



MECHANICAL ENGINEERING DEPARTMENT
ASSAM ENGINEERING INSTITUTE
CHANDMARI, GHY-781003

VISION

To be a center of excellence by producing qualified skilled Diploma professionals in the field of Mechanical Engineering who are innovative contributors to the society.

MISSION

- To create an excellent teaching learning environment through value based education as well as the skills and innovation to adopt to change in the global environment.
- To promote industry relevant employable skills, professional competencies through Outcome Based Education (OBE), and practice.
- To instill ethical values and social awareness through constant interaction, motivation and guidance.

MechAEI

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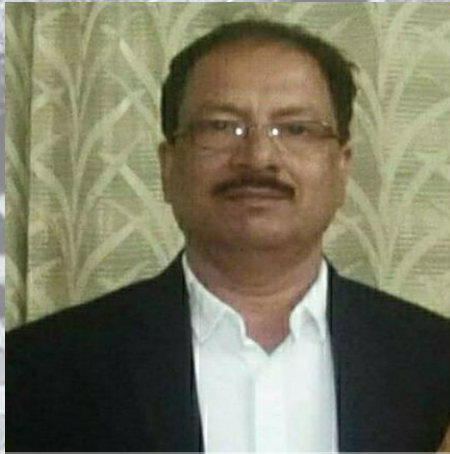
Message from Principal

I am very happy to know that the Mechanical Engineering department is bringing out the News letter named MechAei.

I congratulate the faculty members, Students & other supporting staff for successful completion of the News letter.

I am sure that the news letter will bring out the hidden talent of faculties, students and staff in the field of departmental activities and will also encourage the faculties and students to understand the different activities to be done for continuous improvement of the department.

Dr. Hitesh Tahbildar
Principal



**Message by
Head of the Department**

It gives me great pleasure to write a few words for our departmental magazine MechAei 1st Edition . It is meant for bringing out the potential writing talent as a part of overall personality development of students and faculties. I am sure this magazine will help our students to acquire knowledge and skill, build character and enhance employability to become globally competent .

The all round progress of our students is of paramount importance and our most cherished moto as it will help our students to empower better INDIA through education.

I extend my wishes to all readers of this message and invite you to join hands with us in our noble mission

Mr. Gautam Barman

HOD OF MECHANICAL ENGINEERING DEPARTMENT .



**Message from
Faculty In-charge**

It gives me immense pleasure to present the very first issue of “MechAEI” magazine of the Department of Mechanical Engineering. This is one of the best platforms for our students to present multifaceted personalities and innovative ideas.

I take this opportunity to thank our respected Dr. Hitesh Tahbildar Principal, Mr. Gautam Barman HOD, Mr. Utpal Kalita NBA Coordinator for mechanical engineering and all the faculty members for their inspiration and kind support.

I express my heartfelt gratitude to the editorial committee for their relentless efforts, the young writers for their valuable articles and all those who have been a part of “MechAEI”.

Ms Archana Choudhury

EDITOR'S SPEECH

It is my pleasure to welcome you to the latest edition, the departmental magazine of the Mechanical Engineering department. Our magazine has the prime objective of providing aspiring engineers a wide platform to showcase their technical knowledge and to pen down their thoughts and ideas.

As an editor, I am proud to present to you a collection of articles, research papers, and technical reports that highlight the latest developments in the field of mechanical engineering. Our team of writers and contributors have worked tirelessly to bring you a diverse range of topics that cover everything from Quantum computer and automation to energy conservation and sustainability. We also have articles on the latest research in materials science.

