load management, anchoring systems, and energy transmission. Engineers design floating platforms capable of withstanding dynamic ocean forces while using advanced materials like carbon fiber-reinforced polymers to enhance durability and reduce weight. Mooring systems are engineered to provide stability under changing sea conditions, while innovative cable designs ensure efficient electricity transmission from turbines to onshore grids. FOWTs offer significant advantages over traditional wind

turbines. They provide access to higher wind speeds in deep-water areas, leading to greater energy yields. Additionally, they minimize environmental impacts by reducing the need for invasive seabed construction, thereby preserving marine ecosystems. Their scalability allows for deployment far from shore, avoiding conflicts with coastal developments and expanding energy production capacity. Moreover, FOWTs create opportunities for countries with limited shallow coastal areas to adopt renewable energy solutions. However, challenges such as high installation costs, maintenance complexities, and energy transmission inefficiencies remain. To address these, mechanical engineers are driving innovations such as hybrid energy systems that integrate wind with solar or wave energy, digital twins for real-time monitoring and predictive maintenance, and standardized manufacturing processes to lower costs and facilitate mass adoption. The global interest in floating wind energy is growing rapidly, with projects like Hywind Scotland demonstrating the feasibility and potential of this technology. As investments in research and development increase, FOWTs are expected to become a cornerstone of the renewable energy landscape. They exemplify how mechanical engineering is pushing the boundaries of innovation to tackle energy challenges, enabling a cleaner and more sustainable future. By harnessing the power of wind in deep waters, FOWTs are redefining how renewable energy is generated and paving the way for a transformative shift in global energy systems. Despite these advantages, the widespread adoption of FOWTs is not without obstacles. High initial costs, technical expertise requirements, and maintenance challenges are notable barriers. However, advancements in automation, robotics, and digital twin technology are providing solutions. Automated inspection drones and sensors can monitor turbines for wear and tear, while predictive maintenance models help preempt failures, minimizing downtime and costs. Governments and private enterprises worldwide are investing heavily in research and pilot projects, with countries such as Norway, Japan, and the United States leading the charge in deploying commercial-scale floating wind farms. The future of FOWTs is bright, and their integration into global energy portfolios marks a significant step toward decarbonization. Floating offshore wind turbines are not just an engineering marvel; they are a testament to the ingenuity and innovation of mechanical engineers striving to create a cleaner, more sustainable world. By bridging the gap between ambition and reality, FOWTs are set to redefine the renewable energy landscape for generations to come.

Written by: Navneet Singh (2102436), Sem VII

3D Printing of Metal Alloys: A New Era in Mechanical Engineering

The advent of **3D printing** technology has already revolutionized several industries, including healthcare and aerospace, and its impact on mechanical engineering is poised to expand even further with the introduction of metal alloys in additive manufacturing. This groundbreaking technology involves using high-powered lasers or electron beams to fuse metal powders into solid objects, layer by layer, based on a digital design. The primary advantage of 3D printing with metal alloys is the ability to produce intricate, high-performance components with exceptional precision, which would be challenging or impossible to achieve through traditional manufacturing methods. Metals such as stainless steel, titanium, and aluminum, which are highly valued for their strength, corrosion resistance, and thermal stability, are commonly used for 3D printing, especially for applications requiring superior material properties. One of the main benefits of 3D printing with metal alloys is the **design flexibility** it offers. Traditional manufacturing techniques often face limitations when producing complex geometries, but 3D printing allows engineers to create parts with intricate lattice structures, reducing weight without compromising strength. This is especially valuable in industries like aerospace, where weight reduction directly impacts fuel efficiency and performance. Additionally, 3D printing provides the opportunity for **customization**. For example, in the medical field, implants and prosthetics can be tailored to fit a patient's specific needs, offering better functionality and a faster recovery time compared to standard mass-produced parts. The ability to create such customized components efficiently and cost-effectively is a game-changer for industries that require high precision and personalized solutions.

Another significant advantage is the reduction of **material waste**. Traditional manufacturing methods, such as machining, involve cutting away material from

a solid block, often leading to significant waste. In contrast, 3D printing only uses the material necessary to build the part, and unused metal powders can be recycled for future prints, making it a more sustainable manufacturing process. Furthermore, 3D printing allows for **faster prototyping and production**. Engineers can rapidly produce prototypes to test designs, speeding up the iterative process of development. This capability is particularly important in industries like automotive and aerospace, where innovation is a key factor in maintaining competitive advantage.

Despite its many advantages, there are challenges to overcome with metal 3D printing. The process is still relatively expensive, requiring specialized equipment and materials, which may limit its accessibility for smaller businesses or certain industries. The speed of production is another concern—while additive manufacturing is excellent for prototyping, it can be slower than traditional manufacturing for large-scale production. Additionally, ensuring the **quality and consistency** of 3D printed metal parts is crucial. The parts must be free of defects and meet industry standards for strength and durability. Engineers are continually improving the technology to address these concerns, and as printer speeds increase and material costs decrease, 3D printing is expected to become more viable for mass production.

