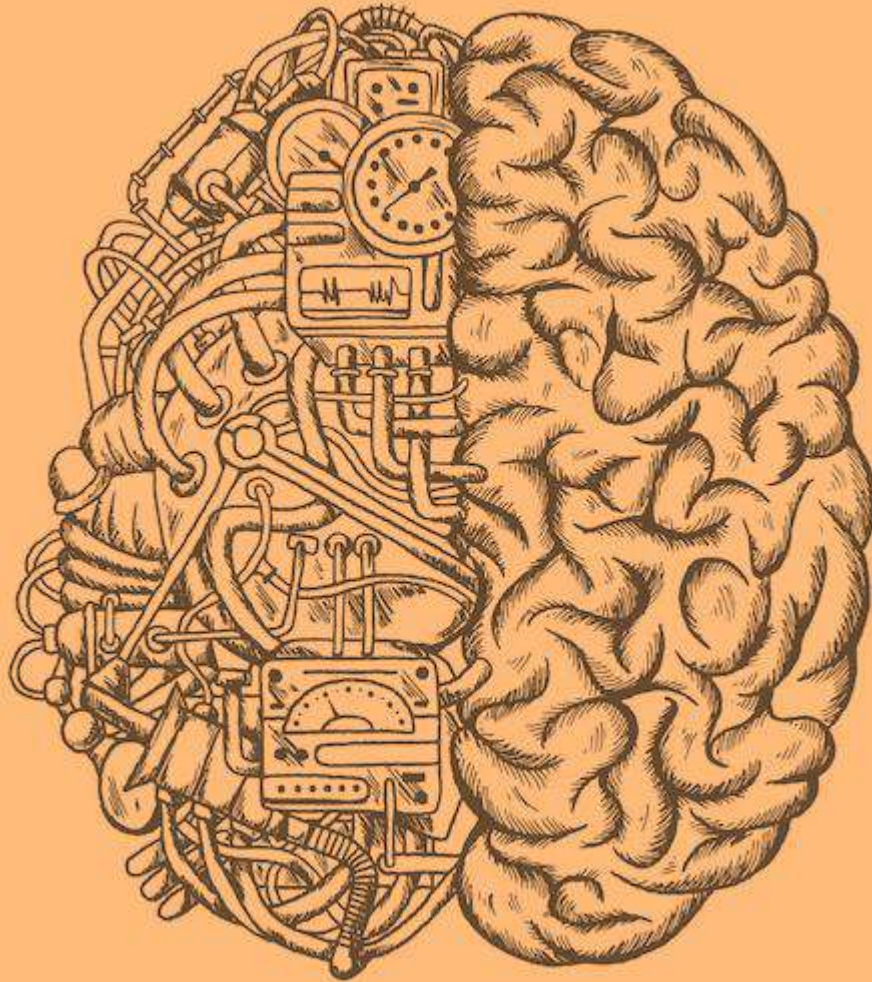




IPS Academy
INSTITUTE OF ENGINEERING & SCIENCE

Knowledge, skills and values



MECHAZINE

Department of Mechanical Engineering
Annual Magazine
2023-24

Letter from the Editors

Dear Readers,

It gives us immense pleasure to present the 2023–2024 edition of the Department of Mechanical Engineering Magazine, **MECHAZINE**. This magazine is a reflection of the knowledge, creativity, innovation, and achievements of our students and department throughout the academic year. It serves as a platform where students share their ideas, technical knowledge, and views on emerging technologies and modern engineering developments.

This edition of **MECHAZINE** includes informative student articles on topics such as Green Hydrogen as a sustainable energy source, Artificial Intelligence in manufacturing and robotics, Wind Energy, and Industrial Applications of Lasers. These articles highlight the growing role of mechanical engineering in sustainable energy, smart manufacturing, automation, and advanced industrial technologies. The magazine also showcases departmental achievements, student academic performance, placements, sports achievements, and other accomplishments of our students.

Mechanical engineering is continuously evolving with new technologies such as renewable energy systems, automation, artificial intelligence, advanced manufacturing, and sustainable engineering practices. Through this magazine, we aim to encourage students to develop technical knowledge, innovative thinking, research interest, and writing skills along with their academic studies.