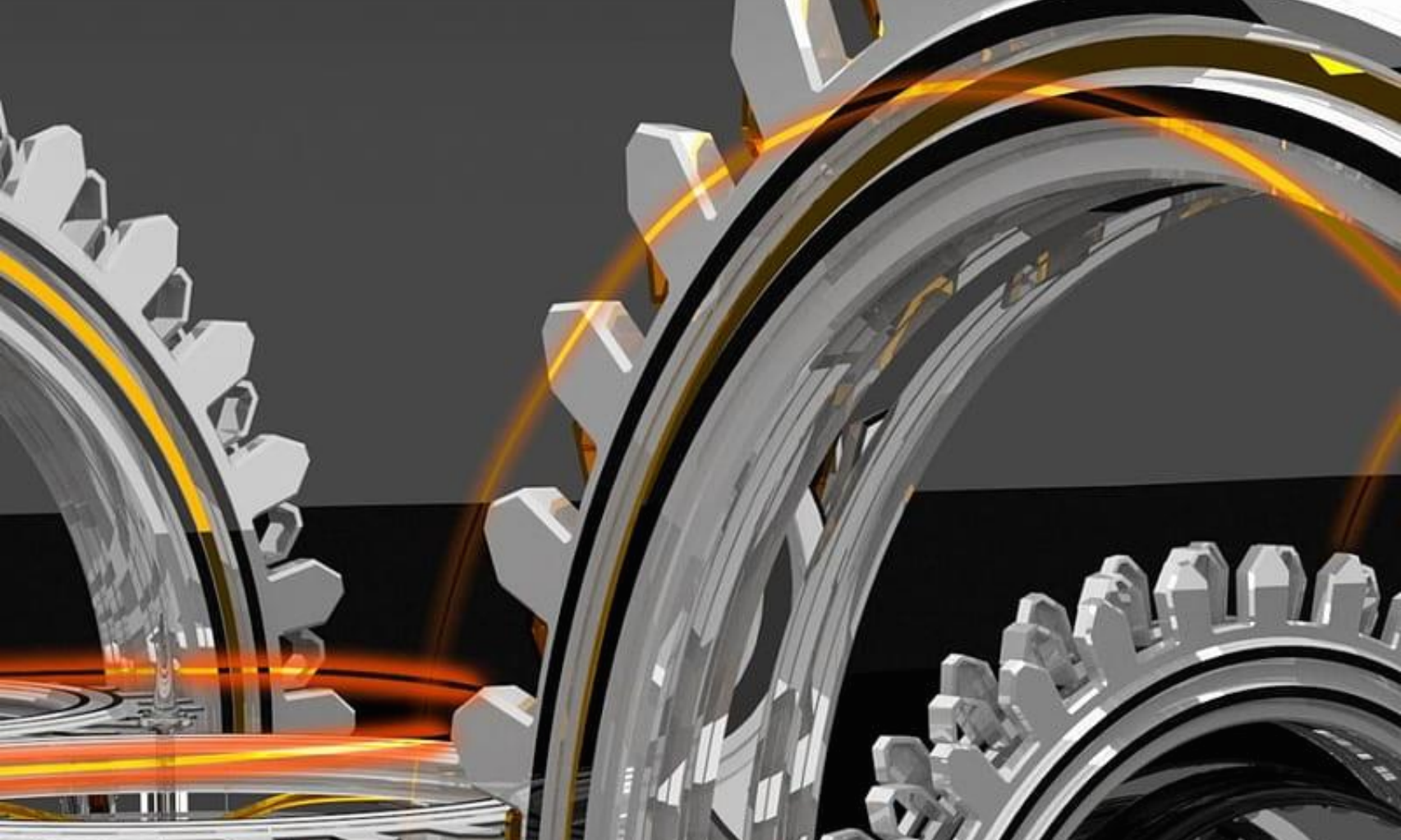
I would like to take this opportunity to thank our editorial board and contributors for their hard work and dedication in bringing this magazine to life. I would also like to thank our readers for their continued support and feedback, which helps us to improve and grow with each edition. I hope you enjoy reading this edition and look forward to your continued support in the future.

Sincerely,

Debajit Deka

5th Semester

Mechanical Engg. Dept.



STUDENTS ARTICLES



HISTORY OF MECHANICAL ENGINEERING

Bedanta Sarma (1st Sem)

Mechanical engineering finds its application in the archives of various ancient and medieval societies throughout mankind. In ancient Greece, the works of Archimedes (287–212 BC) deeply influenced mechanics in the Western tradition and Heron of Alexandria (10–70 AD) created the first steam engine (Aeolipile). In China, Zhang Heng (78–139 AD) improved a water clock and invented a seismometer, and Ma Jun (200–265 AD) invented a chariot with differential gears. The medieval Chinese horologist and engineer Su Song (1020–1101 AD) incorporated an escapement mechanism into his astronomical clock tower two centuries before any escapement can be found in clocks of medieval Europe, as well as the world's first known endless power transmitting chain drive.

Mechatronics

Dishant Kalita (3rd Sem)

Mechatronics is a multidisciplinary field that combines mechanical engineering, electronics, computer science, and control systems. It is an essential foundation for the expected growth in automation and manufacturing. Mechatronics specialists create simpler, smarter systems by uniting the principles of mechanics, electrical, electronics, and computing. Mechatronics engineering is a synergic combination of mechanical engineering, electronic control, and software design in product development. Mechatronics engineers design, develop, and test intelligent systems to make work easier, more efficient, and safer. They create robots for various purposes, from exploring other planets to working in factories.

