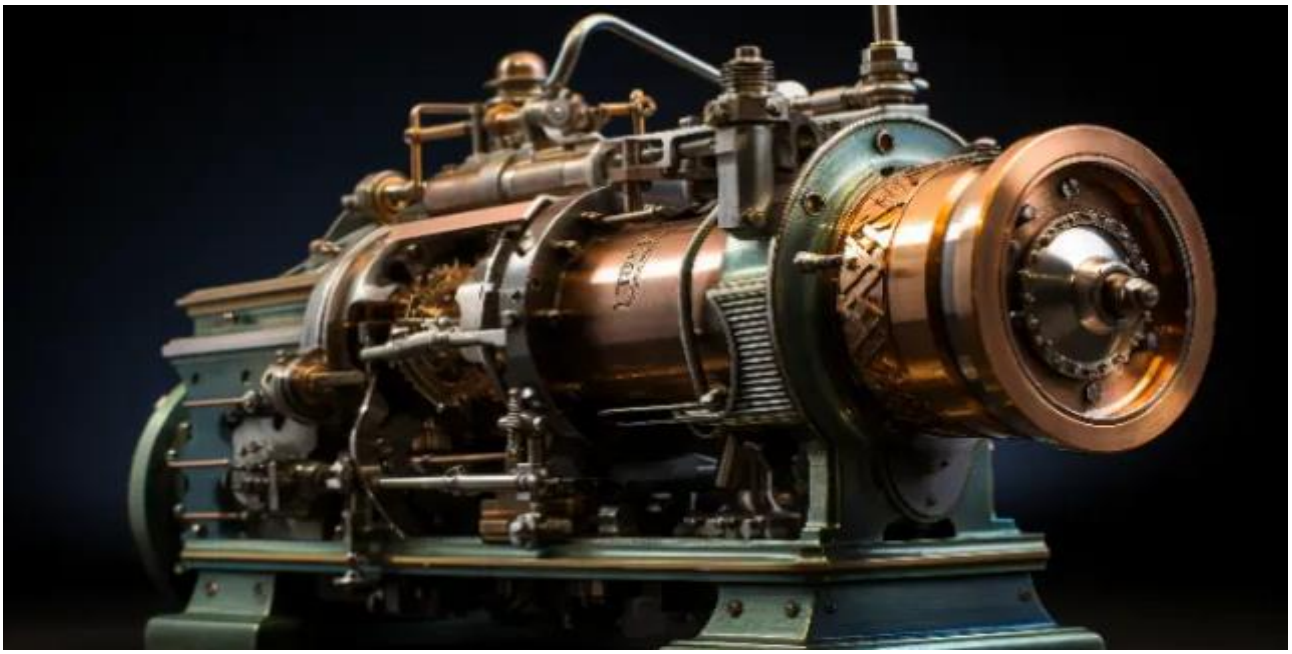
Department of Mechanical Engineering
April-June-2024

# ECHELON INSTITUTE OF TECHNOLOGY

# NEWS LETTER April-June 2024

## DEPARTMENT OF MECHANICAL ENGINEERING



# ECHELON INSTITUTE OF TECHNOLOGY, FARIDABAD
# INSTITUTE VISION AND MISSION

## Vision

The institute is committed to fulfilling its vision of- "Technical and Management leaders engaged in the evolution of life, being at the frontiers of the continuous technological and administrative breakthroughs, inspired by ongoing exploration of self, society, and nature through self-reflective consciousness by building a culture of inspiration, exploration and growth."

## Mission

M-1 Having a culture of inspiration, exploration and invention through effective, experiential teaching-learning giving rise to ever evolving knowledge and wisdom.

M-2 To have self-inspired students ever engaged in continually working upon and sharpening and deepening computational, creative, innovative and leadership consciousness.

M-3 Having students established in self- reflective consciousness, committed to personal, social & human integrity and engaged in deep inquiry and conversation, giving rise to shared, inter-subjective human values and consciousness.