We sincerely thank our respected Principal **Dr. Archana Keerti Chowdhary**, Head of Department **Dr. Amit Chandak**, faculty members, student contributors, and editorial team for their continuous support and contribution in making this magazine successful. We hope that **MECHAZINE** will continue to inspire students to learn, innovate, and contribute to the field of mechanical engineering and society.

Editors...





THE
EDITORIAL
BOARD

Student Magazine Coordinators

S. No.	Name of Student	Year
1.	Mr. Anirudh Mishra	Final Year
2.	Mr. Goutam Goswami	Third Year
5.	Mr. Gyanendra Tiwari	Second Year
6.	Mr. Shailendra Tiwari	Second Year

Editorial Team

1.	Mr. Kapil Patodi	Assistant Professor
2.	Mr. Pradeep Singh Hada	Assistant Professor

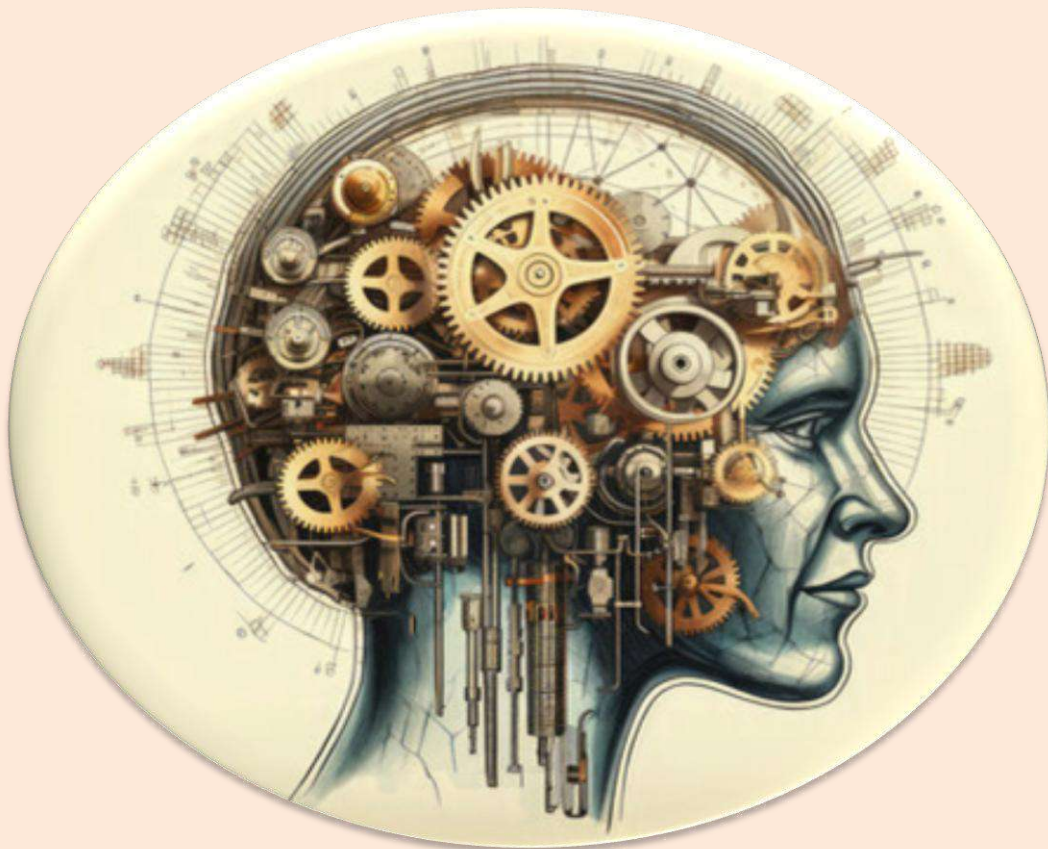


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STUDENTS ARTICLES



GREEN HYDROGEN: THE FUTURE OF SUSTAINABLE ENERGY

— By [Your Name], Second Year,
Department of Mechanical Engineering

Introduction

In an era where sustainability has become a global priority, green hydrogen has emerged as a revolutionary solution for achieving a clean energy future. As the world faces challenges of climate change, fossil fuel depletion, and rising carbon emissions, green hydrogen offers a promising pathway toward energy