Advantages of Mechatronics Engineering Technology include enhanced efficiency, innovative designs, and automation of processes to make them more efficient. Mechatronics specialists can do quite a bit across multiple disciplines and have a solid base from which to grow. If you are interested in mechatronics engineering, you should have a knack for creative problem-solving, enjoy technical and engineering activities, and work well as a member of a team. A career in mechatronics engineering may be a great fit for natural-born problem solvers who enjoy tackling new challenges.

In conclusion, mechatronics is an interdisciplinary branch of engineering that focuses on the integration of mechanical, electrical, and electronic engineering systems, and also includes a combination of robotics, electronics, computer science, telecommunications, systems, control, and product engineering. Mechatronics engineering is a rewarding career that offers a wide range of opportunities for those who are interested in the field.

3D PRINTING TECHNOLOGY

Dibyajyoti Das (3rd Sem)

Introduction: 3D printing is a manufacturing process that constructs objects layer by layer using computer-aided design (CAD) models as blueprints. Unlike traditional subtractive manufacturing, where material is removed from a solid block, 3D printing adds material in a controlled manner, allowing for intricate and customized designs.

3D Printing Processes: There are several 3D printing processes, each with unique methodologies. Some prominent ones include:

- Fused Deposition Modeling (FDM): This process involves extruding melted thermoplastic materials layer by layer to build the object.
- Stereo lithography (SLA): SLA uses a UV laser to cure liquid resin layer by layer, solidifying the material.
- Applications: 3D printing has diverse applications across industries, including:
 - Prototyping: Rapid prototyping enables quick iteration of designs.
 - Medical: Custom implants, prosthetics, and anatomical models.
 - Aerospace: Lightweight and complex components..

Advantages:

- Design Flexibility: Complex geometries and intricate designs can be easily realized.
- Customization: Products can be tailored to individual needs, enhancing user experience.
- Rapid Prototyping: Accelerates product development cycles.

Challenges:

- **Material Limitations:** Available materials may not have desired properties.
- **Post-Processing:** Some processes require additional curing or finishing steps.
- **Surface Finish:** Layered nature can result in rough surfaces.
- **Quality Control:** Ensuring consistent quality across prints.
- **Speed:** Production speed is often slower compared to traditional methods.
- **Cost:** Initial investment and material costs can be high.

Future Prospects:

The future of 3D printing holds several exciting possibilities:

- **Advanced Materials:** Development of new materials with enhanced properties.
- **Multi-Material and Multi-Color Printing:** Printing with multiple materials in a single object.
- **Bioprinting:** Printing functional human tissues and organs.
- **On-Demand Manufacturing Networks:** Global networks of localized manufacturing hubs.
- **Space Exploration:** 3D printing for constructing structures on other planets.

Conclusion:

3D printing technology has evolved from a niche process to a transformative force across industries. Its ability to create intricate designs, enable

CLOUD SEEDING

Debajit Deka (5th Sem)

Introduction:

Cloud seeding is the deliberate introduction of various substances into clouds to encourage precipitation. The primary goal is to augment rainfall, snowfall, or other forms of precipitation, with potential applications ranging from water resource management to drought mitigation.

Principles of Cloud Seeding:

Cloud seeding operates on the principles of nucleation and growth. Seeding agents introduced into clouds provide additional particles around which water droplets or ice crystals can condense, leading to the formation of larger precipitation particles. Common seeding agents include silver iodide, potassium iodide, and sodium chloride.

Cloud Seeding Methods:

There are two main methods of cloud seeding:

- **Aircraft Seeding:** Flares containing seeding agents are released from aircraft into target clouds at appropriate altitudes.
- **Ground-Based Seeding:** Seeding agents are released from the ground using various devices like rockets, cannons, or generators.

Applications:

Cloud seeding finds applications in:

- Agriculture: Increasing crop yield through enhanced precipitation.
- Water Resource Management: Supplementing water supply in reservoirs and aquifers.
- Drought Mitigation: Alleviating water shortages during dry periods.

Effectiveness and Challenges:

- Cloud seeding's effectiveness is influenced by:
- Cloud Conditions: Suitable clouds with super cooled water or ice crystals are required.
- Seeding Agents: The choice of seeding agent and its dispersion efficiency..

Conclusion:

Cloud seeding is a technology with potential benefits for various sectors, yet it remains a subject of debate due to its complexities and potential environmental impacts. Continued research and collaboration among meteorologists, scientists, policymakers, and stakeholders are essential to further the understanding of cloud seeding's capabilities, limitations, and ethical considerations.