# ECHELON INSTITUTE OF TECHNOLOGY, FARIDABAD

# DEPARTMENT OF MECHANICAL ENGINEERING VISION AND MISSION

## Vision

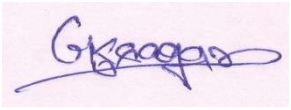
"To create quality mechanical engineering professionals having ethical and moral values, able to solve real life technological problems, possessing capability to adapt the rapid changes occurring in the technology to serve society as technocrats, innovators, academicians & entrepreneurs."

## Mission

i. To ensure sufficient technological exposure to the students in order to Create tech-savvy professionals.
ii. To maintain high quality labs and workshops as per the requirement of current industry scenario.
iii. To impart adequate CAD/CAM exposure to nurture designing skills of the students.
iv. To ensure effective counseling and career guidance facilities to the students to help them achieve their goals.
v. To motivate the students to participate in the national level examinations such as GATE/CAT/Engineering Services etc.
vi. To have well qualified and competent faculty members in the department who are in a position to impart quality technical education.
vii. To encourage faculty & staff members to participate in seminars and workshops for their awareness of state-of-the-art technology.
viii. To encourage the faculty & staff members to pursue higher education and research.

# FROM THE DESK OF EDITIOR IN CHIEF

It gives me immense pleasure to present the latest trends in Mechanical Engineering. The period has been packed with variety of activities in the hectic and tight academic schedule. This edition of the newsletter summarizes the achievements and highlights of the semester. I would like to take this opportunity to present the readers with the glimpses of the week and other activities of the Mechanical Engineering Department. In this quest, I would like to keep you up –to-date with the happenings of the department. And hence, present you with this half yearly newsletter. You can know the details as you go through the newsletter. Every faculty made an effort to avoid the boredom of class room lectures and ample opportunities were provided for personality development of the students and enhancement of their skills as per their choice/ area of interest through hobby clubs and industrial visits. This approach helps maintaining a very healthy and conducive atmosphere of learning, keeping the students in an excited state eager to grasp knowledge at all times. The department is scaling new heights with such positive approach.

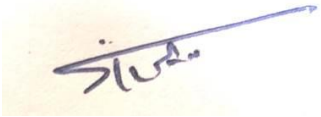


Mr. Gaurav Kumar
Assistant Professor
Department of Mechanical Engineering
EIT Faridabad

# ENDEAVOUR BY HOD

The Aim of our department is to provide quality education. The process of learning is extremely important in life. What you learn, how you learn and where you learn play a crucial role in developing ones intellectual capability, besides career. I am proud to see that the students and faculty of our department have put in appreciable effort into creating this newsletter. This newsletter highlights the academic and non-academic activities of both faculty and students of the Department of Mechanical Engineering.

I congratulate the editorial team for their brilliant and original efforts. I wish all the students and faculty a great academic career



Dr. Sindhu Kumar
HOD Mechanical Engineering
EIT, Faridabad

# ABOUT THE DEPARTMENT

Mechanical Engineering is the application of physical and scientific principles, and its history is intricately linked to advances in understanding of physics and mathematics throughout history. Because Mechanical engineering is a wide ranging profession, including several separate specialized sub-disciplines, its history is linked to knowledge of structures, materials science, Production, Design, Thermal, Welding, Manufacturing, Various Machine operations, and Solid mechanic etc.

The course cover basic sciences, Mathematics, Engineering graphics, computing techniques along with the fundamental Engineering principles of construction materials, Engineering Graphics & Drawing and Laboratory classes interesting of materials help to understand Mechanical Engineering in a practical way. Software packages like AutoCAD, CNC, CATIA, Solid Works, Origin Pro, ANSYS and CAD/CAM allows our students to expand their skills and provide an adequate platform to perform analysis, design and drawing for a wide range of Mechanical Engineering machines and other heavy Design structures or tools etc.

Every semester students will be taken for Industrial Visits to various Automobile, Thermal, Power Plants, Design related companies, Dams and places of interest to impart Practical Knowledge. In addition, the students have to undergo practical Training for 2- 3 weeks in any Design, Manufacturing, Welding, Automobile and Production to gain practical experience and technical skills. The students are also encouraged to give seminars on current areas of research. To acquire high degree of engineering skills and to translate brilliant ideas into a working reality.