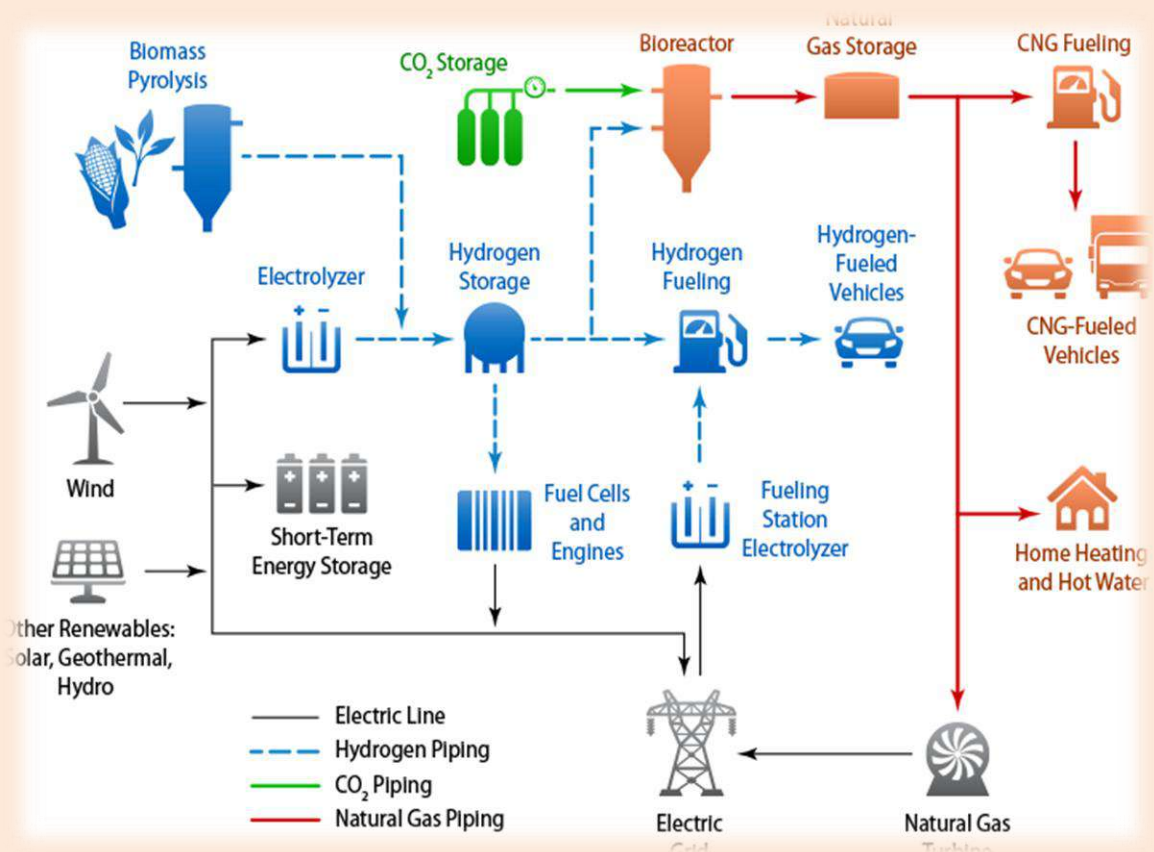
independence and environmental preservation.

What is Green Hydrogen?

Hydrogen is the most abundant element in the universe, but it rarely exists in its pure form on Earth. It must be extracted from compounds like water (H_2O) or natural gas. Green hydrogen is produced through a process called electrolysis, which splits water into hydrogen and oxygen using electricity generated entirely from renewable sources such as solar, wind, or hydro power. This makes green hydrogen a zero-emission fuel — the only byproduct of its use is water vapor.