ROBOTIC PROCESS AUTOMATION

Pranjit Lashkar (5th Sem)

ABSTRACT

Many software automation techniques have been developed in the last decade to cut down cost, improve customer satisfaction and reduce error. Robotic process automation has become increasingly popular recently. RPA offers software robots that can mimic human behavior. Attended robots work in tandem with human and can operate while the human agent is active on the computer.

INTRODUCTION

The robotic process automation does not represent neither physical nor mechanical robot, even if it brings to our mind a vision of some electromechanical machine.

In the term of robotic process automation, robot refers to a software based solution, programmed to carry out procedures, processes or tasks on the repetitive way that are usually done by human.

WHAT IS ROBOTIC PROCESS AUTOMATION ?

As salbt describes in his study, RPA in a technological imitation of a human worker with the goal of automating structured tasks in a fast and cost efficient manner. It represents a

Computer software programmed to execute repetitive labor-intensive tasks.

According to magazine digitalis RPA is defined as ‘application of software and technology with the use of artificial intelligence to carry out repetitive tasks quickly, timelessly and accurately.

Nowadays, many international companies such as Wal-Mart, AT&T Emst and young and American express are using RPA in everyday business. Some example of the typical tasks that are automated using RPA are:

- Sending emails
- Opening applications and
- Copying and posting information from one system to another.

ROBOTIC PROCESS AUTOMATION VS TRADITIONAL PROCESS AUTOMATION

The traditional process automation is mainly considered as an inevitable aspect of business process management, and it is referred to as business process automation.

The primary focus of the traditional automation is on process improvements by streamlining existing processes and removing inefficiencies. Therefore, this approach is based on creating or evolving system and processes to increase efficiency. On the other hand, RPA is focused on enabling virtual workforce to do all the tedious, repetitive tasks. RPA doesn’t optimize the process but aims to make it.

QUANTUM COMPUTER

Abu Talha (5th Sem)

Introduction:

In the realm of modern computing, quantum computers stand as a beacon of innovation, promising to revolutionize industries, solve complex problems, and unlock new frontiers of scientific discovery. Unlike classical computers that rely on binary bits, quantum computers operate on the principles of quantum mechanics, harnessing the unique properties of subatomic particles to perform computations at astonishing speeds.

Quantum Computing:

At the heart of quantum computing lies the strange and counterintuitive principles of quantum mechanics. Classical computers process data in binary, using bits that can be either 0 or 1. Quantum computers, on the other hand, utilize quantum bits or qubits, which can exist in a superposition of states, effectively representing 0, 1, or any combination of both simultaneously. This property allows quantum computers to perform certain calculations exponentially faster than their classical counterparts.

Entanglement, another quantum phenomenon, enables qubits to become interconnected in a way that the state of one qubit instantly influences the state of another, regardless of the distance between them. This property amplifies the processing power of quantum computers and underpins their ability to solve complex problems efficiently.

Applications:

Cryptography and Security:

Quantum computers have the potential to break current encryption methods used to secure sensitive data. However, they can also be used to create more secure encryption methods based on quantum principles, ensuring enhanced data protection.

Optimization and Simulation:

Quantum computers can optimize complex systems and simulate quantum phenomena that are currently impractical for classical computers. This has applications in fields such as materials science, drug discovery, and financial modeling.

Machine Learning:

Quantum computing could greatly accelerate machine learning algorithms, enabling the rapid analysis of vast datasets and enhancing pattern recognition capabilities.

Quantum Supremacy:

The objective of quantum supremacy is to demonstrate that a quantum computer can solve a problem that no classical computer can solve in any reasonable length of time, despite the usefulness of the problem. Achieving this goal demonstrates the power of a quantum computer over a classical computer in complex problem-solving.

In October 2019, Google confirmed that it had achieved quantum supremacy using its fully programmable 54-qubit processor called Sycamore. They solved a sampling problem in 200 seconds which would take a supercomputer nearly 10,000 years to solve. This marked a significant achievement in the development of quantum computing. Since then, many researchers have demonstrated quantum supremacy by solving various sampling problems. The impact of achieving quantum supremacy cannot be overstated. It validates the potential of quantum computing to solve problems beyond the capabilities of classical computers, as first theorized by Richard Feynman in the 1980s

Conclusion:

Quantum computing represents a new frontier in technological advancement, holding the potential to reshape industries, tackle problems previously thought insurmountable, and provide solutions to some of the most pressing challenges of our time. As researchers continue to make strides in qubit stability, error correction, and algorithm development, the path towards practical and powerful quantum computers becomes clearer.

What is Chandrayaan -3 Mission

Nilutpal Das (5th Sem)

As of my last knowledge update in January 2022, Chandrayaan-3 was a proposed lunar exploration mission by the Indian Space Research Organisation (ISRO). The mission was intended to follow the successes of Chandrayaan-1 and Chandrayaan-2, which were India's first and second lunar exploration missions, respectively.