Looking ahead, the potential for metal 3D printing in mechanical engineering is vast.. The ability to create complex, customized, and efficient components with reduced waste positions 3D printing of metal alloys as a leading force in the future of mechanical engineering. With its promising benefits in terms of efficiency, performance, and sustainability, this technology is set to redefine how mechanical components are designed, produced, and tested in the coming years.

Written by: Jatin Verma (2237645), Sem V

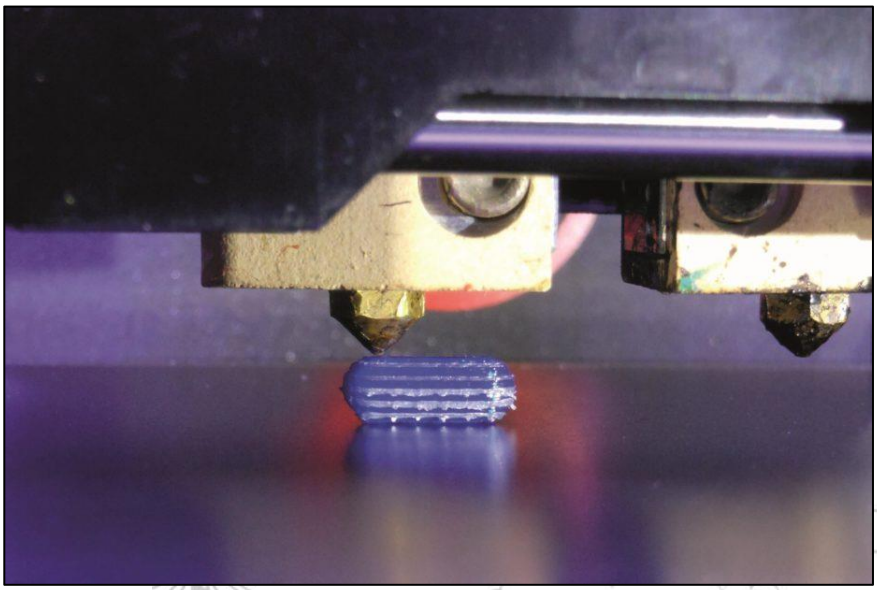
3D Printing Drug in Healthcare: Revolutionizing Medical Treatment and Prosthetics

3D printing has been making remarkable strides in various industries, and one of its most promising applications lies in the field of **drug development**. Traditionally, drug development is a lengthy, costly process that involves the discovery of active pharmaceutical ingredients, preclinical testing, clinical trials, and finally, the regulatory approval stages. However, 3D printing is transforming this process by enabling more efficient, customized, and cost-effective drug development. This innovative technology, through its ability to create complex structures layer by layer, is offering unprecedented opportunities to tailor medicines and streamline the drug production process.

One of the key ways 3D printing is revolutionizing drug development is through the creation of **personalized medicines**. In traditional drug manufacturing, pills and tablets are often produced in a one-size-fits-all approach, with set dosages and compositions. However, 3D printing allows for the creation of personalized drug doses based on an individual's specific needs. By using data such as a patient's weight, age, and medical history, 3D printing can produce medications with customized dosages, combinations, and even release rates. This ability to design medications that cater specifically to the unique requirements of individual patients can significantly improve treatment outcomes, particularly in complex conditions like cancer, where personalized therapy is key.

One of the most notable examples of 3D printing in drug development is the **creation of multi-drug tablets**. This innovation allows for the printing of pills that contain multiple drugs within a single tablet. Instead of taking multiple pills throughout the day, patients can benefit from a single, 3D-printed tablet

that releases the appropriate drugs in a controlled manner over a period of time. For instance, a 3D-printed tablet could be designed to release one drug immediately for quick action, while others might be released gradually, enhancing the effectiveness and convenience of treatment. This approach could be particularly beneficial for patients with chronic conditions who need long-term medication management, such as those with hypertension or diabetes.



Additionally, 3D printing allows for the **design of complex drug delivery systems**. Traditional tablets and capsules often follow basic structures. Moreover, 3D printing has the potential to **accelerate the development of new drug formulations**. In the traditional drug development process, researchers often have to wait for weeks or months to test the stability and effectiveness of a drug. With 3D printing, researchers can create prototypes of drug formulations in a matter of hours and quickly assess their properties. This can significantly speed up the process of drug discovery and reduce the time and cost involved in clinical trials. It also allows researchers to experiment with more complex drug formulations, such as drugs that require a combination of compounds, without the need for expensive and time-consuming manufacturing processes.These complex geometries allow for precise control over how a drug is released in the body, which is critical for optimizing treatment regimens. For instance, certain drugs may need to be released at specific locations within the digestive system, or over extended periods. 3D printing can design tablets that dissolve at particular pH levels or under specific conditions, ensuring that the drug reaches the desired location in the body at the right time.

Written by: Karan Kumar Chanyal (2237650), Sem V