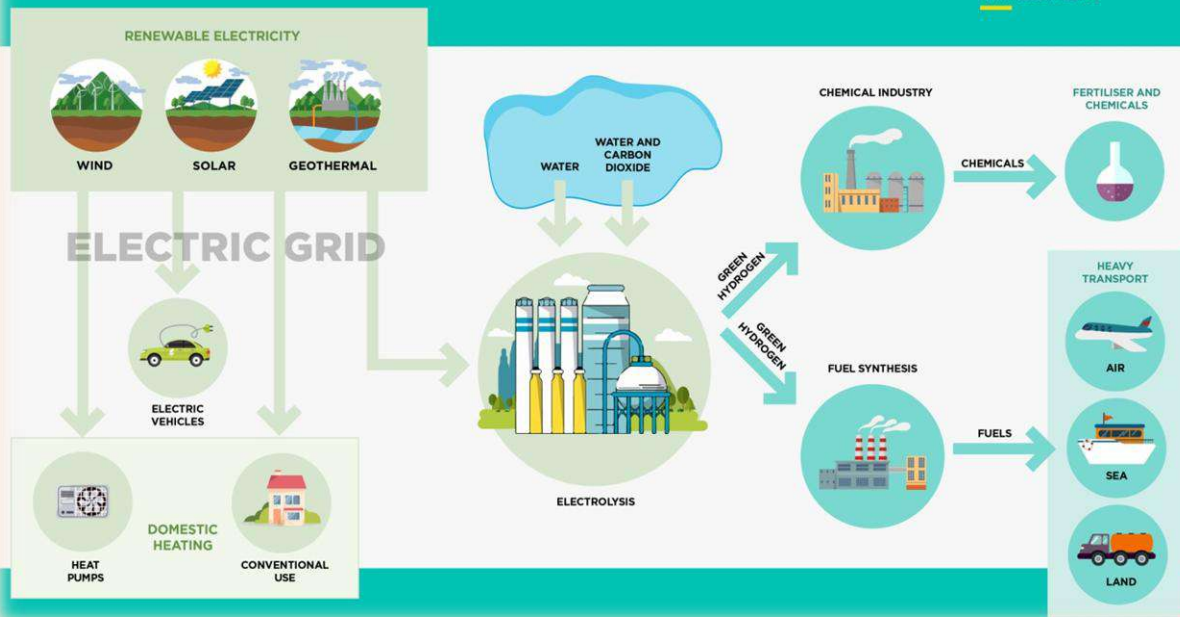
How Green Hydrogen Works

1. Electrolysis: Water is split into hydrogen and oxygen using renewable



GREEN HYDROGEN PRODUCTION

by **CIC energigUNE**
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE



electricity.

2. Storage: The produced hydrogen is stored in tanks or pipelines.

3. Utilization: Hydrogen can be used in fuel cells, industries, or converted into electricity or heat.

Applications of Green Hydrogen

- Transportation: Fuel-cell electric vehicles (FCEVs) powered by hydrogen can travel long distances with zero emissions.
- Industrial Use: Hydrogen can replace coal and natural gas in high-temperature processes like steel and cement manufacturing.
- Energy Storage: It acts as an efficient medium to store excess renewable energy for later use.
- Power Generation: Hydrogen-powered turbines can generate clean electricity when solar or wind output is low.

Advantages

- Zero Carbon Emissions – Produces only water vapor.
- Energy Independence – Reduces reliance on imported fossil fuels.
- Versatility – Can be used across multiple sectors.
- Scalability – Easily integrated into existing infrastructure with technological adaptation.

Challenges Ahead

Despite its promise, large-scale adoption faces hurdles such as high production cost, storage and transport challenges, and the need for efficient electrolyzers. Governments and industries worldwide are investing in research to overcome these barriers and make green hydrogen commercially viable.



[Insert Image: Engineers working in hydrogen production plant or renewable lab]

India's Progress

India has launched the National Green Hydrogen Mission (2023) with the goal of producing 5 million metric tonnes of green hydrogen annually by 2030. Mechanical engineers play a key role in developing the systems — from electrolyzers and compressors to fuel cell technologies — that make this vision possible.

Conclusion

Green hydrogen is not just a fuel — it's a symbol of a cleaner and more sustainable tomorrow. As a mechanical engineering student, I believe that this technology will redefine the global energy landscape and inspire innovation for generations to come. The day is not far when vehicles, industries, and power plants will run on hydrogen — and the air we breathe will be cleaner because of it.

Roshik Vyas (IV Year)

ARTIFICIAL INTELLIGENCE IN MANUFACTURING AND ROBOTICS

AI-powered robots are widely used in modern industries for welding, assembly, painting, inspection, and material

handling. These robots can work continuously with high precision and efficiency. AI is transforming traditional factories into smart factories, also known as Industry 4.0. AI-driven robots improve productivity, reduce human error, and optimize manufacturing processes.