# Faculty Development Program (FDP)

**Mr. Gaurav Kumar Sagar** has participated in 5 days Faculty Development program on **Advanced Machining Processes** conducted by Mechanical Engineering Department from **06/05/2024 to 10/05/2024** (One Week) at NITTTR Chandigarh.

Certificate No: ICT-311/24

National Institute of
Technical Teachers Training and Research
Chandigarh

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

Certificate



*This is to certify that*

**GAURAV KUMAR SAGAR**

**ECHELON INSTITUTE OF TECHNOLOGY FARIDABAD, FARIDABAD HARYANA**
**HARYANA**

*Participated in the AICTE Recognized Faculty Development Programme*

**on**

**Advanced Machining Processes**

*Conducted by*

**Mechanical Engineering Department**

**from**

**06/05/2024 to 10/05/2024 (One Week)**

**at**

**NITTTR, Chandigarh**

*Coordinator*

*Director*

# Projects

**1. A Project on Solar Bicycle is prepared by our 4th semester students ( Mr. Jayant, Mr. Purshottam, Md. Asad, Mr. Aman, Mr. Dharmender).**

**Project Name – Solar Bicycle**

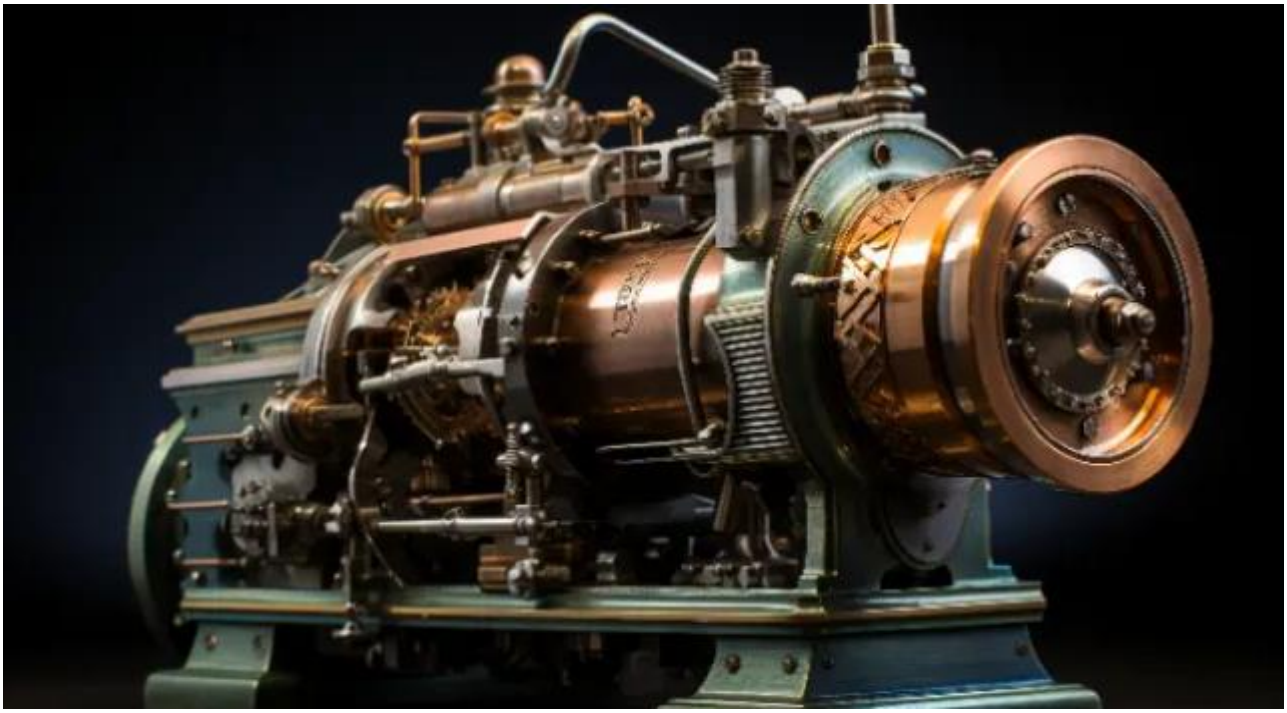
**2. A Project on Electromagnetic Solenoid Engine is prepared by our 6th semester students ( Mr. Aayush, Mr. Prince, Mr. Lakshay, Mr. Jatin, Mr. Abhay).**

**Project Name - Electromagnetic Solenoid Engine**

**3. A Project on Wireless Power Tranfer Equipment is prepared by our 6th semester students ( Mr. Pranjal, Mr. Prajwal, Mr. Lalit, Mr. Nitin, Mr. Rajan).**

**Project Name – Wireless Power Transfer Equipment**

# Government Project on 6-Stroke Engine



## Six Stroke Engine Working Principle and Firing Order

The 6-stroke engine operates on an extended cycle of the traditional 4-stroke engine, incorporating two additional strokes - water injection and steam exhaust.