Chandrayaan-1, launched in 2008, was primarily an orbiter mission but also included an impactor probe that was released onto the lunar surface. Chandrayaan-2, launched in 2019, consisted of an orbiter, a lander named Vikram, and a rover named Pragyan. Unfortunately, the Vikram lander lost communication during the descent, and the rover was unable to deploy successfully.

Chandrayaan-3 was expected to be a follow-up mission with the goal of attempting a soft landing on the lunar surface. However, as of my last update, the mission had not been officially approved or scheduled, and details were limited.

To get the most up-to-date information on Chandrayaan-3, I recommend checking the latest announcements from ISRO or other reliable space-related sources. Keep in mind that developments in space missions can occur, and new information may have emerged since my last update in January 2022.

Smart Dustbin

Here we are going to make an evolution changes toward cleanliness. The combination of intelligent waste monitoring and trash compaction technologies, smart dustbins are better and shoulders above traditional garbage dustbin. It is equipped with smart devices like sensor arduino etc. of the dustbin will automatically open when an object comes near to the dustbin and after certain time period it will close the lid.

For social it will help towards health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it . Believe this will bring something changes it terms f cleanliness as well technology . So our next work is full or not . And there will be a display will be added so that user can notify that dustbin is full or not.

Ultrasonic Navigation system for the Blind

Vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight. The 2011 statistics by the WORLD HEALTH ORGANISATION (WHO) estimates that there are 297 million people in world with visual impairment, 43 million of which are blind and 254 million with low vision.

Presently blind people use of stick as a tool for directing them when they move or walk Here we develop a tool which can serve as blind stick more efficient and helpful than the conventional one. This will assist the blind persons during the walk and provide an alarm if any hurdle is detected within the set range .

Solar Powered Spinning Wheel

In our Solar Powered Spinning Wheel project the drive wheel is most essential component . This wheel is constructed with the help of 19mm x 0.9mm PVC conduit pipes. 4 pieces of 40 cm length and 8 pieces of 20 cm length are cut off from the PVC pipes . The wheel is basically constructed with the help of this PVC pipes pieces , 8 Elbow sockets and 2 Union Sockets . Along with this, an Electric Motor, Regulator, Battery and Solar Panel are also connected with the wheel.

The main purpose of this Spinning wheel serves as a medium for collecting threads from the Cocoons of Nuni Silkworms. We have constructed the wheel in such a way that it can also be operated manually . But our reason for designing the Spinning wheel in an electrical and Mechanical from are :-

- Smooth Operation
- Less Time Consuming
- Increase Efficiency
- Non-conventional Power Source

<p>Comparative Study Between Electric Vehicle and Conventional Vehicle</p>	<p>Depletion of fossil fuel and increase of carbon emission has been a major issue, the solution that came up was electric vehicle</p> <p>To know whether the solution is good or not and how far it can replace the current conventional vehicle, a comparative study is very necessary.</p> <p>In our body we will first know about both the type of vehicle. Then we will compare them according to some factors which are range refueling/recharging, pollution ,safety, and the cost of ownership. We will not only compare these two types but also look into one another alternative</p>
<p>Electro- Magnetic Metal separator</p>	<p>Electro-magnetic metal separator is a metal separating device that is based on the principle of electromagnetism. When the current flows through a coil, magnetic field is generated in it. It is formed when a strong magnetic field is produced inside a solenoid to magnetism a piece of a magnetic material like soft iron. Electromagnets are made out of coil wire.</p> <p>This device can be used to pick up or separate small metallic pieces or scraps from any surface. It can be used to separate or clear a field that might be having metallic debris and pieces like nails lying on it. If the field left unclean these small scraps like nail might hurt someone and would result in an injury.</p>
<p>Study about the working of an EGG Incubator</p>	<p>The purpose of this project is to design and develop a system of an egg incubation which is able to incubate various types of egg incubation which is able to incubate various types of eggs. It is named as Smart Egg Incubator System . The system will comprise of temperature and humidity sensors, which will measure the conditions of the incubator and will automatically change to the suitable condition for the purpose. The health of egg is very important for the development of embryo within the egg. Improper control means that the temperature or humidity is too high or too low. In this project, an electric bulb is used as a heater, so as to provide suitable temperature to the egg. By using water and controlling fan, the humidity can be produced inside the incubatorA W1209 thermostat controller is used to display temperature and also control the humidity inside the incubator. To make sure all part of egg are heated evenly we have to change the position of the egg manually.</p>