Industrial Robots in Manufacturing

Industrial robots are used in automobile industries, electronics manufacturing, packaging industries, and heavy machinery production. These robots can perform repetitive tasks faster and more accurately than humans. AI allows robots to learn from data and improve their performance over time.

Predictive Maintenance Using AI and Sensors

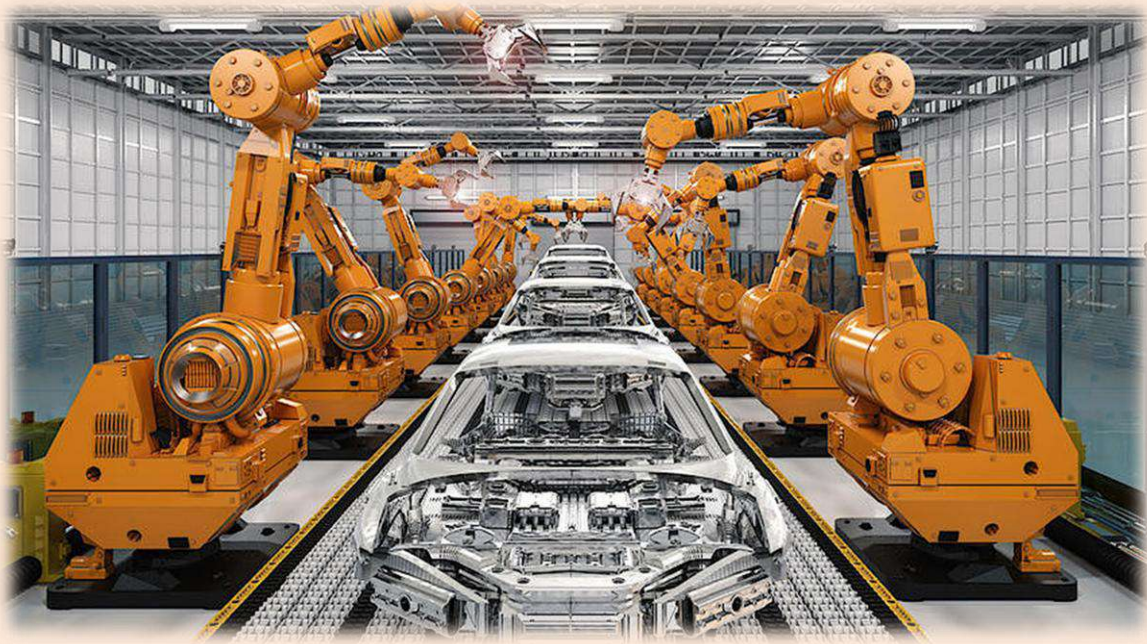
AI is also used for predictive maintenance in industries. Sensors are installed on machines to monitor temperature, vibration, noise, and pressure. AI analyzes this data and predicts machine failures before they occur, reducing downtime and maintenance cost.

Predictive Maintenance Sensors and Smart Systems

Predictive maintenance helps industries:

- Reduce machine breakdowns
- Increase machine life
- Reduce maintenance cost
- Improve safety
- Increase production efficiency





AI systems can monitor machines continuously and alert engineers when maintenance is required.

designing these intelligent systems and advanced manufacturing technologies.

Banti Lodha (III Year)

“The future mechanical engineer will not only design machines but also design intelligent machines.”

Wind Power

Wind is the movement of air from an area of high pressure to an area of low pressure. In fact, wind exists because the sun unevenly heats the surface of the Earth. As hot air rises, cooler air moves in to fill the void. As long as the sun shines, the wind will blow. And wind has long served as a power source to humans.

Ancient mariners used sails to capture the wind. Farmers once used windmills to grind their grains and pump water. Today, more and more wind turbines wring electricity from the breeze. Over the past decade, wind turbine use has increased more than 25 percent per year.

Conclusion

Artificial Intelligence is becoming an important part of mechanical engineering, especially in manufacturing, robotics, automation, and maintenance systems. The combination of mechanical engineering with AI, robotics, IoT, and automation will create smart factories and intelligent machines in the future. Mechanical engineers will play a major role in



Still, it only provides a small fraction of the world's energy.

How it Works

Most wind energy comes from turbines that can be as tall as a 20-story building and have three 200-foot (60-meter)-long blades. The wind spins the blades, which turn a shaft connected to a generator that produces electricity.