- Intake Stroke: The first stroke involves drawing an air and fuel mixture into the cylinder.
- Compression Stroke: During the second stroke, the air-fuel mixture is compressed.
- Combustion Stroke: The compressed mixture is then ignited, forcing the piston down.
- Exhaust Stroke: The fourth stroke expels the burnt gases.

- Water Injection Stroke: This is the first additional stroke unique to the 6-stroke engine, where water is injected into the hot cylinder.

- Steam Exhaust Stroke: Finally, the injected water turns into steam due to the residual heat in the cylinder, forcing the piston down again, and the steam is then expelled.

- The firing order of the 6-stroke engine depends on the number of cylinders and the configuration of the engine, much like the 4-stroke engine.

However, with the additional two strokes, each cylinder will complete a cycle in three revolutions of the crankshaft instead of two.

The specific firing order will vary depending on the design and application of the engine.

## Benefits of the 6-Stroke Engine

- Enhanced Efficiency: The added two strokes help extract more work from the same amount of fuel, thereby improving the engine's thermal efficiency.

- Lower Emissions: The water injection stroke significantly reduces the temperature of the combustion chamber, minimizing the formation of nitrogen oxides (NOx), a harmful emission.

- Internal Cooling: The water injection and steam exhaust strokes cool the engine internally, reducing the necessity for an extensive cooling system.

- Better Fuel Economy: The extra power stroke contributes to getting more work done with the same amount of fuel, resulting in improved fuel economy.

## Drawbacks of the 6-Stroke Engine

- Increased Complexity: The inclusion of two more strokes adds to the complexity of the engine design and operation.

- Water Injection System: The requirement of a water injection system increases the engine's weight and cost.

## Practical Applications of the 6-Stroke Engine

- Although the 6-stroke engine is still under development, its potential applications are broad-ranging.

- Automobiles: The 6-stroke engine, with its increased efficiency and lower emissions, could be a valuable option for powering automobiles.

- Power Generation: The superior fuel economy of the 6-stroke engine makes it an appealing choice for power generation applications.

- Marine Applications: The internal cooling feature of the 6-stroke engine makes it suitable for marine applications where cooling water is readily available.

The 6-stroke engine, with its advantages of enhanced efficiency, reduced emissions, and internal cooling, offers a promising alternative to conventional 4-stroke and 2-stroke engines.

# Conclusion

In conclusion, mechanical engineers play a critical role in the development and growth of modern society. They are involved in the design and development of machines, tools, and systems that are essential for many industries.

I believe that Mechanical Engineering is too vital of a field to be dropped from the curriculum due to its importance to the University and to the world. Mechanical Engineering has intertwined throughout the making of our history, and is the backbone of almost everything that we use on a daily basis. Since the days of Archimedes, it has played such a large role in the development of our world, and it's the foundation of so many amazing products and feats in our lives. This computer I am trying on would not be in existence if not for a Mechanical Engineer.

The department here at UK knows this and teaches its pupils how to be great in today's world. Mechanical Engineering courses teach valuable information and applications that can be easily put forth in the real world. Think of a tree, a giant tree with many branches. Think of this tree as the Mechanical Engineering major, and the branches as the other engineering majors. Without this tree, the branches could not survive, the tree is Mechanical Engineering and the branches are the other majors. Without Mechanical Engineering, the other fields would cease to exist, because so much of what they stand for was built through Mechanical Engineering.

I believe that there are not enough Mechanical Engineers in the world to face real problems today, and I believe the major should be expanded to accommodate the larger problems in the world today, instead of completely dropping it to fund a different major.