The biggest wind turbines generate enough electricity in a year (about 12 megawatt-hours) to supply about 600 U.S. homes. Wind farms have tens and sometimes hundreds of these turbines lined up together in particularly windy spots. Smaller turbines erected in a backyard can produce enough electricity for a single home or small business.

The Booming Wind Energy Industry

Wind is a clean source of renewable energy that produces no air or water pollution. And since the wind is free, operational costs are nearly zero once a turbine is erected. Mass production and technology advances are making turbines cheaper, and many governments offer tax incentives to spur wind-energy development.

Drawbacks include complaints from locals that wind turbines are ugly and noisy. The slowly rotating blades can also kill birds

and bats, but not nearly as many as cars, power lines, and high-rise buildings do. The wind is also variable: If it's not blowing, there's no electricity generated.

Nevertheless, the wind energy industry is booming. Thanks to global efforts to combat climate change, such as the Paris Agreement, renewable energy is seeing a boom in growth, with wind energy leading the way. From 2000 to 2015, cumulative wind capacity around the world increased from 17,000 megawatts to more than 430,000 megawatts. In 2015, China also surpassed the EU in the number of installed wind turbines and continues to lead installation efforts.

Industry experts predict that if this pace of growth continues, by 2050 one third of the world's electricity needs will be fulfilled by wind power.

Nikhil Pal (II Year)

LASERS IN INDUSTRIES

The very first production laser was introduced in 1965. Developed by Western Electric, a major American electrical engineering and manufacturing company responsible for many seminal developments in industrial engineering, it was used to drill holes in diamond dies. Two years later, a German scientist engineered the laser cutting nozzle and



used an oxygen assist-gas to cut 1 mm thick steel sheet with a focused CO₂ laser beam. Fast forward another couple of years, when three researchers at Boeing wrote a paper concluding that, with significant R&D, laser gas-assist could be an effective tool for cutting hard materials such as titanium, Hastelloy, and ceramic. The first commercially available moving optics CO₂ laser cutting system, with a configuration comparable to today's modern equipment, was introduced in 1975. The technology did not stand still. Foresighted industrial entrepreneurs adapted laser technology for engraving and marking, and the 1980s ushered in the development of laser welding as a precise, clean, high speed, and easily automated solder-free alternative to traditional methods of joining. Lasers for industrial processes continue to get more powerful, accurate, and efficient to meet the ever growing quality and financial challenges of precision manufacturing.

Laser technology provides an elevated level of accuracy, consistency, control, and flexibility to manufacturing. As a non-contact process with no heat affected zone, laser increases the engineer's ability to process sensitive and highly engineered materials. Advanced computer controls and positioning systems promote accuracy and consistency from part to part and lot to

lot. Lasers have the ability to cut intricate, complex, shapes, precisely drilled micro holes, and seamless welds with striation free edges and smooth surfaces. A minimal tooling requirement promotes rapid prototype development, simplifies execution of design changes, and allows flexible capacity to handle spikes in demand. The growing complexity of medical devices combined with stringent regulatory validation and traceability requirements compels medical device companies to forge a supply chain of component manufacturers that can unfailingly provide accurate, consistent, repeatable, and timely results.

Laser Cutting

A laser cutter works by focusing the output of a high-power laser on the material to be cut. The intense beam of coherent light heats, melts, or vaporizes the selected area and leaves a clean, burr-free edge with a high-quality surface finish. Precise computer controlled positioning systems enable lasers to create any geometry with pinpoint accuracy and consistent repeatability. Lasers are capable of creating distortion-free cuts in flat or tubular stock of almost any metal, plastic, or composite material, and create a minimal "heat affect zone" that could potentially compromise the microstructure or properties of the base material.



Laser Welding

For applying thermal energy to a very small area, no other method is as efficient as a laser. By delivering a pulse of light focused on a very narrow spot, the surface absorbs the light, vaporizes the material, and allows it to fuse together and form a strong structural bond. Tightly controlled laser beam and motion parameters result in welds that are quite small and have an excellent cosmetic appearance. Laser welding equipment with pulse-shaping capability allows for precision welds and high welding rates. No filler is required, which makes it an ideal method of joining two dissimilar metals without any risk of contamination, and little if any joint preparation is required. Millisecond-long pulses effectively weld thin materials, while continuous laser systems are more suitable when deep welds are required.

Laser Drilling

Laser drilling is the process of repeatedly pulsing focused laser energy at a material, vaporizing it layer by layer until a through-hole is created. Short-pulse lasers are capable of drilling holes with exacting precision in materials such as stainless steel, nickel, titanium, and other alloys, as well as polymer and rubber. In addition to creating holes that are clean and uniform with excellent surface quality, some lasers

offer the advantage of virtually no heat affected zone to maintain material integrity, even on thin walled geometries. Lasers are particularly successful in producing micro holes in polymer tubing, which cannot be electro discharge machined, and where mechanical drilling would leave burrs and debris that would be costly to clear and dangerous to leave behind.

Laser marking

Marking lasers produce durable and biocompatible markings with important specification and traceability data and graphical information. As a non-contact form of engraving that offers high processing speeds and consistent high quality marks, they make it possible to convey important product details without using toxic inks or chemicals. The marks they make are flat, so there is no risk of creating fissures or crevices that could potentially harbor harmful pathogens. Using lasers that meet approved guidelines ensures that medical products are FDA compliant and safe to use.

Anisha Singh (II Year)



Departmental News & Updates

Students Achievements

1) Special Award

S. No.	Name of Student	Date	Achievement (Detail)
1	Md. Noor & Team	20/01/2024	Win Best Debutant team Award

2) Sports




S. No.	Student Name	Organize Place	Name of Events	Awards
1.	Mr. Noor Mohd. & Team	IES-IPSA	Carom	Winner

3) List of Students Who Got First/Second Position (Academics) (UG)

S. No	Name of Student	Branch	Year	Position	Percentage
1	Chiraj Patidar	ME	I	I	8.60
2	Shivam Goyal	ME	I	II	8.30
3	Anisha Singh	ME	II	I	8.64
4	Om Rajput	ME	II	II	8.29
5	Shiv Sen	ME	III	I	9.04
6	Yuvraj Saini	ME	III	II	8.84
7	Anirudh Mishra	ME	IV	I	9.02
8	Roshik Vyas	ME	IV	II	8.92



Placement Details (2019-2023 Batch)

S.No.	Name of the Comany	Student Name	CTC Offered	Image	Company's logo
1	Reliance Industries limited	Utkarsh Shinde	8 LPA		
2	Reliance Industries limited	Nishant Patel	8 LPA		
3	Reliance Industries limited	Somya Jain	8 LPA		
4	L&T	Utkarsh Shinde	6.5 LPA		
5	MU Sigma	Prateek Kapde	30 L for 4 years		
6	MU Sigma	Somya Jain	30 L for 4 years		
7	ACG World Wide	Gaurav Mehra	5.5 LPA		
8	Vedanta Limited	Aryan Soni	14 LPA		
9	Vedanta Limited	Gourav Undhaliya	14 LPA		
10	Vedanta Limited	Siddharth Purohit	14 LPA		
11	Vedanta Limited	Prateek Kapde	14 LPA		
12	Vedanta Limited	Shreyansh Vyas	14 LPA		
13	Vedanta Limited	Amarnath Kunwar	14 LPA		
14	DTDC	Swaroop Mali	4.8 LPA		
15	Chegg	Vedansh Thakur	5 LPA		
16	Chegg	Prakhar Parsai	5 LPA		
17	Chegg	Gaurav Mehra	5 LPA		
18	Praj Industries	Swaroop Mali	4.5 LPA		
19	Techure Ltd.	Swaroop Mali	4.5 LPA		
20	Tata Consulting Engineering	Mohit Kumar	5.5 LPA		
21	Tata Consulting Engineering	Siddharth Purohit	5.5 LPA		
22	Tata Consulting Engineering	Amarnath Kunwar	5.5 LPA		
23	Tata Consulting Engineering	Shreyansh Vyas	5.5 LPA		
24	Techure Ltd	Twinkle Chavhan	4.5 LPA		
25	Techure Ltd	Mr. Ritik Kushwah	4.5 LPA		
26	Ameron Battries	Twinkle Chavhan	4.0 LPA		
27	Motherson Sumi Electric	Sandeep Lovanshi	3.00 LPA		

